



Workshop Report for the Modena meeting of the International network on Public Health and Environment Tracking (INPHET)

Workshop Title: Environmental & Public Health Tracking to Advance
Environmental Health

In collaboration with:

Regione Emilia-Romagna, Comune di Modena, AUSL Modena, Rete Città Sane-OMS

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1. Summary

Monitoring environmental hazards is critical for the prevention of disease. Environmental Public Health Tracking (EPHT) aims to merge, integrate, analyse and interpret environmental hazards, exposure and health data. At the International Conference of the International Society for Environmental Epidemiology in Basel in 2013, a pre-conference workshop on “Environmental Public Health Tracking: practical methods for priority setting and evaluation” was held. Participants were interested in the development of an international network for EPHT to share best practices and support development of systems and related studies. Specific suggestions for future workshops included organisation of a discussion roundtable (workshop) to share experiences, explore solutions, common challenges and develop strategies for development and implementation of an International Network on Public Health and Environment Tracking ([INPHET](#)).

According to the feedback from the workshop held in Basel in 2013, the proposals towards an International Network on EPHT were supported. In particular a need to focus on the potential relevance of the topics discussed in the view to strengthen the existing networks on environmental health among national and regional public health institutes, as well as development of new initiatives across both Europe and continents. In response to this feedback, a two day workshop to take forward these ideas was proposed. The workshop took place over two days in May 2014, in the City of Modena, Northern Italy. Patronage of the workshop included the University of Modena and Reggio-Emilia. The very first step toward the implementation of an international network was the definition of the role of the network by describing its purpose, aims, objectives and membership.

The aim of the workshop was to initiate the International Network. The workshop was arranged along three main dimensions to help address the priorities, challenges and needs of public health professionals. Three working parties were defined to look at aspects and priorities of the network:



- A. Partnerships: strategies and opportunities instrument in developing an international network;
- B. Science and Data: data availability, indicators, methods and training;
- C. Ethics and Confidentiality: legal frameworks, relationships with industry, data exchange, protection and confidentiality.

Discussions at this workshop focused on procedures to initiate INPHET and explored:

- Advancing environmental health by tracking exposures, hazards and health effects;
- Identifying INPHET goals in a way to align with broader public health infrastructure needs, yet retaining a focus on environmental health surveillance;
- Identifying partnerships with mutual potential benefits and explore strategies to deliver and receive information;
- Identifying processes that can strengthen communication about the INPHET and collaborations among stakeholders;
- Supporting/co-ordinating/leading any initiative (such as bids for support) which need to be “winnable”, based on persuasive approaches and realistic expectations.

The workshop consisted of sub-working parties (WP) to consider in more detail the focus of specific topics. The WP members and specific agendas were organised by the Scientific Committee (SC) (the founding members of the network).

There were two plenary sessions of the workshop: the first introduced the aims and objectives and organization of the workshop, the second plenary session aimed to collect and finalise in an appropriate manner, the outputs of the WP's at the conclusion of the event.

Around fifteen authoritative officials from national public health organisations and researchers in the field were invited to attend the workshop and participate by coordinating and leading the working parties. Over 70 participants attended the workshop, from 38 different organisations, coming from 10 countries, including Israel, the US, Spain, Sweden, Denmark, France, the UK, Italy, Belgium and the Netherlands.

An official statement to set up such a network was drafted and agreed by the participants of the workshop as a position paper and was presented to the Undersecretary for European Affairs of the Italian Government, who attended the workshop, as Italy currently held the presidency of the EU. Entitled 'Why Environmental and Public Health Tracking: The Modena Position Paper for the Italian Presidency of the EU Council “for a Better Environment and Health”, the position paper called for co-ordinated action and prioritisation of environment and health support, during the Italian presidency. Essentially, the position paper asked for the support of two proposals:

1. To promote the creation of an international EPHT network to address environmental challenges to public health by establishing a Working Group in the European Union.
2. To support research and monitoring of environmental hazards and health risks.

A draft version of the position paper was circulated to all attendees of the workshop. Throughout the two day meeting, participants were encouraged to consider and comment on the draft and main messages that needed to be included and presented to the Italian Presidency. After the meeting, the paper was finalised to take into account the comments and discussion of the meeting. The Scientific Committee agreed the final draft and the final position was paper presented to Mr Sandro Gozi for consideration by the Italian Presidency of the EU. A copy is available here:

<http://www.epiprev.it/INPHET/PP2014>

There were a number of recommendations arising from the workshop. Detailed recommendations arose from the working parties:

WP1: Partnerships: Recommendations to develop the partnership and network;

- Start sharing our current resources, questions and expertise to show the added value of this network (start building a list of expertise in Public Health and Environment tracking: who does what and why?).
- Look at possibilities to start an informal network.
- Start with a website and link this with the websites of national public health and environmental agencies.
- Start with exchanging experiences and training modules/e-courses, organize a webinar if several people are interested in the same subject.
- Look for funding possibilities (national, international, EU-COST, HORIZON 2020, DG Sanco – Health programme).
- Pay attention to involve various stakeholders, disciplines and expertise.
- Involve the public (e.g. through NGO's) from the start (e.g. at international level: HEAL, WECF).
- Involve communicators/educator groups (e.g. NGOs, Eurohealthnet).

WP2: Science and data. There was consensus that EPHT includes steps from science to public health benefits, therefore it is focused on applications of the science. Four areas emerged from the discussion:

1. Themes to focus EPHT studies on were highlighted:
 - Polluter/pollutant-focus: waste, climate change/vectors, specific pollutants including their change over time
 - Disease focus: a broader range of topics emerged.
2. What level of precision is required needs to be defined. Different aggregation of environmental data are possible, such as: Address, Postcode, Census area, Region.
In particular in relation to environmental and exposure data, the aim of data collected/used may be:
 - Production of risk estimates, as part of etiologic research
 - Public health surveillance/exploratory research/planning of interventions.

Therefore, an EPHT programme has a different aim compared to etiologic research, and is likely to require a lower level of precision/aggregation of data over larger areas.

3. Scenarios: There are several drivers of environmental change, not limited to climate change but including use of water, type of energy production, and changes in environment related to all human activities. Therefore an EPHT international activity would need to consider this broad “change” agenda, and scenarios may drive some of the planned work.
4. Tools: Common tools might support EPHT developments and therefore they may be a key aspect for taking joint work forward. Tools may include:
 - an atlas summarizing comparable information on preventable environmental hazards to health
 - rapid enquiry methods such as ‘Rapid Inquiry Facility’ used in England may be of value in several countries.

WP3: Ethics and Confidentiality

- Personal data: We need to protect access to personal data for assessing local environment-health associations. However care is needed to avoid implementation of EU data protection rules jeopardising the opportunity for public health use of such data.
- Role of biomarkers: Potentially useful for EPHT studies, but need to prioritise the least invasive, and recognise limitations in interpreting biomarkers, eg short half-lives.
- Essential to have informed consent for the individual uses of biomonitoring data.
- Need to be careful on feeding back the risk related to individual exposure markers or clinical markers, and may be impossible in some cases.
- Should explore possibility of using accumulated lab samples if they can be geo-referenced and if ethical approval is given. Probably does not need prior informed consent.
- Main emphasis is population (rather than individual) use of data to characterise risk, as individual data may be very difficult to interpret in terms of risk.
- Communication – consider analysing public concern, e.g. through twitter or Google searches to identify perception of environmental problems as part of surveillance.

