



Coordination of national environment and
health research programmes

ERA-ENVHEALTH



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Survey on indoor air quality research and policy governance



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**Report from the ERA-ENVHEALTH joint activity on indoor air quality
research and governance within the ERA-ENVHEALTH network**

June 2012



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WP3: Implementation of joint activities

Task 3.2: Cooperation and implementation of coordinated activities

Joint activity on indoor air quality research and governance – Survey results

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EXECUTIVE SUMMARY

Healthy indoor air governance is a quite complex issue, still facing many research (such as for instance pattern of exposure or secondary pollutants) and policy challenges at the national and European levels.

Indoor air quality was also ranked among one of the top topics of interest by the ERA-ENVHEALTH consortium partners further to the project's activity results achieved in the different workpackages.

This survey was developed within task 3.2 of the ERA-ENVHEALTH project. This task is under workpackage 3 meant to provide a framework plan for joint activities to address the prioritised work areas defined in workpackage 2.

ERA-ENVHEALTH partners, both in preparatory work and discussions on selecting topics for joint activities, agreed on 3 main joint activities (see Figure 1) to be developed using project tools and tasks:

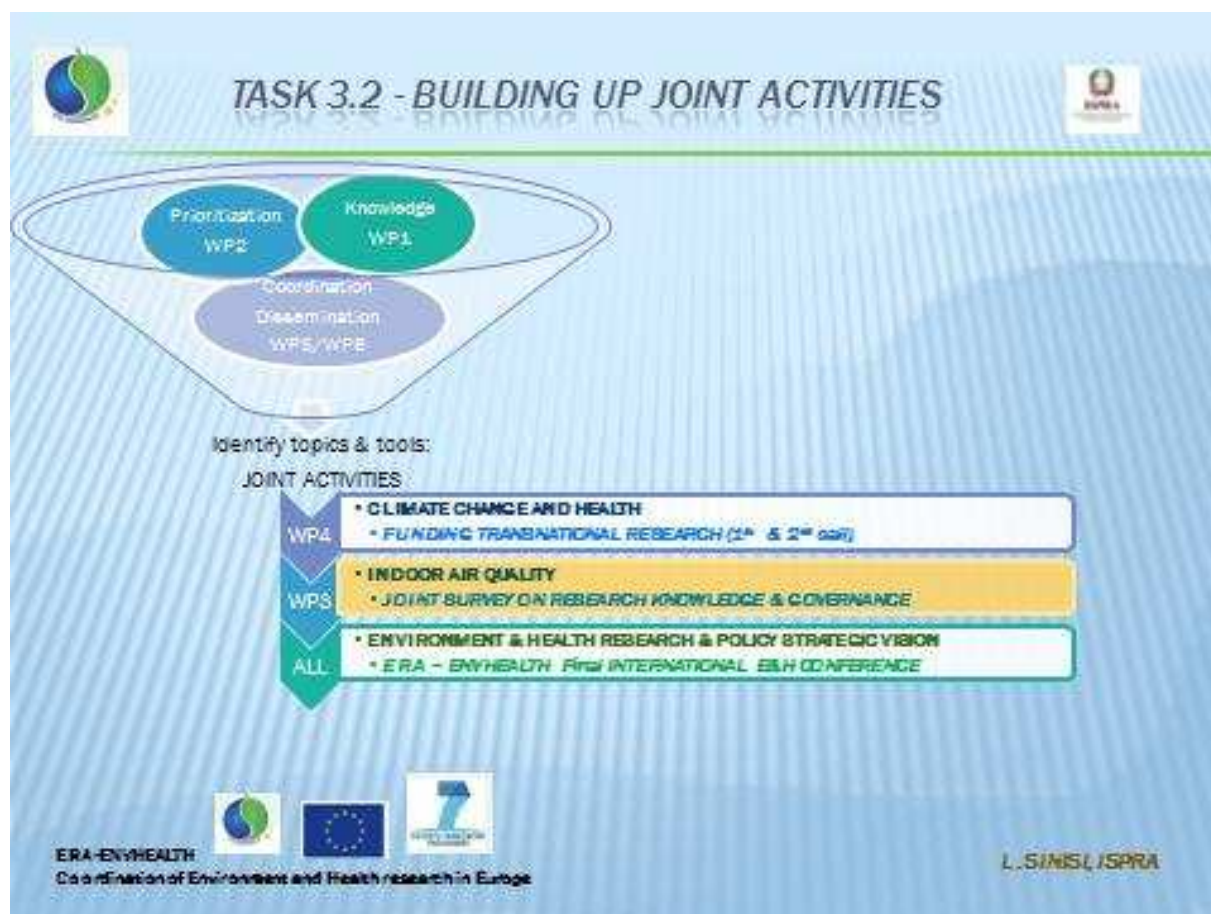
- a) funding transnational calls on the topic of climate change (see WP2 and 4 reports)
- b) launching a pilot activity using the ERA-ENVHEALTH network and tools (consortium and potential new partners, ERA-ENVHEALTH research database, ERA-ENVHEALTH dissemination tools) to test the network's ability to define IAQ research and policy needs (see also task 3.2 and 5.2 reports)
- c) the organisation of the ERA-ENVHEALTH project final conference, open to stakeholders and researchers outside of the consortium on Environment and Health research strategic visions to share experiences and lesson learnt.

The indoor air quality survey was launched using a “contributing and sharing” approach in order to also verify the cooperation potential of the global ERA-ENVHEALTH network including potential new partners enrolled under the framework of task 5.2 and also all institutions that provide information for the ERA-ENVHEALTH research database.

The work programme defined by the leader of task 3.2 was presented, discussed and approved at the ERA-ENVHEALTH General Assembly meeting in September 2011. The survey was launched in the fall in 2011.



Figure 1 Building joint activities



Results were preliminarily presented at the ERA-ENVHEALTH work sessions in Berlin in April 2012 and finally discussed at the ERA-ENVHEALTH final conference held in June 2012 in Paris.

An online questionnaire built on the ISPRASINANET (Italian Environment Information System managed by ISPRASINANET) was created using a user-friendly interface. The questionnaire was also available and disseminated through the ERA-ENVHEALTH website (*section joint activities and join the project*).

The report summarises the methodologies, issues encountered and results of this joint activity including a brief review of existing indoor air quality related policy at the EU level.

The questionnaire consisted of two main sections, one for strictly research-related input and one for governance-related input.

The "Research overview" section includes six basic questions investigating in more detail the research focus on the:

1. Type of indoor environment
2. Sources of indoor air pollution



3. Population groups
4. Chemical and biological pollutants
5. Indoor air quality monitoring techniques/procedures
6. Health impacts

The “Governance overview” section included questions about:

1. Indoor air quality regulation in your country
2. Competent authority for the management of indoor pollution sources
3. Participation in indoor air quality related research projects
4. Allocated funds for indoor air research in (your) institute (yes/no/ % total budget)
5. Integrated research activities (e.g. climate change and indoor air...)

Although dissemination of the questionnaire was European-wide, if we just look at the figures, the survey results aren't satisfactory both from a quantitative and qualitative point of view. The response rate was low compared to the relevance that was highlighted in the discussions on the indoor air topic. We feel that this was due not only to a question of time constraint (the survey was done over a period of a couple of months), neither to a lack of interest for the issue, but mainly to the fact that the indoor air quality issues is very complicated to define *per se* and often it is still not very clear which are the authorities involved and their fields of action.

However, the data also show some interesting information: no regulation exists on indoor air quality in residential homes still these are the indoor environments that received most attention from researchers. Although respiratory and allergic diseases are the health impacts most commonly investigated, ozone and pollens are the “least” monitored pollutants.

In most cases, the question related to competent authorities for local indoor air monitoring were left blank even if some countries, such as France, Italy and Germany, show advanced policy scenarios with a focus also on vulnerable groups or environments (i.e. children, schools).

The data gathered from the questionnaire are scarce and probably not very representative of the actual situation on indoor air research at the European level, it is still true though that any extension of this survey may lead to interesting results on the current indoor air quality scenario.

KEYWORDS

Indoor air quality, environment, health, research, joint activity, network, policy, communication, recruitment strategy, ERA-ENVHEALTH.





1. INTRODUCTION

In the last decade the topic of indoor air quality has received a strong interest from research and policy communities and is ranked among top priorities of European Environment and Health research and policy agenda.

Living environments may be affected by conditions of pollution having a different nature and origin that may prove detrimental to the health of those who spend most of their time there. Exposure to indoor pollution exists potentially on a daily basis and for extended periods of time. Various studies have highlighted not only that indoor concentrations of some pollutants (biological, chemical or physical) are higher than their outdoor concentrations - therefore confirming that there are also "own" indoor sources of pollution-, but also that even at low concentrations they may affect human health, especially for subjects particularly vulnerable such as children and allergic and asthmatic individuals.

Results achieved so far show the health relevance of exposure to indoor hazards as well as the role of many policy areas to prevent indoor sources and unsafe concentration of chemical and biological pollutants. However many policies relevant for Indoor Air Quality (IAQ) can be outside of the traditional direct environment and health domain (such as product labelling and certification of consumer products, construction materials, energy efficiency and building design) requiring proactive tools to enable a coherent approach to prevent health risks.