Common discussion points and recommendations arose from the workshop as a whole. They included;

- The need to use epidemiology as an evidence base- and show how it is supported by tracking type studies, using evidence and surveillance to support the arguments, to help answer economic questions. The tracking network can be used to help support this role. *Tracking needs to sit along- side epidemiology and monitoring activities.*
- A statement of INPHET is needed:- e.g. to provide support and a clearing house for international EPH tracking activities. It can include a regular exchange of activities, e.g. meetings etc, or be a more co-ordinated network. Dedicated secretarial support is needed.
- A launch of a pilot is needed to show how the network will work- a suggestion of pilot projects to demonstrate the use in a tracking project. Need to demonstrate the benefits of the network on a topic, including financial benefits. Air pollution and contaminated land examples have been used in other programmes, so it was suggested to use another example to best demonstrate benefits.



The scientific committee agreed to implement progressively the following actions after the meeting:

- Prepare the workshop reports and publish the proceedings of the meeting so that the outputs of the meeting and the network's intentions are open and made public.
- Develop a website on INPHET, highlighting its members and activities.
- Hold a membership list, so that individuals and organisations can register, become members of the network and ensure that documents and outputs are circulated to members and interested parties that couldn't attend the workshop.
- Draft papers on INPHET, its mission, ideas and accomplishments for publication in journals or the WHO Bulletin.
- Share case studies: it was suggested that the network start with the sharing of case studies to help understand the role of tracking and the purpose of the network. Case studies can be hosted on the network website.
- Share skilled groups: the Network can show the benefit of sharing skilled resources- e.g. statisticians.
- Create an inventory of health data that can be used for environmental health analysis. Then document what areas need to be improved.
- Show case the positive experience of tracking- and how it works. e.g. outlining the US and European experiences, the tracking network.
- Look for support and contributions to funding proposals to further the activities of the network and tracking activities across different countries.
- Boost membership of INPHET: in terms of organisations and also the number of countries involved and bring strong EU MS together to support less active MS to the table, where less tracking activities exist- e.g. in eastern European countries.
- Hold training seminars and webinars to show case tracking activities and the benefits of the network.
- Host an online forum for sharing of ideas, through the INPHET website- in a closed environment for members. This would encourage the sharing good practice, resources, websites, etc.
- Link with the Healthy Cities Initiative and network- to demonstrate collaboration and benefits.
- The next meeting for INPHET is proposed in 2016 in the US as a parallel session of an international conference to be identified.

More details about the workshop are available on <http://www.epiprev.it/INPHET/home>



2. Background

Monitoring environmental hazards is critical for the prevention of disease. Environmental Public Health Tracking (EPHT) aims to merge, integrate, analyse and interpret environmental hazards, exposure and health data.¹ EPHT can provide accurate and systematic environmental data in a timely manner to public health decision makers and the wider public, to help reduce the environmental hazard burden on health. By effectively linking environmental and health data and translating it into meaningful information, EPHT can help to protect the health of the public. Thus, EPHT represents the essence of proactive public health practice, since the ultimate goal of such a system is to guide public health action.

Specifically, EPHT should:

- Monitor environmental precursors of disease
- Merge, integrate, analyse and interpret environmental hazard, exposure and health data
- Examine relationships between environmental hazards and diseases
- Identify populations at risk from environmental hazards
- Examine data on the implementation and evaluation of intervention and prevention strategies
- Inform public health policy makers.

EPHT can include surveillance systems that focus ongoing collection, management, analysis and dissemination of data to public health programs to stimulate public health action. It can be seen as the intersection of epidemiology and surveillance – both offering a framework within which specific targeted epidemiological studies can be carried out and being itself a form of epidemiological surveillance.

EPHT identifies potential hazards and examines their distribution and trends in the environment. It is an essential component in prevention strategies, particularly in the absence of definitive knowledge about the health impacts of environmental exposures.²

The Pew Commission², whose report was instrumental in setting up the US Tracking programme, identified some helpful distinctions of different components of the EPHT, and these are summarised here. Ideally, **exposure tracking** includes the systematic measurement of harmful environmental agents to which individuals are exposed. Exposure tracking also helps evaluate the effectiveness of public health policies. It should be closely coordinated with ongoing **hazard tracking**². This involves the monitoring of individuals, communities, or population groups for the presence of an environmental agent or its metabolite.³ Exposure (and hazard) tracking is sufficient for public-health

¹ EPHT can be defined as: “The ongoing collection, integration, analysis, and interpretation of data about environmental hazards, exposure to environmental hazards, human health effects potentially related to exposure to environmental hazards. It includes dissemination of information learned from these data and implementation of strategies and actions to improve and protect public health” (United States Center for Disease Control and Prevention, 2003)

² The Pew Environmental Health Commission at the Johns Hopkins School of Hygiene and Public Health, 2000.

³ McGeehin MA, Qualters JR, Niskar AS National Environmental Public Health Tracking Program: Bridging the Information Gap Environ Health Perspect 112:1409–1413 (2004). <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1247569/>



surveillance when the causal link between exposure and health effect has been established, when there is sufficient time latency between exposure and effect, when the **concentration-response functions** (CRFs) are known, when standards are valid, when the quality of exposure measurements is ensured, when exposure measurements are representative of population's exposure, and costs are affordable. Examples of these situations include chemicals in drinking water and ionizing radiation exposure effects.

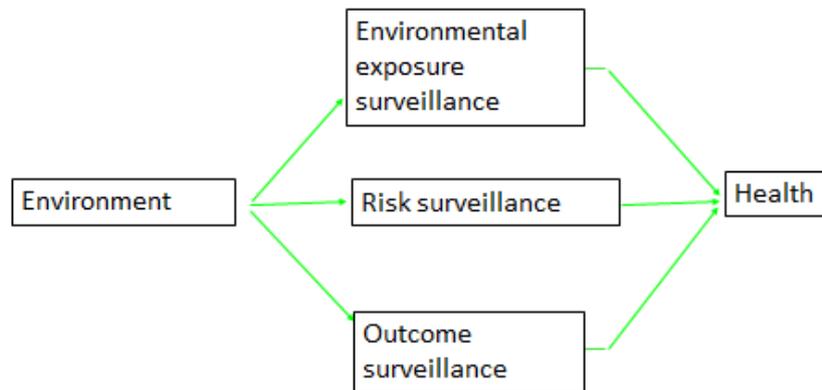
The final component in the conceptual model of Thacker et al. (1996)⁴ is **health effects tracking**, which represents traditional public health surveillance efforts. Health-effects tracking is sufficient for public-health surveillance when exposure is specific, when the outcome is sensitive to environmental changes, when the latency is relatively short, when it's possible to use biomarkers, when health data are available, when quality of health data is ensured, and costs are affordable. Examples of these situations are lead poisoning, hospital admissions for bronchiolitis, mesothelioma, some congenital malformations and the burden of disease from carbon monoxide poisoning.

A key distinction between EPHT and traditional surveillance is the emphasis on data integration across health, human exposure and hazard information systems. We could call it "**risk tracking**" which involves quantifying and monitoring, at population level, trends, the relationship between hazard, exposure and health indicators. Risk tracking is appropriate for public-health surveillance when environmental and health measures are valid, when there is an adequacy between the different types of information systems (time/space), when CRFs need to be established or validated, and when standards need to be set. Examples of risk tracking are water turbidity, air pollution, heat waves.

Another important issue to be addressed when conducting environmental public health surveillance is the need to involve a number of different constituencies in public health activities. Public alarm or concern can influence a public health agenda by influencing not only funding decisions but also the directions of scientific research and the decisions made by policy makers. Including input from specific interest and community activist groups, as well as the public health community, may improve the success of an environmental health surveillance program. The demand for better information about our environment and health comes from the public, the media, researchers and policymakers.

⁴ Thacker SB, Stroup DF, Parrish RG, Anderson HA. Surveillance in Environmental Public Health: Issues, Systems, and Sources. *Am J Public Health*, 1996; 86:633-638.

Environmental-health surveillance



Environmental health surveillance framework – InVS –

Similar tracking activities may be conducted across the world, to address public health and environmental hazards, but they may not be labelled as ‘tracking’ or may use another names. Many countries have already adopted the label ‘tracking’ e.g. the US, UK, France, Canada. Some other countries clearly support similar activities but not necessarily call it ‘tracking’ e.g. Italy, Brazil, Australia, New Zealand. In the US, the Centre for Disease Prevention and Control (CDC) leads the federal level tracking programme, with state level governments running their own tracking projects and programmes. At the regional level, the European Centre for Disease Prevention and Control (ECDC) in Stockholm run a comparable programme for Europe. The main aspect is that the work conducted is fulfilling the task of tracking information for an on-going public health use (prevention), and not that a country uses the word ‘tracking’ or ‘EPHT’.

3. North American Experience

In September 2000, after 18 months of review, the Pew Environmental Health Commission released a report on the state of environmental public health in the United States⁵. They reported that Environmental public health surveillance or tracking systems are critical in preventing and controlling disease in populations. Accurate and timely surveillance data permit public health authorities to determine disease impacts and trends, recognize clusters and outbreaks, identify populations and geographic areas most affected, and assess the effectiveness of public health interventions⁶. “We can track flu, West Nile virus, and mad cow disease but not enough of the chronic illnesses that are the biggest killers of Americans, because we just don’t have enough of that

⁵ MA McGeehin, JR Qualters, AS Niskar, *Environmental Health Perspectives* 112:1409–1413 (2004).doi:10.1289/ehp.7144 available via <http://dx.doi.org/>

⁶ Teutsch SM. 2000. Considerations in planning a surveillance system. In: *Principles and Practice of Public Health Surveillance* (Teutsch SM, Churchill RE, eds). New York: Oxford University Press, 17–29.



basic information.” Tom Burke, PhD., Professor, co-director, Risk Services and Public Policy Institute, Johns Hopkins University, 2006.

The U.S department of health and human services, Centers for Disease Control and Prevention (CDC) responded to this need by creating the National Environmental Public Health Tracking (Tracking) Program, with the Nationwide Tracking Network as its cornerstone. The system operates at a federal level to give a consistent national response to demands in terms of environmental hazard and health risks. The Tracking Program’s primary task is to translate environmental and public health data into meaningful information and increased knowledge, then apply that knowledge to improve community health. Tracking should empower environmental and public health practitioners, healthcare providers, community members, policymakers, and others. They can then make information-driven decisions that help protect community health, at the local, state, and national levels.

For example, California, one of the more advanced state partners in this program, established the California Environmental Health Tracking Program in 2002. Initial development was guided by a report ‘*Strategies for Establishing an Environmental Health Surveillance System in California*^{7,8}’ which defined the need for and goals of environmental health tracking in the state and reported on current knowledge about environmentally related diseases and their costs. The report listed the diseases, environmental hazards and exposures that should be tracked in California, and described community information needs as well as ethical, legal and policy issues. Afterwards South Carolina’s EPHT Program has enhanced the availability and use of environmental public health data in examining several environmental health issues, e.g. lead prevention program, birth defects data, the Coastal Environmental Health landing page⁹.

EPHT practices in Canada included a review of existing environmental exposure databases and health databases¹⁰. For environmental exposure data, the focus was on outdoor air quality, water quality and soil contaminants. Health databases included emergency department visits, hospital admissions, cancer and mortality data. Health data in Canada is of good quality and could be easily linked using specific geographical boundaries with environmental exposure data including outdoor air quality and boiled water advisories data. Challenges in creating an EPHT in Canada included the lack of data for certain environmental exposures and collaborating with different stakeholders including provinces in order to obtain access to the relevant data.

4. European Experience

Another application of the EPHT concept refers to the monitoring of drivers of (re-) emerging infectious diseases. Such drivers are globalisation and environmental change, social and

⁷ California Policy Research Centre, University of California. 2004. Strategies for Establishing an Environmental Health Surveillance System in California. A Report of the SB702 Expert Working Group. Retrieved December 11, 2008. <<http://www.catracking.com/sub/sb702.htm>>.

⁸ California Policy Research Centre, University of California. 2004. Strategies for Establishing an Environmental Health Surveillance System in California. A Report of the SB702 Expert Working Group. Retrieved December 11, 2008. <<http://www.catracking.com/sub/nl.htm>>.

⁹ http://ephtracking.cdc.gov/docs/State_Tracking_2011_SC.pdf

¹⁰ <http://www.hc-sc.gc.ca/fnih-spnia/promotion/public-publique/index-eng.php>



demographic change and public health system factors. In order to address this need, the European Centre for Disease Prevention and Control (ECDC) has developed the European Environment and Epidemiology (E3) Network.¹¹ The E3 Network provides access to climatic/environmental geospatial data for epidemiologic analysis that are currently collected and analysed by a variety of European agencies, public health institutes, as well as research organisations. The E3 Network serves as a platform for collaborative dataset compilation, advanced analyses, data processing, and reporting and monitoring of data for risk assessments. The aim is to strengthen the capacity of formulating public health intervention strategies, and increase the effectiveness of prevention and control measures and general policies. It can also be used to enhance the rapid detection of emerging public health threats driven by environmental factors through prediction tools and forecasting models.

The Italian approach to a national environmental public health service, has elements that overlap with EPHT, but with its own differences. This is illustrated with reference to the management and investigation of environmental asbestos. Many other experiences/projects have been carried out such as: Sentieri¹² aiming at describing the health profile of population living in contaminated sites; EpiAir¹³ which provided methods and criteria for epidemiological surveillance of the effect on health of air pollution in large Italian cities; Monitor¹⁴ which was focused on providing adequate and consistent information to, and communicating with, the general population and its representatives. Nevertheless, they were all projects with the applied systematic framework and/or vision. They all challenged the relevant differences in the types of legal authorities and scientific background available within the public environmental health protection sectors. One of the main obstacles for an effective and timely environmental and public health action is the collaboration among institutions, disciplines and in general with any other stakeholders.

EPHT in the UK, at a national level, includes several proof of concept studies: population exposure estimation of arsenic in private water supplies, the burden of disease of carbon monoxide poisoning, developing methods of risk prioritisation to support public environmental health interventions and surveillance of lead in children¹⁵. At a local level Sandwell Metropolitan Borough Council use EPHT to identify the largest environmental public health concerns for the local authority area to help prioritise public health interventions¹⁶.

In France, EPHT activities have included developing environmental-health dimensions of routine surveillance data systems. The European Apehis and Apekom surveillance systems on air pollution and health (Web: www.aphekom.org) co-ordinated by InVS met the information needs of their key audiences by performing health-impact assessments (HIAs) on short- and long-term effects of air pollution over time using routine mortality and hospital admissions data. These initiatives were successful because they built on an Europe-wide collaborative network from the bottom up to

¹¹ Semenza JC, Sudre B, Oni T, Suk JE, Giesecke J. Linking Environmental Drivers to Infectious Diseases: The European Environment and Epidemiology Network. *PLoS Neglected Tropical Diseases*. 2013; 7(7): e2323.