Our current prevention systems and the regulations that monitor indoor pollution address, for the most part, a few types of indoor environments, such as workplaces, and few risk factors, such as radon, asbestos, electromagnetic fields and noise. Still, the protection of the biological and chemical quality of indoor air lacks a reference system that may be likened to the one provided for outdoor air pollution and this also applies at the community level and in many countries outside the European Union.

Indeed, healthy indoor air governance is a quite complex issue, still facing many research (such as for instance pattern of exposure or secondary pollutants) and policy challenges at the national and EU levels.

All these considerations were taken into account by the ERA-ENVHEALTH Partners both in the preparatory work and discussions on selecting topics for joint activities. Indoor air quality, as well as climate change, was considered among the top priorities both for research and governance needs. After preparatory phase, three main joint activities were defined using the project tools and tasks (see the ERA-ENVHEALTH task 3.2 report on Joint activities): funding transnational calls on the topic of climate change, launching a pilot activity using the ERA-ENVHEALTH network and tools (consortium and potential new partners, ERA-ENVHEALTH research database, ERA-ENVHEALTH dissemination tools) to test the network ability to define IAQ research and policy needs and last, but not least, the organisation of the project final conference open to stakeholders and researchers outside the consortium on E&H research strategic visions to share experiences and lesson learnt.





2. AIM OF THIS REPORT

This report was prepared within workpackage 3 of the ERA-ENVHEALTH project meant to provide a framework plan of joint activities to address the prioritised work areas defined in workpackage 2.

The ultimate aim was to develop multi-national working relationships between nationally-funded research programmes and support wider cooperation in policy oriented research.

Particularly the survey on indoor air quality was also meant as a pilot activity within the ERA-ENVHEALTH network including partners, potential new partners enrolled through the ERA-ENVHEALTH recruitment strategy and all institutions that provide information for the ERA-ENVHEALTH research database.

This report summarises the methodologies, issues encountered and results of this joint activity including a brief review of existing indoor air quality-related policy at the EU level.





3. SURVEY METHODOLOGY

The survey was launched using a “contributing and sharing” approach in order to also verify the cooperation potential of the global ERA-ENVHEALTH network including also potential new partners enrolled under the framework of task 5.2 and also all institutions that provide information for the ERA-ENVHEALTH research database.

The work programme defined by the leader of task 3.2 was presented, discussed and approved at the ERA-ENVHEALTH General Assembly meeting in September 2011. The survey was launched in the fall in 2011.

Results were preliminarily presented at the ERA-ENVHEALTH work sessions in Berlin in April 2012 and finally discussed at the ERA-ENVHEALTH final conference held in June 2012 in Paris. It was decided to use an on line questionnaire built on the ISPRA-SINANET (Italian Environment Information System managed by ISPRA) using a user-friendly interface. The questionnaire was also available and disseminated through the ERA-ENVHEALTH website (*section joint activities and join the project*).

Because the rationale was to carry out a “joint activity”, the contribution of potential new partners was seen as of major importance to promote the active involvement of their institution in the consortium activities and the future ERA-ENVHEALTH network (see also the ERA-ENVHEALTH 2nd Report on potential new partner involvement entitled: Mechanisms for enrolment and involvement of new partners, July 2012).

Potential new partners enrolled in the project - through the recruitment activity done within task 5.2 – who completed the potential new partners questionnaire and stated their interest in consortium activities, were also asked to participate to this survey. The experts listed in Annex 4 of the “April 2010 ERA-ENVHEALTH Report on potential new partners: programmes and organisations” under task 5.2, which mainly belong to countries outside the consortium area, were contacted even if they had not answered the potential new partner questionnaire, as they could be still interested in participating in this survey. Furthermore all the contact persons who have indoor air-related projects listed in the ERA-ENVHEALTH Research Database were contacted and asked to participate in the survey.

The survey was also advertised on the internet through the ERA-ENVHEALTH official website, and through the project web page located on the ISPRA website (<http://www.isprambiente.it/it/progetti/progetto-era-envhealth>)

Aside from the work on the indoor air survey, another basic investigation was carried on the ERA-ENVHEALTH Research Database. All the closed and ongoing projects listed in the database under the indoor air topic were analysed and clustered on the basis of possible matches with the survey questions.

This analysis, as well as the tracking of any updates of major indoor air documents and publications listed at the EU level, was carried to ensure that the survey was built properly, on the basis of a further requirement for knowledge on research and governance needs.





4. REVIEW OF INDOOR AIR-RELATED POLICY IN THE EU

Major technical activities on indoor safety are lead by JRC and DG SANCO through Expert Working Group such as, for instance, the European Collaborative Action (ECA) "Indoor Air Quality & its Impact on Man" or the EU Expert Group Indoor Air Quality. DG Research also provides through its framework programme major research knowledge.

Many of these policy-support research and their achievements are summarised in the recent (2011) EC Report *Promoting actions for healthy indoor air (IAIAQ)* (http://ec.europa.eu/health/healthy_environments/docs/env_iaiaq.pdf) funded by DG SANCO in the framework of the Second Programme of Community Action on Health 2008-2013.

This report has been a major source to update our preliminary work for the indoor air survey and facilitate the overview of current regulations/ policies /guidelines. The latter, in the absence of a single regulation platform for indoor air quality, can be divided into two main categories: those finalised to prevent exposure to indoor hazards (see table 1) and a separate group of indoor air related policies, i.e. EU policy developed in different domains but that have implications or direct impacts on indoor air quality (table 2).

Table 1 Main current EU policies /guidelines to prevent exposure to indoor hazards

	Policy	Description	Year
Ambient environment	Clean Air for Europe Directive (CAFE, Directive) 2008/50/EC	(SO ₂ , NO ₂ , NO _x , PM, Pb, benzene, CO, O ₃)	2008
	2004/107/EC	(As, Cd, Hg, Ni, PAH),	2007
	WHO Air Quality Guidelines, Global Update 2005 (WHO, 2006a)	The WHO air quality guidelines offer guidance on reducing the effects on health of air pollution. This book presents revised guideline values for the four most common air pollutants - particulate matter, ozone, nitrogen dioxide and sulfur dioxide - based on a recent review of the accumulated scientific evidence. The special case of indoor air pollution is explored.	2006
	WHO guidelines for indoor air quality: dampness and mould	A comprehensive overview of the scientific evidence on the health problems associated with this ubiquitous pollution and provides WHO guidelines to protect public health. It also describes the conditions that determine the presence of mould and provides measures to control its growth indoors.	2009
	WHO guidelines for indoor air quality: selected pollutants	Guidelines for the protection of public health from a number of chemicals commonly present in indoor air. The substances considered – benzene, carbon monoxide, formaldehyde, naphthalene, nitrogen dioxide, polycyclic aromatic hydrocarbons (especially benzo[a]pyrene), radon, trichloroethylene and tetrachloroethylene have indoor sources, are known for their hazardousness to health and are often found indoors in concentrations of	2010





		concern to health. For each substance, the chapter covers a general description, the sources and pathways of exposure, the indoor–outdoor relationship, kinetics and metabolism, the health effects, a health risk evaluation, the guidelines, a summary box and references.	
	Radon levels are regulated by Directive 90/143/Euratom	Recommendation on the protection of the public against indoor exposure to radon	1990
	96/29/Euratom (EU Basic safety standard for radiation protection)	Laying down <i>basic safety standards</i> for the <i>protection</i> of the health of workers and the general public against the dangers arising from ionising <i>radiation</i>	1996
Building emission	REACH 2006/121/EC	<i>from building materials</i>	2006
	Construction product directive 89/106/EEC		1989
	Classification of indoor climate produced by FiSIAQ		
	WHO guidelines for indoor air quality: dampness and mould 2009	<i>water system</i>	2009
	90/396/CE; 92/42/EEC; 92/42/EEC COM 2004/8/EC COM 2005/32/EC	<i>fixed hose equipment/appliance</i> Indoor fuel burning Central heating boilers Environmental and economical benefit Eco-design requirements	1990 1992 2004 2005
Ventilation	EN 13779	European standard for ventilation and room conditioner	2007
	EN 152151	Parameter related to energy performance of buildings	2007
	CEN CR 1752	Design criteria for ventilation	1996
	VDI (6022 blat 1 (2006) 2 (2007)) RHEVA (2007) ASHARE (2007)	Professional standard guidelines which are applied beyond national borders	2006/7 2007 2007
Consumer products	REACH directive; GPSD (2001/95/EC)	Furnishing, interior surface materials and electrical appliances	2001
	Directive 2004/42/CE 2002/95/CE ;2005/32/EC	<i>safety of products</i> Covers paints and varnishes Covers electrical appliances	2004 2002/05 2005
	REACH a GPSD /2001/95/CE	Cleaning and other products	2006 2001
Occupants behaviour	VDI 6022 (2006-7) and ASHARE 62,2 (2007) ISIAQ (1966);	Maintain ventilation	2007
	EN 15239:2007	European standard	2007
	EN 1524:2007	For energy inspection of building	2007
	EPBD (2002/91/EC) (Smoking ban)	For conditioning system; smoking (cooking, hobbies, pets)	2002

This exercise was important for the development of the questionnaire to understand the availability of research and policy information at the national level.