¹² <http://www.iss.it/epam/index.php?id=387&tipo=11&lang=1>

¹³ <http://www.epi-air.it/>

¹⁴ <http://www.arpa.emr.it/monitor/>

¹⁵ <http://www.hpa.org.uk/ProductsServices/ChemicalsPoisons/EnvironmentalPublicHealthTracking/>

¹⁶ <http://www.sandwell.gov.uk/>



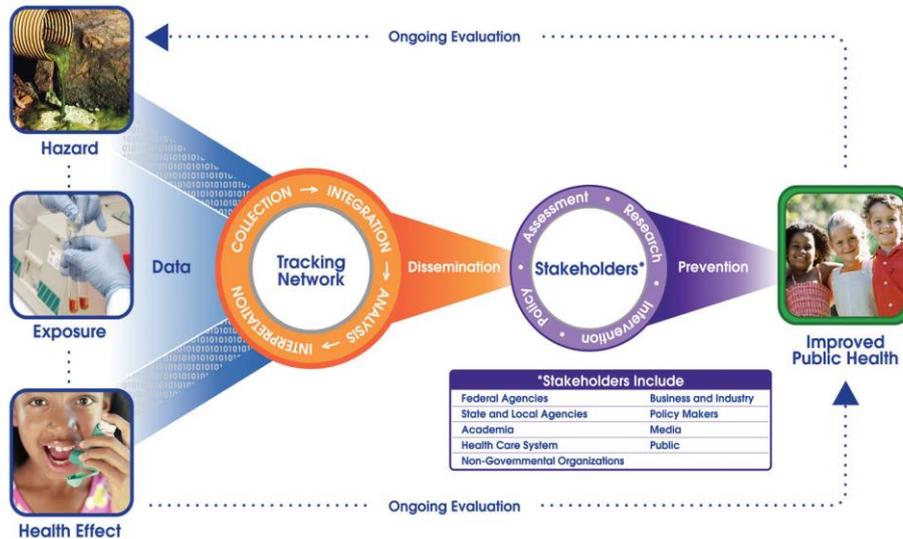
stimulate cooperation and facilitate decision making on local and national levels; they used standardized protocols and tools for data collection and analysis at the local level to ensure quality and comparability; they kept analyses simple to ensure feasibility and long-term commitment; they involved local entities from the outset to ensure acceptance; they fostered cross fertilization between multiple disciplines and regions to create skilled and motivated local teams; and they focused on benefits of findings in messages to local stakeholders to increase impact on decision making. The Triple-S European project: Syndromic Surveillance in Europe (Web: www.syndromicsurveillance.eu) co-ordinated by InVS, assessed Syndromic Surveillance Systems (SyS) in Member States (MS) with a view to produce guidelines for both human and veterinary SyS in MS, and a proposal for a European strategy on SyS. Examples of the complementarity between specific and syndromic surveillance in environmental health in France include: the Heat Health Watch Warning System, Carbon monoxide surveillance, Poisoning surveillance, Xynthia storm (2010¹⁷), and the health monitoring of a gas leak at the Lubrizol company (2013¹⁸).

5. International Network on Public-Health and Environment Tracking (INPHET)

EPHT may be seen as an approach to facilitate translation of evidence into routine practice, rather than as yet another approach to construction of evidence on environmental public health. So, a tracking programme would not just provide data or information to users and stakeholders, but data representing evidence that is sufficiently mature to be translated into routine actions even in the middle of an economic and social crisis.

¹⁷ Increase in psychotropic drug deliveries after the Xynthia storm, France, 2010. Motreff Y, Pirard P, Gorla S, Labrador B, Gourier-Fréry C, Nicolau J, Le Tertre A, Chan-Chee C. *Prehosp Disaster Med.* 2013 Oct;28(5):428-33. doi: 10.1017/S1049023X13008662. Epub 2013 Jun 27.

¹⁸ http://ars.basse-normandie.sante.fr/fileadmin/BASSE-NORMANDIE/CIRE/PE_Suivi_sanitaire_Lubrizol_30012013.pdf



Environmental Public Health Tracking Components (US CDC)¹⁹.

Once an information system is developed, its own findings may generate awareness of gaps in knowledge that need addressing by research. Research and tracking systems need each other.

5.1 Origins of a proposal for an International Network on EPHT (INPHET).

A Symposium on “Environmental Public Health Tracking: international perspectives” was held at the International Society for Environmental Epidemiology – 24th Annual Conference (ISEE 2012) that took place in Columbia, South Carolina, USA, from August 26 to 30, 2012. The Symposium was chaired by Dr Marco Martuzzi of WHO and Dr Jan C. Semenza of ECDC, and its goals were to compare development of national environmental public health tracking systems in the US, Canada, Italy and UK, and in particular examine the role of environmental epidemiology in contributing to an evidence base and methods for their operation. Speakers represented national agencies for environmental health, complemented by a US State experience from South Carolina. Participants gained an understanding of current approaches to national environmental public health services, and an international perspective on EPHT and its dependence on environmental epidemiology. Given positive feedback from this first event, it was proposed to explore the support for further international activities on this topic.

On August, 19th, 2013, in Basel, Switzerland, on occasion of the 25th International Conference of the International Society for Environmental Epidemiology (ISEE 2013), a pre-conference workshop on

¹⁹McGeehin MA et al, 2004. National environmental public health tracking program. Bridging the information gap. Environ Health Perspect 112(14):1409-413, and Thacker SB et al, 1996. Surveillance in environmental public health: issues, systems and sources. Am J Public Health 86:638-41.



“Environmental Public Health Tracking: practical methods for priority setting and evaluation” was held. The workshop was well attended by over 50 people and oversubscribed. Delegates from seventeen countries took part, eight European (UK, Italy, France, Belgium, the Netherlands, Sweden, Finland, Latvia as well as the European Commission) and nine from other continents (USA, India, Japan, South Korea, UAE, Mongolia, Nigeria, Australia and New Zealand). Participants included staff from national or regional institutes of public health or environmental protection, as well as university researchers in epidemiology or other disciplines related to environmental public health.

Participants were interested in the development of an international network for EPHT to share best practices and support development of systems and related studies. Among those interested, from a survey held at the workshop, the most supported activities were contributions to topic related specific networks, and organisation of future workshops on tracking where methods could be shared. Specific suggestions for future workshops included organisation of a discussion roundtable (workshop) to share experiences, explore solutions, common challenges and develop strategies for development and implementation of an **INPHET**. Other supported activities were the joint publication on methodological topics and the establishment of international fellowships.

The very first step toward the implementation of an international network was the definition of the role of the network by describing its’ purpose, aims, objectives and membership, as outlined in Box 1.

Box 1: INPHET Statement of Purpose

Environmental Public Health Tracking (EPHT) – an International Network – Statement of purpose

Why

Monitoring environmental hazards is critical for the prevention of disease. Environmental Public Health Tracking (EPHT) aims to merge, integrate, analyse and interpret environmental hazards, exposure and health data²⁰. EPHT can provide timely, accurate and systematic environmental data to public health decision makers on how to reduce the environmental health burden. By effectively linking environmental health data and translating it into meaningful information, EPHT can help protect the health of the public. Thus, EPHT represents the essence of proactive public health practice, since the ultimate goal of such a system is to guide public health action.

Main Objectives

The international EPHT network aims to support the development, implementation and evaluation of national EPHT initiatives. The EPHT network provides an international clearinghouse for public health practitioners and researchers on how to monitor environmental hazards, exposure and health data. Moreover, the international EPHT network aims to advance and enhance national EPHT capacity through support of systematic analyses of environmental health data. Specifically, how to:

²⁰EPHT can be defined as: “The ongoing collection, integration, analysis, and interpretation of data about environmental hazards, exposure to environmental hazards, human health effects potentially related to exposure to environmental hazards. It includes dissemination of information learned from these data and implementation of strategies and actions to improve and protect public health” (United States Center for Disease Control and Prevention, 2003)

- (i) Monitor environmental precursors of disease
- (ii) Merge, integrate, analyse and interpret environmental hazards, exposure and health data
- (iii) Examine relationships between environmental hazards and diseases
- (iv) Identify populations at risk from environmental hazards
- (v) Implement and evaluate intervention and prevention strategies
- (vi) Inform public health policy makers.