Table 2 EU policy with IAQ-relevant implications

Regulations	Description	Year
Regulation (EC) n°1907/2006 concerning Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)	The purpose of REACH regulation is to protect human health and environment. It states that it is manufacturers', importers' and downstream users' responsibility to ensure that substances in use do not adversely affect human health or environment	2006
General Product Safety Directive (GPSD), 2001/95/EC	This directive covers all consumer products. Special attention is given to products that are used by children and elderly. The directive requires that products that are available in the market are safe. This includes both composition and packaging	2001
Recast of Council Directive 92/75/EEC on the indication by labeling and standard product information of the consumption of energy and other resources by household appliances	This directive is referred to as the "Energy Labelling Directive" or "ELD". The aim of this recast is to extend its scope, currently restricted to household appliances, to allow for the labelling of all energy-related products including the household, commercial and industrial sectors and some non-energy using products such as windows which have a significant potential to save energy once in use or installed	1992
Construction Products Directive (CPD), 89/106/EEC	This directive covers very broadly the finished building, as well as its components and equipment and the construction materials. It also concerns their impacts on IAQ, thermal comfort and indoor noise and health, respectively.	1989
General Product Safety Directive (GPSD), 2001/95/EC	This directive covers all consumer products. A special attention is given to products that are used by children and elderly. The directive requires that products, that are available in market, are safe. This includes also composition and package. Product's interaction with other products, that it is likely to be used with, should be safe.	2001
Energy Performance of Buildings Directive (EPBD), 2002/91/EC	From its 1st article "The objective of this Directive is to promote the improvement of the energy performance of buildings within the Community, taking into account outdoor climatic and local conditions, as well as indoor climate requirements and cost effectiveness	2002
EC Green paper on tobacco smoke, COM (2007)27, based on WHO FCTC, 2005 FCTC	It is the first treaty negotiated under the auspices of WHO. It reaffirms the right of all people to the highest standard of health, represents a paradigm shift in developing a regulatory strategy to address addictive substances and was developed in response to the globalisation of the tobacco epidemic. <i>Since 2004, starting from Ireland and soon followed by Italy, both outright public smoking bans and less comprehensive restrictions have been rapidly expanded and implemented across the European countries</i>	2007
EU's climate and energy package	<p>This package includes a broad range of EU legislation, programmes, R&D support, etc. most having indirect and many also direct implications for buildings (see http://ec.europa.eu/energy/index_en.htm & http://ec.europa.eu/climateaction/)</p> <p>Consequently, the most energy efficient buildings, and the most energy efficient urban structures, are not necessarily compatible with each other.</p> <p>The impacts of the EUs climate and energy package are too broad for IAQ policy assessment alone, because they involve the whole urban structure, and therefore this issue is not covered further in the current report. Yet, it is fundamentally important to keep in mind the interlinks between energy, climate and IAQ policies when making any final decisions on any of these policies independently</p>	





5. THE SURVEY QUESTIONNAIRE

5.1 Content and responses

The questionnaire consisted of two main sections, one for strictly research-related input and one for governance-related input.

The “Research overview” section includes six basic questions investigating in more detail the research focus on the:

1. Type of indoor environment
2. Sources of indoor air pollution
3. Population groups
4. Chemical and biological pollutants
5. Indoor air quality monitoring techniques/procedures
6. Health impacts

The “Governance overview” section includes five questions:

1. Indoor air quality regulation in your country
2. Competent authority for the management of indoor air pollution sources
3. Participation in indoor air-related research projects
4. Allocated funds for indoor air-related research in (your) Institute (yes/no/ % total budget)
5. Integrated research activities (e.g. climate change and indoor...)

The questionnaire was built using multiple-choice answers and open text-boxes for input on work references or research results. Since most of the questions were labelled as “required” to move forward in completing the survey, a “other” option was provided for cases when no answers were not available.

During the progress of the task, in order to involve as many partners as possible, the choice of filling in only an “interesting” part of the questionnaire was also given.

Table 3 summarises the total replies while table 4 lists the institutions that answered the questionnaire and therefore contributed to the results of our survey. Depending on the type of organisation, the responses concern, either the research conducted by the organisation or funded by the organisation.

Table 3 Number of replies to the questionnaire

Indoor air research and regulation survey	N°
Total n° of indoor air questionnaires completed	18
N° of questionnaires completed by ERA-ENVHEALTH partners	8
N° of questionnaires completed by potential new partners or others	10





Table 4 List of contributing institutions

Country	Institution/Organisation
Belgium	VITO – Flemish Institute for Technological Research
Belgium	HVS - Hainaut Vigilance Sanitaire
France	ANSES - French agency for food, environmental and occupational health & safety
France	CURAPP-CNRS - Centre national de la recherche scientifique
France	LNE - National testing and metrology laboratory
France	MEDDE- Ministry of Ecology, Sustainable Development and Energy
Germany	Kooperationsstelle Hamburg IFE GmbH
Germany	UBA - Federal Environment Agency
Italy	ISPRA - National Institute for Environmental research and protection
Italy	ISS - National Health Institute
Netherlands	RIVM - National Institute for Public Health and the Environment
Norway	NIPH - Norwegian Institute of Public Health
Poland	NIOM - Nofer Institute of Occupational Medicine
Portugal	INSA - National Health Institute
Slovak Republic	UVZSR -Public Health Authority of the Slovak Republic
Sweden	Swedish EPA – Swedish Environmental Protection Agency
United Kingdom	MMU - Manchester Metropolitan University





5.2 Survey results

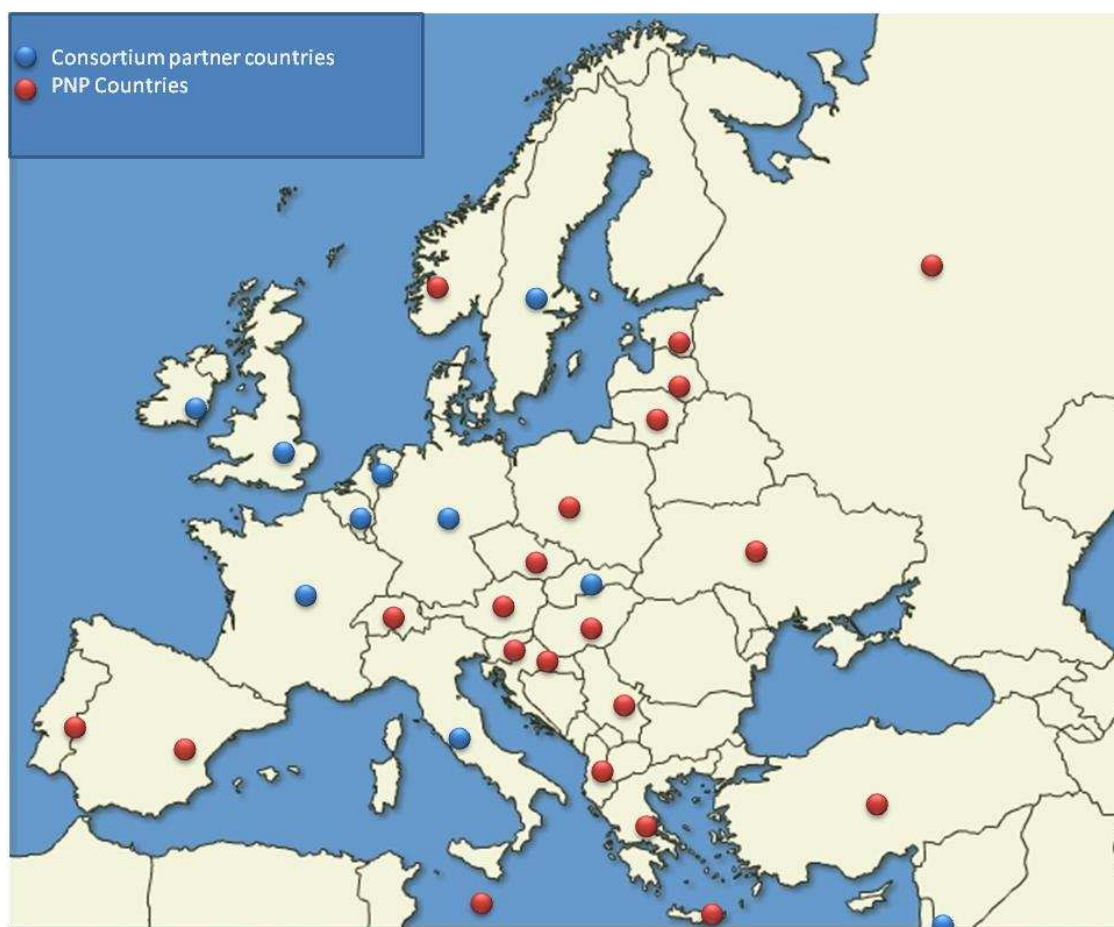
5.2.1 Mapping the survey results

As show in the following maps the survey was disseminated within several countries, within and outside of the EU and the consortium partner countries.

The blue dots show the partner countries of the ERA-ENVHEALTH consortium, while the red dots show the countries outside the consortium and sometimes outside of the EU, interviewed through the survey, included in the ERA-ENVHEALTH network as potential new partners (PNP).

Almost the entire pan European region has been covered by the survey, and the institutions involved were asked to spread the survey to fellow institutions that could be interested in participating.

Figure 2 Countries interviewed as potential new partners and ERA-ENVHEALTH consortium countries





After a first period of “dissemination” of the survey, answers from the participating experts and institutions were gathered and filed for the next step of the analysis.

Figure 3 shows a map representation of the countries/institutions actually participating in the survey as listed. The map shows with blue dots partner countries and with red and green dots potential new partner (PNP) countries outside the consortium or potential new partner institutions within the consortium’s geographical area.

It is clear that few countries outside the consortium answered and participated in the survey, while other institutions within the consortium countries were more interested.

Figure 3 Countries participating in the indoor air survey





5.3 Analysis of data on indoor air research scenario

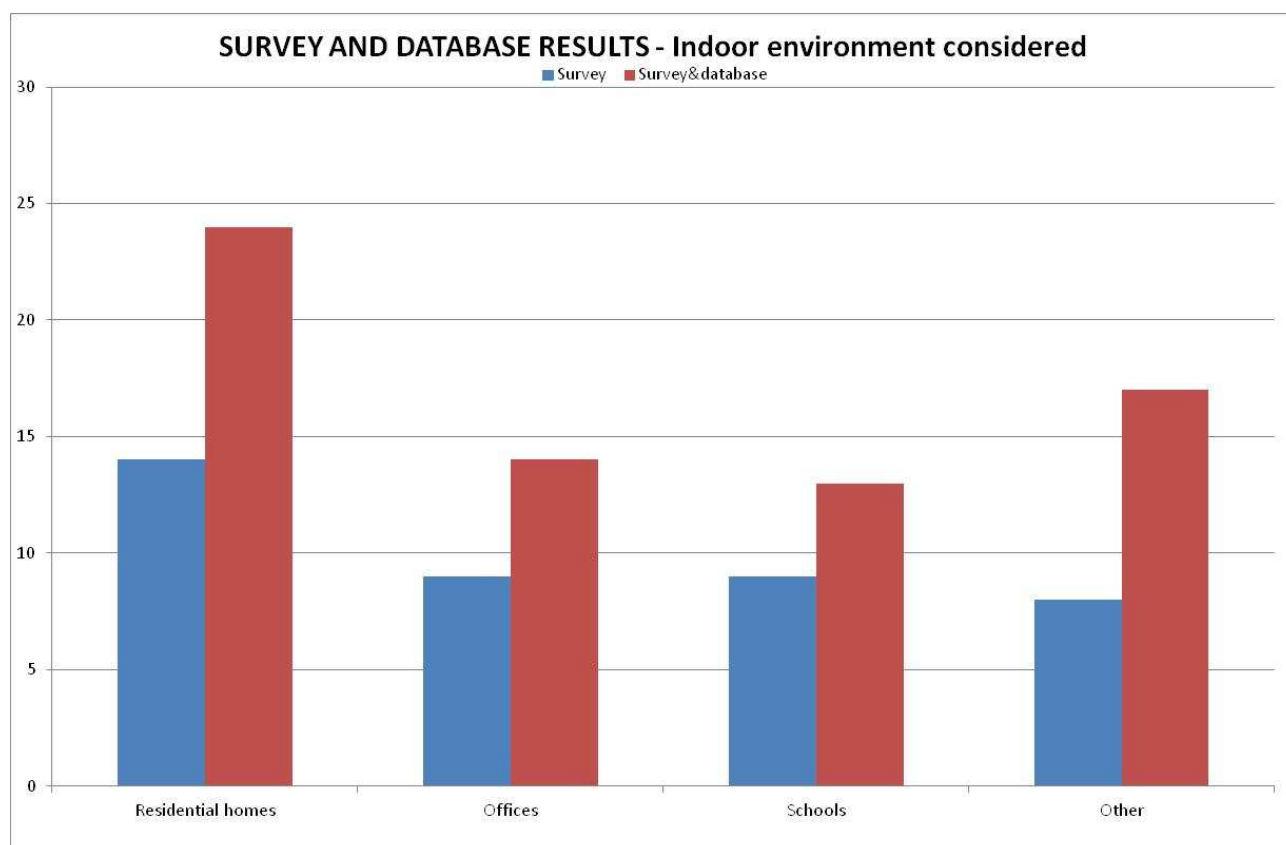
Data gathered from the questionnaire are limited and probably not very representative of the actual situation on indoor air research at European level, it is still true though that any extension of this survey could lead to interesting results on the current indoor air scenario.

Data from the ERA-ENVHEALTH research database were also analysed and merged with the data of the survey to increase the range of information collected. They sometimes made a difference in the overall results.

5.3.1 Type of indoor environment

The most studied indoor environment, based on the answers received, are residential homes, with 78% of answers, while other studied environment are occupational, such as offices, and schools. A few studies also investigate other microenvironments such as kindergartens, nurseries, and elderly care centres.

Figure 4 Indoor environment considered – Results from the survey and database analysis

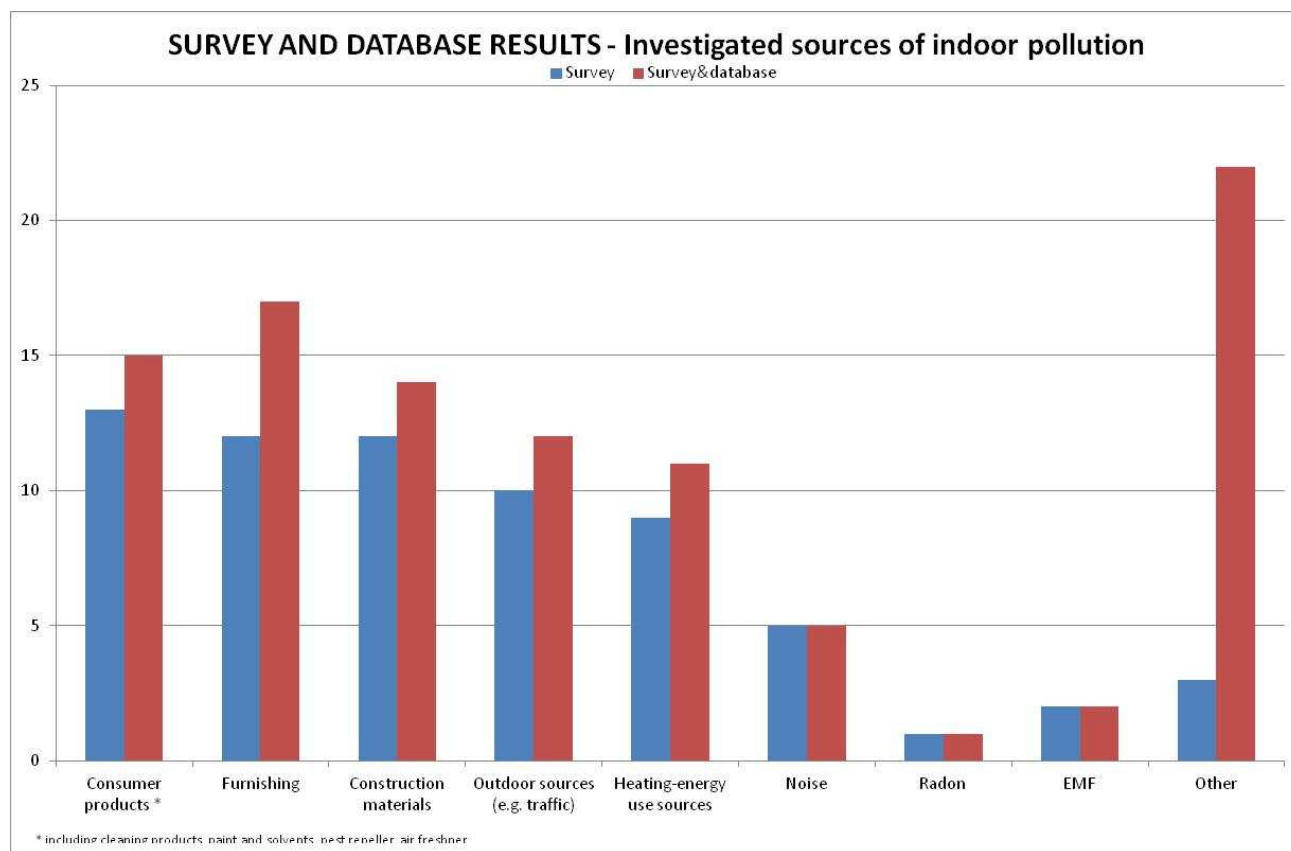




5.3.2 Sources of indoor air pollution

The sources of pollution for indoor environments most often investigated are consumer products, furnishings and construction materials, with a slight difference in prevalence if considering or not data from the ERA-ENVHEALTH research database. Outdoor sources and heating-energy use sources appear to be less investigated. Noise, radon and electromagnetic fields are at bottom of the table with very few answers. Ventilation systems and air conditioning systems were mentioned a couple of times.