Benefit to public health

An international EPHT network provides a number of benefits to (public) health professionals, policy makers, local, national and international stakeholders, etc. Specifically, an international EPHT network would serve as:

- An established clearinghouse for environmental health data, methods and processes
- A resource with environmental decision support tools for policy and decision makers
- Evidence-based information that can be used to guide public health actions in different settings, such as regional and national health departments
- A resource to increase comparability and cross-border surveillance capacity
- A reference point for public health agencies and scientific organisations.

Examples of international EPHT network activities:

- Co-ordination of international EPHT projects (e.g. pilot initiatives, databases and their use such as congenital anomalies, housing-related hazards to health, environmental drivers of infectious diseases (E3 Geoportal), etc.)
- Exchange of experiences/expertise, staff, trainees
- Guidelines, standards (e.g. INSPIRE)
- Benchmarking
- Training and education.

Strategic partnerships:

- Health departments
- Ministries of health
- International and national public health organisations (public health practitioners, civil servants, etc)
- Non-Governmental Organisations, environmental agencies and related organisations
- Data stewards
- Academic Institutions (researchers, scientists, etc.).



6. Proposal for a Workshop for an International Network on Public Health and Environment Tracking (INPHET)

According to the feedback from the workshop held in Basel in 2013, the proposals towards an International Network on EPHT were supported. In particular it was claimed the need to focus on the potential relevance of the topics discussed in the view to strengthen the existing networks on environmental health among national and regional public health institutes, as well as development of new initiatives across both Europe and continents. In response to this feedback, a two day workshop to take forward these ideas was proposed.

6.1 Aims of the workshop to initiate the International Network

The discussion at this workshop was proposed to focus on procedures to initiate an INPHET with specific emphasis on:

- advancement of environmental health by tracking exposures, hazards and health effects
- identify critical information gaps that INPHET will uniquely be positioned to fill first and foremost between science and policy
- definite areas for which timely and locally relevant environmental data with established connections to human health is available
- clearly defined public health benefits, for example through quantitative impact assessments
- different tasks of tracking such as routine monitoring or response to specific events. This would be helpful not only for research purposes but for possible interventions, including economic compensation;
- identify the INPHET goals in a way to align with broader public health infrastructure needs, yet retaining a focus on environmental health surveillance
- identify partnerships with mutual potential benefits and explore strategies to deliver and receive information
- identify processes that can strengthen communication about the INPHET and collaboration among stakeholders
- lead any initiative (such as bids for support) which needs to be “winnable”, based on persuasive approach and realistic expectations;
- fixing the distinction between routine monitoring aspects and response to specific events or questions needs to be well-defined and characterised.

Examples to be carried out by an INPHET network could include:

- Co-ordination of international EPHT projects (e.g. pilot initiatives, databases and their use such as congenital anomalies, housing-related hazards to health, environmental drivers of infectious diseases (e.g. ECDC’s E3 Geoportal), etc.)
- Facilitate exchange of experiences/expertise, staff, trainees
- Exploring and writing guidelines and standards (e.g. INSPIRE Directive)
- Benchmarking activities



- Training and education.

The workshop was arranged along these three main dimensions to help address the priorities, challenges and needs of public health professionals. Three working parties were defined to look at aspects and priorities of the network:

- A. Partnerships: strategies and opportunities instrument in developing an international network;
- B. Science and Data: data availability, indicators, methods and training;
- C. Ethics and Confidentiality: legal frameworks, relationships with industry, data exchange, protection and confidentiality.

Discussions at this workshop focused on procedures to initiate INPHET and explored:

- Advancing environmental health by tracking exposures, hazards and health effects;
- Identifying INPHET goals in a way to align with broader public health infrastructure needs, yet retaining a focus on environmental health surveillance;
- Identifying partnerships with mutual potential benefits and explore strategies to deliver and receive information;
- Identifying processes that can strengthen communication about the INPHET and collaborations among stakeholders;
- Supporting/co-ordinating/leading any initiative (such as bids for support) which need to be “winnable”, based on persuasive approaches and realistic expectations.

The expected results of holding such a workshop to explore these principles, dimensions and issues was determined to have the following outputs:

- An official statement to set up such a network (i.e. position paper from the attendees the workshop, or to create an ISEE committee on EPHT),
- Some common agreements to develop shared guidelines for the aforementioned dimensions: Science and Data, Ethics and Confidentiality and decide on basic elements for future guidelines,
- Some statements of intent of support for INPHET by international associations of public health institutes like IANPHI, EUPHA and others, and international organisations such as WHO, EEA, USEPA, etc.

6.2 Organization of the workshop

The workshop took place over two days, in the City of Modena, Northern Italy. It was held in the Sala del Consiglio Comunale (town hall) provided by the Municipality of Modena. Patronage of the workshop included the University of Modena and Reggio-Emilia.



The workshop consisted of sub-working parties (WP) to consider in more detail the focus of specific topics. The WP members and specific agendas were organised by the Scientific Committee (SC) (the founding members of the network).

Each WP meeting was conducted by two coordinators or chairs and were supported by a rapporteur. The coordinators and rapporteurs were appointed by the SC before the workshop. The coordinators were identified among the key-persons invited to the meeting (see below).

There were two plenary sessions of the workshop: the first introduced the aims and objectives and organization of the workshop, the second plenary session aimed to collect and finalise in an appropriate manner, the outputs of the WP's at the conclusion of the two-day workshop.

To facilitate and enlarge the participation, videoconferencing, and internet based resource were utilised to encourage members of the network to contribute to the discussions and activities of the network. The workshop had dedicated pages on <http://www.epiprev.it/INPHET/home>

6.3 Scientific Committee and key organisers

Members of the founding Scientific Committee were;

- Paolo Lauriola (ARPA Emilia Romagna, Italy)
- Giovanni Leonardi (Public Health England, UK)
- Lina Balluz (Centre for Disease Control and Protection, USA)
- Sylvia Medina (InVS, France)
- Jan C. Semenza (European Centre for Disease Prevention and Control, Stockholm)
- Tony Fletcher (Public Health England and the London School of Hygiene and Tropical Health, UK).

Additional organisers, working party chairs and rapporteurs included;

- Brigit Staatsen (RIVM, Netherlands)
- Lisbeth Knudsen (Department of Public Health, University of Copenhagen, Denmark),
- Kees de Hoogh (Imperial College London and Swiss Tropical and Public Health Institute, Switzerland).
- Helen Crabbe (Public Health England, UK).

The organisational secretary included;

- Meri Scaringi (ARPA Emilia-Romagna, Italy)
- Daniele Biagioni (Municipality of Modena- Healthy Cities, Italy)
- Helen Crabbe (Public Health England, UK).

The running of the workshop was also supported by staff from the Municipality of Modena, Healthy Cities Network-WHO, Local Health Authority- Modena (AUSL MO), and Environmental Protection Agency of Emilia-Romagna Region (ARPA ER).

6.4 Key personnel invited to attend the workshop

Around fifteen authoritative officials from national public health organisations and researchers in the field were invited to attend the workshop and participate by coordinating and promoting WPs, leading discussions with WP members, and liaising with rapporteurs in producing documents and reports generated by each WP. An invite also went to participants of the Basel ISEE workshop, and also targeted professionals and researchers in the field, across Europe and internationally.

6.5 Attendees

Over 70 participants attended the workshop over the 2 days. They were from 38 different organisations, from 10 countries, including Israel, the US, Spain, Sweden, Denmark, France, the UK, Italy, Belgium and the Netherlands.