Figure 5 Sources of indoor air pollution investigated – Results from the survey and database analysis

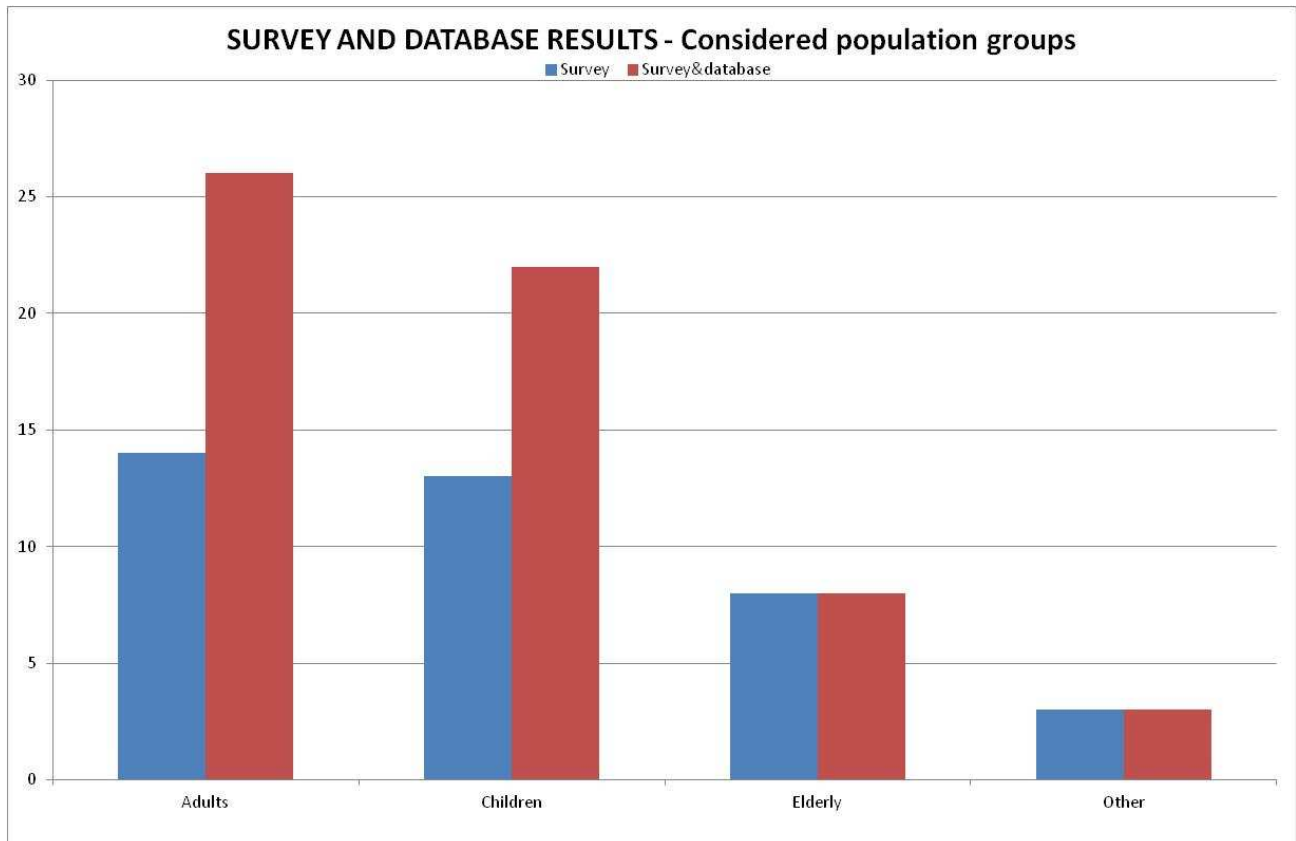




5.3.3 Population groups

In both cases (with or without the ERA-ENVHEALTH research database data) adults are the first population group considered followed closely by children. Elderly people are rarely considered.

Figure 6 Population group considered – Results from the survey and database analysis



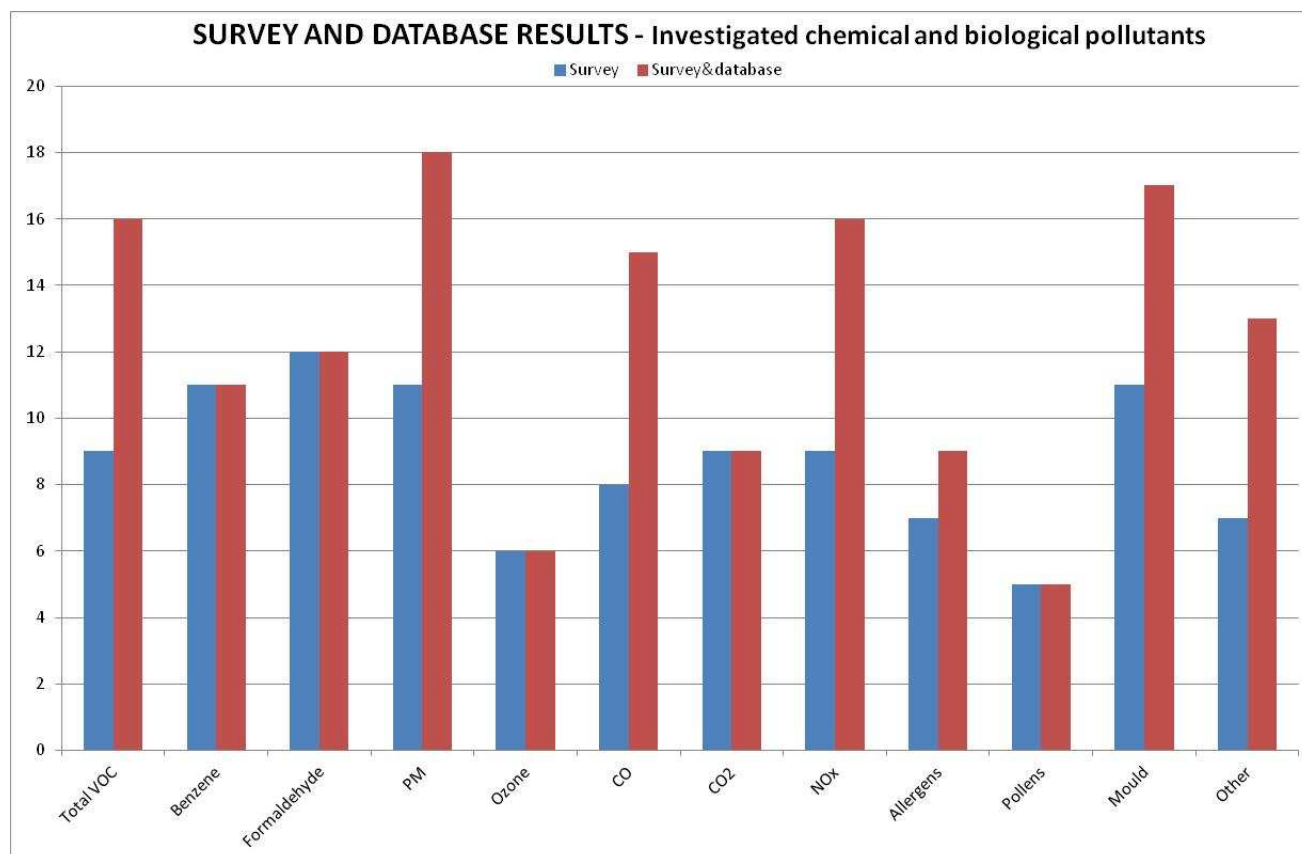


5.3.4 Chemical and biological pollutants

The pollutants investigated in indoor air research show different figures if considering or not data from the ERA-ENVHEALTH research database. In the first case the most investigated are (in the order): particular matter (PM), moulds, total VOC and NOx followed closely by CO and by formaldehyde and benzene. In the second case, formaldehyde, benzene, PM and moulds are the most often investigated.

For the less investigated pollutants, pollens and ozone show similar pattern in both cases.

Figure 7 Chemical and biological pollutants investigated – Results from the survey and database analysis