Mr Sandro Gozi, MP, Undersecretary for European Affairs, Italian Government, also took part in the workshop.





6.6 Press and communication activities

A press release was issued to the Italian media to advertise the workshop. A post meeting press release highlighted the conclusions of the workshop including the headline: “Scientists and professionals for prevention ask for an active role from Italy in defence of the environment and health.” <http://www.epiprev.it/INPHET/inphet-press-release>

Supporting workshop information was posted on the INPHET website and included invitations, announcements, media material and press releases.

7. The Modena INPHET Position Paper

A position paper was drafted before the meeting by the scientific committee. This was to be discussed and finalised through the workshop and would be presented to the current Italian Presidency of the EU Council, as Italy was the current holder of the Presidency. Entitled ‘Why Environmental and Public Health Tracking: The Modena Position Paper for the Italian Presidency of the EU Council “for a Better Environment and Health” ‘, the position paper called for co-ordinated action and prioritisation of environment and health support, during the Italian presidency. The position paper starts with the assumption that health and environment have to become fundamental assets for a social and economic development, because they are the basis of a bond that links the economical and social forces to a territory and contributes in attracting not only economical investments but also those related to innovation and social participation. With these benefits in mind, environmental public health tracking (EPHT), aims to merge, integrate, analyze and interpret environmental hazards, exposure and health data. As such, public-health decision makers can use this timely, accurate and systematic data to inform and draft policies that reduce environmental health burdens and prevent disease efficiently and cost-effectively.

Essentially, the position paper asked for the support of two proposals;

1. To promote the creation of an international EPHT network to address environmental challenges to public health by establishing a Working Group in the European Union.
2. To support research and monitoring of environmental hazards and health risks

A draft version of the position paper was circulated to all attendees of the workshop. Throughout the two day meeting, participants were encouraged to consider and comment on the draft and main messages that needed to be included and presented to the Italian Presidency. After the meeting, the paper was finalised to take into account the comments and discussion of the meeting. The Scientific Committee agreed the final draft and the final position was paper presented to Mr Sandro Gozi for consideration by the Italian Presidency of the EU. A copy is available here:

<http://www.epiprev.it/INPHET/PP2014>



8. Sessions of the Modena workshop

8.1 Opening plenary session- Day 1

The meeting began with a plenary opening session, opened by the chief organiser Paolo Lauriola, and chaired by Brigit Staatsen.

The welcome address included introductions from Luciana Sinisi, Head of Environmental Determinants of Health, ISPRA, Emanuela Bedeschi, Head of Public Health Service, Emilia Romagna Region, Liliana La Sala, Head, Department of Public Health, Ministry of Health, and Mariella Martini-Director General, Local Health Authority, Modena. The local dignitaries highlighted the need for both health and environment related organisations and activities to work together to help understand the burden of disease from environmental exposures. A need to collate the effectiveness of preventions in this area to demonstrate efficiency was highlighted. Local authorities both on the environmental and health sides are committed to provide data for studies and also expertise of staff of local agencies to support this agenda. Both local and regional agencies are involved in this process in Italy.

The joint statement on EPHT was introduced to participants (see Box 1). The draft position paper was also introduced, and participants were encouraged to consider the messages within this draft throughout the workshop and comment on the draft that would summarise the purpose of INPHET and the main outcomes of the workshop. The updated version was to be presented to Mr Gozi at the end of the workshop.

Paolo Lauriola (PL) and Giovanni Leonardi (GL) introduced in detail the aims and the rationale of the workshop. The primary aim was to initiate and set up a network on EPHT. This was not only to be European, or US based, but truly international with many countries having an active role. The workshop was structured to arrange the step-by-step implementation of the EPHT network along three main dimensions to help address the priorities, challenges and needs of the public health community (Partnerships, Science and Data, Ethics and Confidentiality).

In order to give an identity to the network, and for recognition, proposals for an INPHET logo were also introduced, for all participants to comment on.

GL (who firstly launched the idea to involve researchers and institutions to create a common basis for EPHT) outlined the focus of many public health institutes, being on short term acute hazards, with a movement a few years ago to include a focus on chronic hazards. EPHT supports this and has been in action in the US for many years. Institutes, professionals and countries can all learn from this experience and development. This helped to initiate the EPHT activities in the UK, initiated by asking stakeholders what their needs were. On occasion of the 2013 ISEE conference held in Basel, the pre-conference workshop developed this theme further, looking at priority setting in the tracking programme. The Modena workshop hoped to develop the ideas raised at these meetings, on an international scale, and allow more in depth discussion on priority areas.

A possible objective for the INPHET was drafted after the Basel meeting and was circulated at this meeting (Box 1). The objectives and benefits to public health were outlined. This workshop served as



a working session to develop these objectives and ideas further. The focus was encouraged to be on chronic diseases and longer term issues. No pre-determined conclusions were given to participants, as the sessions were designed to define the priorities and future focus of the network.

This attention derives first and foremost from the conviction that the focus on less strong risk factors or associations may be more important than larger known effects and risks. The strength of evidence is of course important e.g. the Bradford Hill criteria. However, following the Precautionary Principle (PP)²¹, we should not wait for better evidence, before taking action and EPHT could be a great opportunity to alert and follow-up the state of risk factors at local and general level, mainly for decision makers and populations.

8.2 The background to EPHT; methodological processes, data sources, collection and management, implementation and evaluation of EPHT

Members of the Scientific Committee then introduced aspects of EPHT from their experiences and projects.

Lina Balluz (LB) provided an overview of EPHT in the US. The US Tracking programme was initiated in 2002, as the first system to integrate both environment and health data in the same system. CDC's EPHT network is known to be the most advanced and probably best example of how tracking can be used to target environment and health related burdens, link environmental monitoring data with health outcome data on geographical levels and to interpret this information.

LB outlined the challenges encountered in setting up this system, e.g. issues of confidentiality and data quality. An initial priority was to identify partners, e.g. federal agencies, EPA, etc., to support the tracking activities. CDC formed working groups to concentrate on developing aspects of the tracking programme. At present there are three main working groups; 1. 'Standards and network development' workgroup which focus on network architecture, user access, data security, meta data development, 2. 'Content' work group which focus on science such as exploring possible contents, indicators and measures to include on the Tracking network, 3. 'Program marketing and outreach workgroup'- assists in development and implementation of program marketing and outreach strategies, 4. 'Academic partners' – to provide technical support on linking environment and health data, developing capacity, provide training and specialist skills, etc.

The CDC EPHT network was officially released in 2009. The ground work to establish this started in 2002, showing the length of time it took to build and develop. The exchange of information and data management are key aspects of this. CDC also relies on the support and input from the States EHTP

²¹ In 1992 the Declaration of Rio, as a result of the United Nations Conference on Environment and Development, the item 15 states: "In order to protect the environment, wide measures of precaution must be applied by all nations according to their ability. In the face of risk and serious or irreversible damage, the absence of scientific certainty should not be a pretense to put off the adoption of efficient measures directed at preventing the degradation of the environment"

More recently (November 17, 1998), the General Committee XXIV (General Committee "Consumer policies and Health Protection") defined PP as "A risk management approach in a scientifically uncertain situation, which calls for **action** in the face of a proportionally serious risk without waiting for the conclusive findings of scientific research"

See also: EEA Report No 1/2013 (<http://www.eea.europa.eu/publications/late-lessons-2>)



programs. CDC's Tracking programme fund 24 states to contribute to the US Tracking network, but recent budget cuts has impacted this support. The Tracking network focuses on health outcomes (chronic diseases), environmental hazard, and population health data. Information comes from national, federal and states sources. LB highlighted examples of state systems and the use of data, e.g. in California- reducing effects of heat waves, reduce exposure to lead poisoning in children in Missouri, Oregon- arsenic exposure in private wells, and the distribution of education material to residents on this issue. All of these examples were supported by the tracking system.