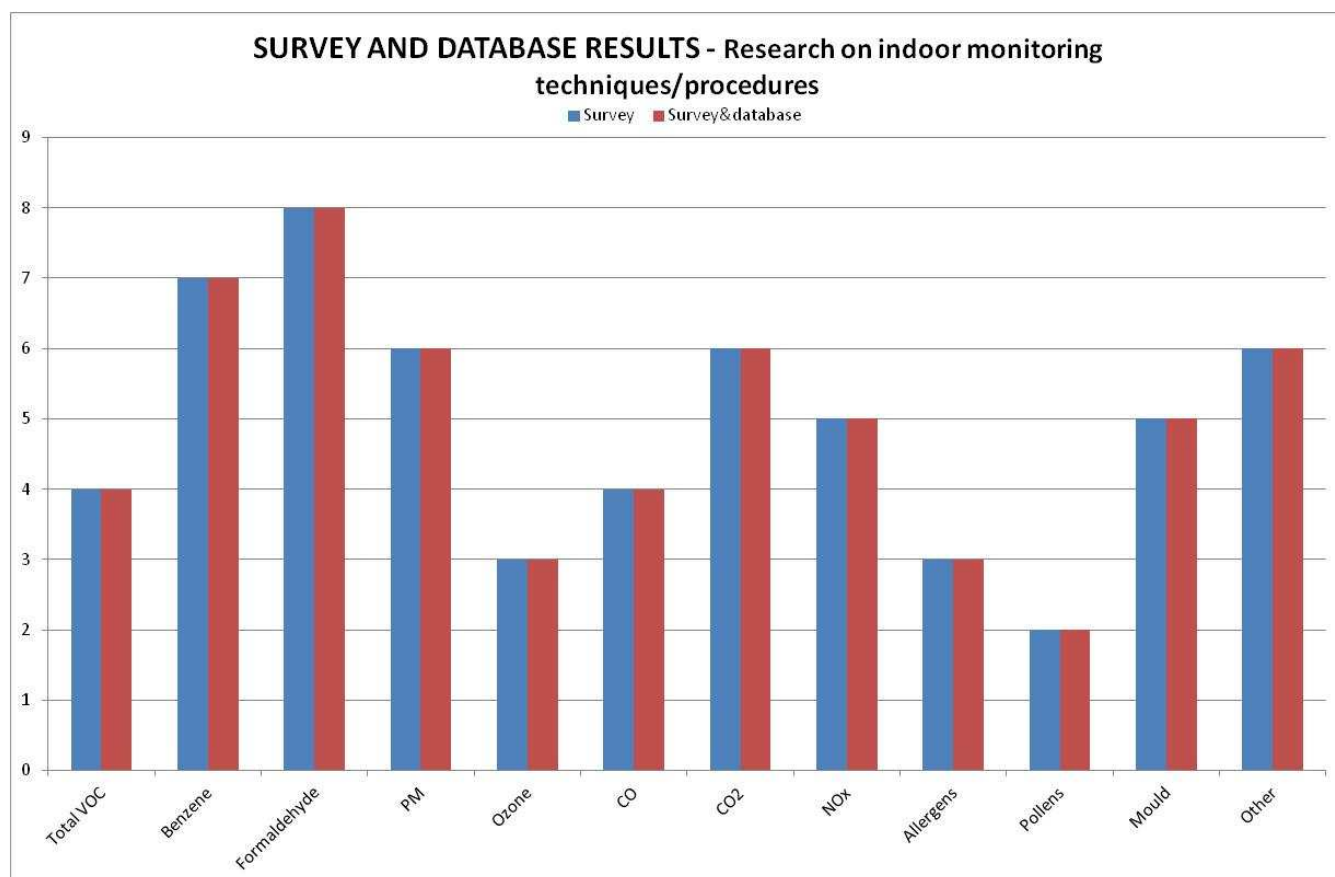


5.3.5 Indoor monitoring techniques/procedures

Data from the survey about research on monitoring techniques or procedures are scarce, but they do suggest that there is more interest in techniques related to the monitoring of formaldehyde and benzene in indoor environments than for other pollutants.

Again in this case, ozone and pollens are the less considered pollutants.

Figure 8 Research on indoor monitoring techniques/procedures – Results from the survey and database analysis

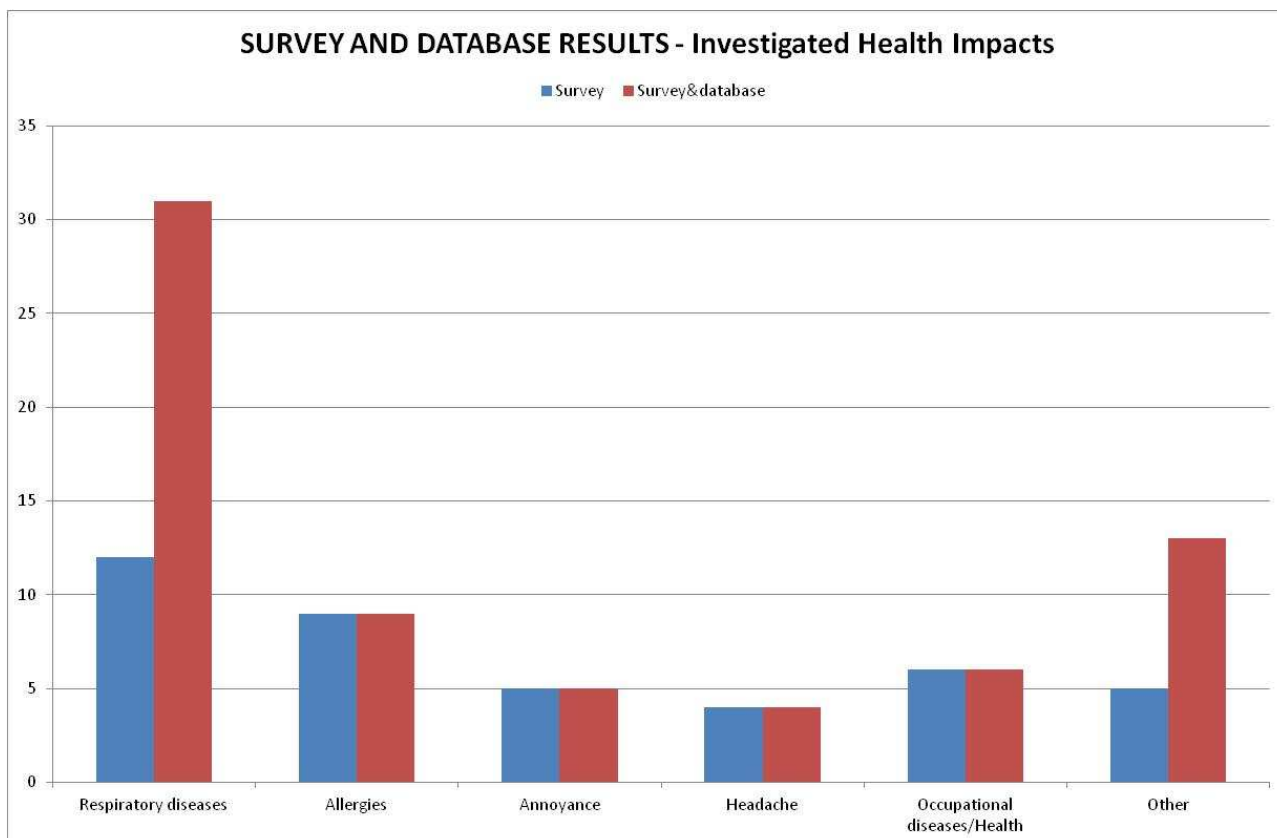




5.3.6 Health impacts

The most investigated health impacts are mainly related to respiratory diseases and allergies in both cases. Only very few showed interest in annoyance and headache. Other impacts were mentioned sporadically, such as hypertension, cardiovascular diseases, sleep disturbances, cancer and nonspecific physical symptoms.

Figure 9 Health impacts investigated – Results from the survey and database analysis





5.4 Analysis of data on indoor air quality governance

5.4.1 Analysis of the data on indoor air quality governance at the national level within the ERA-ENVHEALTH network

Section 2 of the indoor air survey questionnaire focused on indoor air quality governance, basically asking experts about national policy concerning IAQ in their countries and which environmental governance fields relevant for IAQ have known national authorities.

Another group of questions in this section was about the institutional activities on IAQ, such as the presence of funding for IAQ research, competent authorities for monitoring and control, participation in European, international or national projects, presence of integrated activities where IAQ is concerned but not the only subject (e.g. climate change and indoor air).

From the analysis of the answers received it appears that the questions on indoor air quality governance did not have a clear consensus also from the qualitative point of view. We assume the problem is in the intricate nature of the matter where often it is still not very clear and defined which are the authorities involved and their fields of action. However some EU Countries, such as France, Italy and Germany show advanced policy scenarios focusing also on vulnerable groups or environments (i.e. children, schools) .

The survey results are summarised in the next tables. it must be noted that smoking ban laws were excluded.

Table 8 National guidance on IAQ (ERA-ENVHEALTH survey)

National guidance on IAQ		
Country	Guidelines	Year
Norway	The Norwegian Institute of Public Health (NIPH) published «Recommended Guidelines for Indoor Air Quality» in 1998. Revision of this document has been published in 2012	1998 revision 2012
Swedish	Guidelines for some substances and ventilation	-
Italy	27/09/2001 Agreement between the Minister of Health, the regions and autonomous provinces on the document: Guidelines for the protection and promotion of health in confined spaces (<i>Linee-guida per la tutela e la promozione della salute negli ambienti confinati</i>). Published on Gazz. Uff. 27 November 2001, n. 276, S.O. Schools guidelines for the prevention of allergies and asthma from indoor risk factors (<i>Linee di indirizzo per la prevenzione nelle scuole dei fattori di rischio indoor per allergie ed asma</i>) becoming a Regional State Agreement on 18 November 2010 (G U del 13 January 2011, n. 9 S.G.).	2001 2010
France	The OQAI (CSTB) Quality Observatory of Indoor Air was commissioned by the Public Authorities to better understand the issue of indoor air pollution, its origins and its danger. The OQAI was launched July 10, 2001, following an agreement signed between the Ministries of Housing, Health, Environment and ADEME and CSTB (Centre Scientifique et Technique du Bâtiment). Recognised as a flagship of the National Environmental Health Plan	2010





	(NEHAP), the Quality Observatory of Indoor Air, launched by Public Authorities, working closely with ANSES and is represented on the National Council for Air. Two guides for the management of indoor air quality have been published by the Ministry of Health in 2010: A guide for the management of indoor air quality in public buildings, and a guide for diagnosis and treatment of collective unexplained syndromes, designed for state agencies in charge of managing these events.	
Germany	Guidelines for Indoor Air Hygiene in School Buildings. Produced by the German Federal Environment Agency's Indoor Air Hygiene Commission Berlin, August 2008. The recommendations made here aim to help to avoid mistakes – from an indoor air quality perspective – in modernising school buildings, and to provide hygiene-specific support in the planning of new school buildings.	August 2008
Poland	Polish Standard PN-EN 13098:2007. Workplace atmosphere – Guidelines for measurement of airborne microorganisms and endotoxins Polish Standard PN-EN 14042:2004. Workplace atmosphere – Guide for the application and use of procedures for the assessment of exposure o chemical and biological agents.	2007 2004