LB outlined the priorities for the US tracking network: to expand the network, add content, expand the web tools, and continue to show the importance of the use of the tracking data through data use and 'success stories'. Success stories are highlighted to show the added benefit and impact of the tracking program.

Patrick Saunders asked about the US tracking models for predicting PM₁₀ exposure and mortality and morbidity estimates, and how to present data. This spurred a discussion; this is essential if we want policy makers to take note and make changes. There is a need to add numbers of effect. LB explained about the mortality benefit assessment tool available on the national portal and the plan to expand by adding monetary values to the outcomes. A question arose on how the federal government supports states in doing this type of work. CDC gave funding to individual states to develop tracking programs, and support building the state environmental capacity.

Sylvia Medina (SM) introduced the 'Triple S' project- 'Syndromic Surveillance System in Europe'. This was a 3-year project coordinated by InVS and covering both human and veterinary syndromic surveillance systems (SyS). It involved 24 partners and was co-funded by the European Executive Agency for Health and Consumers (EAHC) Grant No. 20091112. The project showed the added value of SyS for: detection of expected or unexpected outbreaks; early awareness - follow-up of indicators based on syndromes during seasonal periods and assessment of the impact of an outbreak after its identification; investigation of outbreaks; better understanding and management of the outbreak (vaccination of specific age groups, targeted information/prevention messages, etc.); and reassurance of decision makers in case of no impact on population's health. Through its continuous monitoring, SyS can support cross-border surveillance of health threats and can help meet the new international public-health surveillance requirements.

SyS is used in France for both unknown and also known sources of ill health (climate, air pollution, infectious outbreaks, others). The project benefits for Member States included: provide practical tools to support the implementation/improvement of their own SyS system(s); encourage synergy between human and animal surveillance in the country; and be part of an SyS expert network to exchange and share experiences. At a European level, the project's benefits include: support SyS systems in EU countries with harmonized surveillance outputs; agreement on the minimum requirements for reporting comparable results between MS; propose a strategy for SyS towards a comparison and summary of findings at a European level; maintain a SyS expert network for surveillance of cross-border public health threats; and increase the EU capacity to monitor the health burden of events for the population. A number of factsheets were developed for the project;



they were circulated in the delegate packs. These include guidelines for local use for the implementation of SyS in MS. The aim is to better harmonise SyS in different countries, regions, or states. More detailed guidelines are available through the SyS website:

<http://www.syndromicsurveillance.eu/>

Jan C. Semenza (JS). Linking environmental with epidemiological data: the ECDC experience.

The European Centre for Disease Prevention and Control (ECDC) in Stockholm focuses on EU level infectious disease surveillance and epidemiological intelligence. Of particular interest are the drivers of infectious diseases in Europe, e.g. social demographic change, health care system change, and global environmental change.

ECDC conducted a survey of government representatives of EU MS on their opinion on the need for surveillance of infectious diseases to cope with global climate change. Do countries need to take action due to the threats from climate change? Do current surveillance systems pick up emerging infectious diseases and shifts in the distribution of infectious diseases? For certain infectious diseases the surveillance systems currently in place in Europe are inadequate to cope with global environmental change. Effective public health response requires early warning and rapid response. How do we pick up a signal early on? Therefore systems need to be sensitive enough to detect the emergence or re-emergence of infectious diseases. There is a need to monitor environmental precursors of infectious diseases.

ECDC has designed a system to merge datasets to help monitor environmental precursors of disease. The European Environment and Epidemiology (E3) Network²² Geoportal and databases, includes population data and environmental precursors of disease, e.g. predicted temperature changes, humidity changes etc, and is available for public health practitioners and researchers. JS showed an example through the application of environmental data to malaria transmission in Greece. Public health interventions were able to be concentrated in the areas of predicted high risk through the use of E3 environmental datasets.

JS outlined another example of an application to the West Nile Fever in Europe. In 2010, a large outbreak was linked to temperature deviations from baseline. ECDC determined the environmental and climate conditions for outbreaks in future years, based on temperature, areas of wetlands, presence of past outbreaks, and migrational birds (the main host of the disease). The datasets can potentially predict where outbreaks may occur. Another application was applied to Dengue, a disease transmitted by mosquitos. Air traffic data from dengue affected areas in the world were mapped to determine where in Europe the disease is imported to. Risk maps were generated highlighting the cities and months with elevated risk.

Sea surface temperature and salinity in coastal waters such as the Baltic Sea have also been monitored and mapped, showing the environmental suitability for the spread of vibrio bacteria. This is temperature dependent and the E3 Geoportal has been used to show environmental suitability for

²² <https://e3geoportal.ecdc.europa.eu/SitePages/Home.aspx>



vibrio in Europe during hot summer months. Another tool available on the E3 Geoportal is a quantitative risk assessment tool for water and food borne diseases; up to 23 exposure pathways can be modelled. Varying environmental conditions and climate change datasets can be used, for the quantitative risk assessment for microbiological borne diseases. The E3 Geoportal serves as an engine for monitoring environmental change as it relates to infectious diseases and other health outcomes.

8.3 Day 2: Plenary sessions

Day 2 of the workshop started with welcome addresses by Simona Arletti, President of the Healthy Cities Initiative of the Municipalities of Modena, and Professor Stefano Tibaldi, Director General of ARPA Emilia Romagna.

Simona Arletti outlined the work of the Healthy Cities Network, which started in 1995 in Italy and is affiliated to the WHO. Modena city holds the presidency of the network, which in Italy includes 70 cities and 8 million people. They hold an annual national meeting, and promote healthy lives, through topics such as air quality and health. Phase 6 of the programme is connected to Health 2020 (2014-18). The goal is for a common health policy framework, to 2020, for sustainable health in all areas. The agenda is determined by the fast changing European context for health, including a focus on urban health and health inequalities. Health 2020 has 4 priority areas including life course approach, and sustainable environments, etc. The Healthy Cities movement supports social inclusion and promotion of walking cities. They also target the determinants of health, e.g. diet, anxiety, etc. It is key to have a strategic plan and an integrated model of action, e.g. the PHAN- health economic assessment tool. The HEAT project involves urban planning and interventions on city mortality from regular walking and cycling (www.heatwalkingcycling.org) showing the benefits of walking and cycling. This has been applied to Modena resulting in the implementation of a new stretch of a cycle lane. The investment on prevention has resulted in a 5.13% decrease in morbidity, saving 4,014 euros on health costs. The visions of Health Cities Initiatives include building a green community, healthy growing, resilience, healthy transport, urban planning and design. This includes the Agenda 21 initiatives; for more information see www.retecittasane.it

Professor Stefano Tibaldi- reported on the work of ARPA Emilia Romagna, which is embedded in to the regional environmental agency, as part of a regional and national health system. ARPA has over one thousand staff and works on controls on protective systems, control and permits for production with industry, etc to control pollution. ARPA's Toxicology unit tries to bridge the gap between environment and health. Data and knowledge flow freely between the two and ARPA lead in this field with good collaboration between the disciplines. Professor Tibaldi explained that ARPA work for the national health system, but also conduct research and provide specialist advice on a local, regional and national basis.

Mr Sandro Gozi, MP, Undersecretary for European Affairs, Italian Government, addressed the participants at the close of the workshop. He supported the efforts in this region for the investigation of the effects of the environment on health. He described how the Italian presidency was committed to promote a new system of healthy living and wellness, to promote environment

and health issues, a new wellness system. This would include research on environment and health policies, e.g. food, diet and health and education. A general framework for new policies, e.g. in targeting climate change and increasing renewable energy, would be inclusive of this.