Table 9 National laws-regulations on indoor air pollution

National laws/regulations related to indoor air pollution (smoking ban is not included)		
Country	Law - regulation	Year
France	In 2007, the French Government launched <i>Le Grenelle Environnement</i> for the identification and improvement of key issues in environment and health. It defined several actions aimed at improving IAQ specified in Law n°2009-967 (August 3, 2009) and Law n°2010-788 (July 12, 2010): mandatory labeling with regards to emissions for building materials and decoration products, and ban of CMR substances (category 1 and) in building materials and decoration products. Other regulations include: Mandatory monitoring of the quality of indoor air in some enclosed places open to the public (law on national commitment to the environment - Article 180): Decree 2011-1728 of December 2, 2011 (measures for formaldehyde, benzene and CO2 (confinement) and The law on environmental liability of 1 August 2008 states that regulatory values on the quality for indoor air quality must be defined in buildings receiving the public: Decree 2011-1727 of December 2, 2011 on indoor air quality guideline values for formaldehyde and benzene.	2007
Germany	Regulation on emissions from construction and furniture	
UK	The UK laws and regulations on indoor pollution, energy efficiency and ventilation are set down in the Approved Documents of the Building Regulations. Part F on ventilation, specifying indoor air quality standards, Part C includes radon and Part L of the Regulations gives guidance on air-tightness. http://www.planningportal.gov.uk/buildingregulations/approveddocuments/partf/	
Swedish	The Norwegian Pollution Control Act 13 March 1981 No.6 Concerning Protection Against Pollution and Concerning Waste 03.04.04 The Pollution Control Act is from 1981. It is the first unified law in Norway concerning pollution and waste issues. It was at that time a political goal to create one basic legal framework for all types of pollution and waste.	1981 2004
Italy	Regulation on labelling of materials : Ministerial Decree DM 10/ October /2008, Provisions to regulate the emission of formaldehyde from wood-based panels and products made with them in life and living environments. . Published on Gazz. Uff. 10 December 2008, n. 288.	2008
Poland	Ordinance issued by the Minister of Health on 22 April 2005 on occupational biological hazards and health protection of people occupationally exposed to such hazards. Official Journal of Laws. 2005; No 81, sec. 716 with subsequent amendments Recommendations of The Interdepartmental Commission for Maximum Admissible	2005





	Concentrations and Intensities for Agents Harmful to Health in the Working Environment	
Portugal	Decree-Law no. 79/2006 of April 4 th "The Decree-law no. 79/2006, which establishes the " <i>Regulation of Temperature Control Systems in Buildings (RSECE)</i> ". Establish limits for the main contaminants of indoor air, which require regular inspections of indoor air quality and verification of components of HVAC systems, performed by qualified experts.	2006
Belgium	Regional building codes (Ref. Code wallon du logement) Decree of 29 October 1998 and more particularly the modification of July 20, 2005 introducing the 9th criteria referring to indoor pollution and its potential impact on the in-occupants' health and sustainable environment (Décret du 9 février 2012, art. 1er); legislation regarding indoor environment in nurseries (Ref. Arrêté du Gouvernement de la Communauté française portant réglementation générale des milieux d'accueil du 21.05.2003) and its later updates: art.18 and art.8 ensure that infrastructure and equipment are safe and respond to salubrity criteria, art.31 precise that agreed nurseries must pay attention to the indoor air quality in order to reduce the potential risk of exposure or reduce the exposure level to an acceptable level. It also refers to chemical use (art.14), materials (art.28, art.29), ventilation (art.26) and heating (art.19) aspects, waste management (art.33)	1998 2005 2012 2003





6. CONCLUSION

Although dissemination of the questionnaire was European-wide, if we just look at the figures, the survey results aren't satisfactory both from a quantitative and a qualitative point of view. The response rate was low compared to the relevance that was highlighted in the project discussions on the indoor air quality topic and looking at the EU policy agenda. We feel that this was not only due to a question of time constraint (the survey was done over a period of a few months), neither to a lack of interest for the issue, but mainly to the fact that the indoor air issue is very complicated to define *per se* and often it is still not very clear which are the authorities involved and their fields of action.

Indoor air indeed summarises all the challenges faced by the field of environment and health: fragmentation of stakeholders, regulations, researchers and, consequently, poor destination of resources or, worst, many duplications without consistent strengthening of prevention.

However, the data also show also some interesting information: no regulation exists on indoor air quality in residential homes still these are the indoor environments that received most attention from researchers. Although respiratory and allergic diseases are the more health impacts most commonly investigated, ozone and pollens are the "least" monitored pollutants. In most cases, the question related to competent authorities for local indoor air monitoring were left blank, even if some countries, such as France, Italy and Germany show advanced policy scenarios focusing also on vulnerable groups or environments (i.e. children, schools).

The data gathered from the questionnaire are limited and probably not very representative of the actual situation on indoor air research at the European level, it is still true though that any extension of this survey may lead to interesting results on the current indoor air quality scenario and may foster joint programming of policy supportive research at national levels.





7. ANNEXES





Annex 1 Excel version of the online survey questionnaire on indoor air quality

INDOOR : Overview Research and Regulation

This survey has the purpose of exploring main information on Indoor research activities and regulation in your Country/Institute. Considered period last five years.

Looking at your Indoor research activities and regulation in your Country/Institute in the last ten years, please fill up following information. You can check one or more boxes

A		Indoor environment considered in your researches /studies	Main references
1	<input type="checkbox"/>	Residential homes	
2	<input type="checkbox"/>	Offices	
3	<input type="checkbox"/>	Schools	
4	<input type="checkbox"/>	Other:	
B		Investigated sources of indoor pollution in your research /study	Main references
1	<input type="checkbox"/>	Consumer products (including cleaning products, paint and solvents)	
2	<input type="checkbox"/>	Furnishing	
3	<input type="checkbox"/>	Construction materials	
4	<input type="checkbox"/>	Outdoor sources (e.g. traffic)	
5	<input type="checkbox"/>	Heating-energy use sources	
6	<input type="checkbox"/>	Noise	
7	<input type="checkbox"/>	Radon	
8	<input type="checkbox"/>	EMF	
9	<input type="checkbox"/>	Others (specify):	
C		Considered population groups:	Main references
1	<input type="checkbox"/>	Adults	
2	<input type="checkbox"/>	Children	
3	<input type="checkbox"/>	Elderly	
4	<input type="checkbox"/>	Other:	





D		Investigated chemical and biological pollutants	Major findings
1		Total VOC	
2		Benzene	
3		Formaldehyde	
4		PM	
5		Ozone	
6		CO	
7		CO2	
8		NOx	
9		Allergens	
10		Pollens	
11		Mould	
12		Other (specify):	
E		Research on indoor monitoring techniques/procedures	Main references
1		Total VOC	
2		Benzene	
3		Formaldehyde	
4		PM	
5		Ozone	
6		CO	
7		CO2	
8		NOx	
9		Allergens	
10		Pollens	
11		Mould	
12		Other (specify):	
F		Investigated Health Impacts in your reaserch/study	Major findings
1		Respiratory diseases	
2		Allergies	
3		Annoyance	
4		Headache	
5		Occupational diseases/Health	
6		Other (specify):	





Governance		
G	Indoor regulation in your Country-	Please provide details
1	National guidance on IAQ	
2	National laws-regulations on indoor pollution (e.g. smoke ban, use of low emission furnitures)	
3	Other	
H	Competent authority for indoor pollution sources management	Specify
1	Consumer products (including cleaning products, paint and solvents, pest repeller, air freshner...)	
2	Furnishing	
3	Construction material	
4	Outdoor sources (e.g. traffic)	
5	Heating - energy use sources	
6	Noise	
7	Radon	
8	EMF	
9	Other	
I	Participation in Indoor research Projects	
1	EU	
2	International	
3	National surveys	
L	Allocated funds for Indoor research in your Institute	
1	yes	
2	no	
3	% total budget:	
M	Integrated research activities (e.g. climate change and indoor...)	
1	Climate change and IAQ	
2	Toxicity mixtures and IAQ	
3	Others:	





Annex 2 List of potential new partners updated in June 2012

Organisation's name	Country	Type of organisation	Type of research funded	Manage E&H programme	Contact person	Funding potential for ERAENVHEALTH
Hasselt University	Belgium	Research organisation	AR/BR/HS/ER/QIR/QtR/POR	-	Tim Nawrot tim.nawrot@uhasselt.be	Yes
Hasselt University	Belgium	Research organisation	AR/BR/QIR/QtR	-	Quirine Swennen quirine.swennen@uhasselt.be	No
University of Antwerp	Belgium	Public body/No Profit Org.	All	-	Caroline Sage caroline.sage@ua.ac.be	No
Hainaut Sanitary Vigilance Public Hygiene in Hainaut	Belgium	Public Body/Research organisation/No Profit Org.	AR/ER/AcR/QIR/QtR/POR	No	Marie-Christine Dewolf marie_christine.dewolf@hainaut.be	No
IMROH Institute for Medical Research and Occupational Health	Croatia	Research organisation/No profit Organisation	AR/BR/HS/POR	Yes	Aleksandra Fucic afucic@imi.hr	No
State General Laboratory of Cyprus	Cyprus	Ministry/ Research organisation	POR	Yes	Nicholas Pissarides npissarides@sgl.moh.gov.cy	Yes
State General Laboratory of Cyprus	Cyprus	Ministry/ Federal Agency/Public Body/Research organisation	AR/HS/ER/QLR/QTR	No	Andromachi Katsonouri akatsonouri@sgl.moh.gov.cy	Yes
DFEH Helsinki University. Department Food Hygiene and Environmental health	Finland	Research organisation	-	-	Hänninen Marja-Liisa marja-liisa.hanninen@helsinki.fi	No
Institut de Veille Sanitaire	France	Public body	POR	No	Medina Sylvia s.medina@invs.sante.fr	No
LNE National testing and metrology laboratory	France	Private organisation	AR/POR	-	Tatiana Mace tatiana.mace@lne.fr	Yes
IRSET Environmental and Occupational Health Research Institute	France	Research organisation	AR/HS/QtR/POR	-	Philippe Glorennec philippe.glorennec@ehesp.fr	No
LERES Environment and Health Research Laboratory	France	Research organisation	AR	-	Olivier Thomas Olivier.thomas@ehesp.fr	No
Center for research on politics and public policy	France	Research organisation	AR/BR/QIR/POR	No	Le Bourish lebourhis@u-picardie.fr	No
Institute and Outpatient Clinic of Occupational, Social and Environmental Medicine of the University of Erlangen-Nuremberg	Germany	Public body	AR/BR/QIR	-	Thomas Göen Thomas.Goen@ipasum.med.uni-erlangen.de	No
University Of West Macedonia	Greece	Public Body/Research organisation	AR/HS/POR	Yes	Bartzis Ioannis bartzis@uowm.gr	Yes
The Technion Center of Excellence in Exposure Science and Environmental Health	Israel	Research organisation	AR/BR/AcR/ER/QIR/QtR/POR	Yes	David M. Broday dbroday@tx.technion.ac.il	Yes





Organisation's name	Country	Type of organisation	Type of research funded	Manage E&H programme	Contact person	Funding potential for ERAENVHEALTH
Institute for Occupational Prevention and Safety	Italy	Public Body/Research organisation/	AR/BR/HS/ER/ AcR /QIR/QtR/POR	No	Giovanna Tranfo giovanna.tranfo@ispesl.it	No
Kaunas University of Technology	Lithuania	Research organisation	AR	No	Dainius Martuzevicius daimart@ktu.lt	No
Ministry of Health - Dep. for Occupational Health	Luxemburg	Ministry /No profit Organisation	AR/HS	No	Ralph Baden ralph.baden@ms.etat.lu	No
University of Malta DEPARTMENT OF PHYSICS	Malta	Research organisation University	AR/BR/HS/QIR/ ER/ AcR POR	-	Charles Sammut charles.v.sammut@um.edu.mt	No
Norwegian Institute of Public Health	Norway	Federal agency/ Public Body/Research organisation/	-	No	Per E. Schwarze per.schwarze@fhi.no	-
EXPERT - Research Laboratory of Bioclimatology and Environmental Ergonomics	Poland	Private organisation	AR/HS/ER	No	Anna Kunert anna_kunert@tlen.pl	Yes
Faculty of Geography and Regional Studies, University of Warsaw	Poland	Research organisation	AR/BR	No	Krzysztof Blazejczyk kblazejczyk@uw.edu.pl	No
Nofer Institute of Occupational Medicine - NIOM	Poland	Research organisation	AR/BR/HS/ER/ AcR /QIR/QtR/POR	-	Wojciech Hanke wojt@imp.lodz.pl	Si
University of Agricultural Sciences and Veterinary Medicine	Romania	Research organisation	AR/BR/ ER/QIR/QtR	-	Edward Muntean edimuntean@yahoo.com	No
Executive Agency for Higher Education, Research , Development & Innovation Funding	Romania	Public Body	AR/BR	-	Bratu Luciana luciana.bratu@uefiscdi.ro	Yes
R&D National Institute on Occupational Health and Safety (OHS)	Romania	Research organisation	AR/ER/QIR	Yes	Nisipeanu Steluta Elisabeta nisipeanusteluta@yahoo.com	No
Department of photogrammetry and remote sensing, Siberian State academy of geodesy	Russia	Education & Research organisation	AR/ER/AcR	No	Ekaterina Kulik katya_kulik@mail.ru	No
Ministry of Environment, Mining and Spatial Planning	Serbia	Ministry	AR/BR/POR	Yes	Biljana Filipovic biljana.filipovic@ekoplan.gov.rs	No
Slovak Medical University	Slovak Republic	Research organisation /State University	AR/BR/HS	No	Monika Ursinyova monika.ursinyova@szu.sk	No
Institute of Experimental Endocrinology	Slovakia	Research organisation	AR/BR	No	Richard Imrich richard.imrich@savba.sk	Yes
Institute of Experimental Endocrinology	Slovakia	Research organisation	AR/BR	No	Jozef Ukropec jozef.ukropec@savba.sk	Yes
State Geological Institute of Dionyz Stur	Slovakia	Ministry/ Research organisation	All	No	Stanislav Rapant stanislav.rapant@geology.sk	Yes
Institute of Environmental Assessment and Water Research	Spain	Research organisation	AR/BR/POR	No	Xavier QUEROL xavier.querol@idaea.csic.es	Yes





Organisation's name	Country	Type of organisation	Type of research funded	Manage E&H programme	Contact person	Funding potential for ERAENVHEALTH
Spanish Research Council	Spain	Ministry/ Federal Agency	AR/ QtR/POR	-	Teresa Moreno teresa.moreno@idaea.csic.es	No
Institute of Environmental Medicine, Karolinska Institutet	Sweden	Public body/ Research organisation	-	No	Mattias Öberg mattias.oberg@ki.se	Yes
Swedish University of Agricultural Sciences	Sweden	Research organisation/ University	AR/BR/HS/QIR/QtR/POR	-	Matilda Annerstedt matilda.annerstedt@slu.se	No
Ospedale Pediatrico Bambino Gesù	Italy	Research/Private Organisation	AR/BR/HS/ER	Yes	Nicola Bergonzi nicola.bergonzi@opbg.net	No
AWS Truepower SLU	Spain	Private Organisation	AR	No	Armando J Palomar ajpalomar@awstruepower.com	No
Hollings Faculty, Manchester Metropolitan University, Old Hall Lane, M14 6HR	UK	Research organisation/University	BR	-	Haruna M. Musa h.musa@mmu.ac.uk	Yes

Type of research funded

Applied research: AR
Basic research: BR
Health survey: HS
Evaluation research: ER
Action research: AcR
Qualitative research: QIR
Quantitative research: QtR
Policy oriented research: POR



How to join the ERA-ENVHEALTH project

Your organisation funds and/or manages and E&H research programme

If your organisation is interested in taking part in the ERA-ENVHEALTH project, please contact the leader of the "Extend the network" task for more information on how to join the project as an E&H research funding and/or managing organisation:

Luciana SINISI

ISPRA - Istituto Superiore per la Protezione e la Ricerca Ambientale
Via Curatone 3, 00185 Roma, Italy

Tel: +39 0650071
luciana.sinisi@isprambiente.it

You are interested in becoming a member of the External Interest Group (EIG)

If you are interested in joining the External interest group to be kept informed of the progress of the project and maybe be called upon to participate in certain meetings and discussions, please contact the leaders of WP5 "Dissemination and Communication":

Yseult NAVEZ and Julie HARLET

ERA-ENVHEALTH project communication

Federal Coordination Environment & Health Services of the President
FPS Health, Food Chain Safety and Environment
Victor Horta Square 40, box 10 , B-1060 Brussels , Belgium

Tel: +32-2524 96 89
yseult.navez@health.belgium.be and
julie.harlet@health.belgium.be

You are part of another ERA-NET focusing on Environment and/or Health

Other ERA-NETs with a focus on environment and health are more than welcome get in contact to exchange ideas and look at possible cooperation. In this case, please contact the coordinator of the project:

Adrienne PITTMAN

ERA-ENVHEALTH project coordination

European and International Affairs Department
ANSES - French Agency for food, environmental and occupational health & safety
27-31 avenue du Général Leclerc, 94700 Maisons-Alfort Cedex, France

Tel: +33 (0) 1 49 77 13 50
adrienne.pittman@anses.fr

ERA-ENVHEALTH'S PARTNERS

Partner name	Acronym	Logo
French Agency for Food, Environmental and Occupational Health & Safety (France)	ANSES	
French Environment and Energy Management Agency (France)	ADEME	
Ministry of Ecology, Sustainable Development, and Energy (France)	MEDDE	
Belgian federal Science Policy Office (Belgium)	BelSPO	
Federal Public Service Health, Food Chain Safety and Environment (Belgium)	FPS	
Environmental Protection Agency (Ireland)	EPA	
Superior Institute for Environmental Protection and Research (Italy)	ISPRA	
Swedish Environmental Protection Agency (Sweden)	Swedish EPA	
Ministry of Infrastructure and the Environment (Netherlands)	IenM	
National Institute for Public Health and the Environment (Netherlands)	RIVM	
Public Health Authority of the Slovak Republic (Slovak Republic)	UVZ	
Environment Agency (England and Wales)	EA	
Natural Environment Research Council (UK)	NERC	
Ministry of Health (Israel)	MOH	
Federal Environment Agency (Germany)	UBA	
National Research Council (Italy)	CNR	

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