Mr Gozi was presented with the workshop position paper, as drafted by participants of the workshop, and agreed with the key concepts. He outlined the importance of prevention approaches, starting from early years, and the relationship with the environment. He reported that the Italian presidency will recognise and address historical mistakes, e.g. ‘Terra dei fuochi’ (Land of Fire) in Italy, and learn from mistakes of the past. The issues of environment and health can also be used as cost reduction methods. E.g. for climate change, the EU 2020 strategies consider environment and health prevention as a cost reduction strategy, along with promoting citizenship. The revision of the EU 2020 strategy will begin with a consultation with stakeholders starting in March 2015. The use of the INPHET network could help with this review. The review will focus on financial strategies and sustainability of health systems and the issue of research and strategy at common levels, for the period 2014-2020. The Italian presidency will focus on these priorities during its presidency, focusing on the better use of strategies and related activities. This will include a new energy policy and an agenda for new and social media use. Mr Gozi said “The defence of the environment and consequent care of public health must not be considered as an expense, but, on the contrary, it should constitute a contribution to a reduction of costs and therefore represents not only a factor of greater social justice and recognition of citizen rights, but also an instrument at the service of a more competitive Europe”.

He also took the commitment to involve other stakeholders in this field to support the request coming from the network. He accepted the position paper and undertook to present this to the Italian Presidency of the EU. A video of his speech is available at http://www.epiprev.it/INPHET/Video_Modena02#Gozi

The workshop closing session heard from the working party chairs a summary of the discussions of the working parties in turn. Separate documents as appendices A-C give a report of each working party and recommendations from each session are outlined below.

9. Recommendations made at the workshop

There were a number of recommendations arising from the workshop. Detailed recommendations arose from the working parties and are summarised here:

9.1 WP 1: Partnerships

Recommendations to develop the partnership and network;

- Start sharing our current resources, questions and expertise to show the added value of this network (start building a list of expertise in Public Health and Environment tracking: who does what and why?).
- Look at possibilities to start an informal network.

- Start with a website and link this with the websites of national public health and environmental agencies.
- Start with exchanging experiences and training modules/e-courses, organize a webinar if several people are interested in the same subject.
- Look for funding possibilities (national, EU-COST, HORIZON 2020, DG Sanco – Health programme).
- Pay attention to involve various stakeholders, disciplines and expertise.
- Involve the public (e.g. through NGO's) from the start (e.g. at international level: HEAL, WECF).
- Involve communicators/educator groups (e.g. NGOs, Eurohealthnet).

9.2 WP 2: Science and data

There was consensus that EPHT includes steps from science to public health benefits, therefore it is focused on applications of the science.

Four areas emerged from the discussion:

1. Themes to focus EPHT studies on were highlighted:
 - Polluter/pollutant-focus: waste, climate change/vectors, specific pollutants including their change over time
 - Disease focus: a broader range of topics emerged
2. What level of precision is required needs to be defined. Different aggregation of environmental data are possible, such as:
 - Address
 - Postcode
 - Census area
 - Region

In particular in relation to environmental and exposure data, the aim of data collected/used may be:

- Production of risk estimates, as part of etiologic research
- Public health surveillance/exploratory research/planning of interventions.

Therefore, an EPHT programme has a different aim compared to etiologic research, and is likely to require a lower level of precision/aggregation of data over larger areas.

3. Scenarios: There are several drivers of environmental change, not limited to climate change but including use of water, type of energy production, and changes in environment related to all human activities. Therefore an EPHT international activity would need to consider this broad “change” agenda, and scenarios may drive some of the planned work.
4. Tools: Common tools might support EPHT developments and therefore they may be a key aspect for taking joint work forward. Tools may include:
 - an atlas summarizing comparable information on preventable environmental hazards to health

- rapid enquiry methods such as ‘Rapid Inquiry Facility’ (RIF) used in England may be of value in several countries.

9.3 WP3: Ethics and Confidentiality

- Personal data: We need to protect access to personal data for assessing local environment-health associations. However care is needed to avoid implementation of EU data protection rules jeopardising the opportunity for public health use of such data.
- Role of biomarkers: Potentially useful for EPHT studies, but need to prioritise the least invasive, and recognise limitations in interpreting biomarkers, eg short half-lives.
- Essential to have informed consent for the individual uses of biomonitoring data.
- Need to be careful on feeding back the risk related to individual exposure markers or clinical markers, and may be impossible in some cases.
- Should explore possibility of using accumulated lab samples if they can be geo-referenced and if ethical approval is given. Probably does not need prior informed consent.
- Main emphasis is population (rather than individual) use of data to characterise risk, as individual data may be very difficult to interpret in terms of risk.
- Communication – consider analysing public concern, e.g. through twitter or Google searches to identify perception of environmental problems as part of surveillance.

9.4 Common discussion points and actions to carry forward

Common discussion points and recommendations arose from the workshop as a whole. They included;

- The need to use epidemiology as an evidence base- and show how it is supported by tracking type studies, using evidence and surveillance to support the arguments, to help answer economic questions. The tracking network can be used to help support this role. *Tracking needs to sit along-side epidemiology and monitoring activities.*
- A statement of INPHET is needed:- e.g. to provide support and a clearing house for international EPH tracking activities. It can include a regular exchange of activities, e.g. meetings etc, or be a more co-ordinated network. Dedicated secretarial support is needed.
- A launch of a pilot is needed to show how the network will work- a suggestion of pilot projects to demonstrate the use in a tracking project. Need to demonstrate the benefits of the network on a topic, including financial benefits. Air pollution and contaminated land examples have been used in other programmes, so it was suggested to use another example to best demonstrate benefits.

The scientific committee agreed to implement progressively the following actions after the meeting:

- Prepare the workshop reports and publish the proceedings of the meeting so that the outputs of the meeting and the network’s intentions are open and made public.
- Develop a website on INPHET, highlighting its members and activities.



- Hold a membership list, so that individuals and organisations can register, become members of the network and ensure that documents and outputs are circulated to members and interested parties that couldn't attend the workshop.
- Draft papers on INPHET, its mission, ideas and accomplishments for publication in journals or the WHO Bulletin.
- Share case studies: it was suggested that the network start with the sharing of case studies to help understand the role of tracking and the purpose of the network. Case studies can be hosted on the network website.
- Share skilled groups: the Network can show the benefit of sharing skilled resources- e.g. statisticians.
- Create an inventory of health data that can be used for environmental health analysis. Then document what areas need to be improved.
- Show case the positive experience of tracking- and how it works. e.g. outlining the US and European experiences, the tracking network.
- Look for support and contributions to funding proposals to further the activities of the network and tracking activities across different countries.
- Boost membership of INPHET: in terms of organisations and also the number of countries involved and bring strong EU MS together to support less active MS to the table, where less tracking activities exist- e.g. in eastern European countries.
- Hold training seminars and webinars to show case tracking activities and the benefits of the network.
- Host an online forum for sharing of ideas, through the INPHET website- in a closed environment for members. This would encourage the sharing good practice, resources, websites, etc.
- Link with the Healthy Cities Initiative and network- to demonstrate collaboration and benefits.
- The next meeting for INPHET is proposed in 2016 in the US as a parallel session of an international conference to be identified.

10. Report authors

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12. Appendices

Working party reports are available as separate documents. Please see the workshop website for copies of these.

A): Working party report 1: Partnerships and Strategies

B): Working party report 2: Science and Data

C): Working party report 3: Ethics and Confidentiality.