

Application of environmental public health tracking systems in environmental public health

ISSN 1857-9787

UDK 614.2:502/504(73)

Sandra Kostaska^{1,3}, Snezana Ivic-Kolevska^{2,3}, Jasmina Mecheska-Jovchevska⁴

¹Institute for Accreditation of Republic of North Macedonia, Skopje

²PHI Re-Medika, Skopje

³European University in Skopje, Faculty of dental medicine

⁴PHI University Institute for Clinical Biochemistry

Abstract

For environmental public health, the ability collect and use data is an essential service in addressing community environmental public health problems. Environmental public health tracking (EPHT) has been proposed and developed as an approach to public health surveillance when environmental factors affecting health are involved. There are a number of strengths of the EPHT approach including the use of existing public health surveillance systems. EPHT may also be more widely used in countries where quantitative risk assessment and epidemiological capacity and capability are limited. This surveillance can be carried out at the local level, for example at a community level, as well as nationally.

Kew words: environmental health, public surveillance, health tracking

Introduction

Development of industry and its products has brought many benefits to modern societies, including a reduction in average deprivation, although it has also generated a huge dispersion of hazardous materials, in many cases dumped in places where some of the most disadvantaged people live. Such pattern could engender potential harm to health and wellbeing attributable to chemical exposure and to socioeconomic deprivation^[1-3]. Additionally, public health agencies have recognised a responsibility for addressing health issues attributable to industrially contaminated sites (ICSs), by characterising the hazards released to the environment and mitigating any potential impact on human health attributable to those sites. There is an urgent need to identify the most suitable interventions aimed at prevention in affected communities, to facilitate a better social and economic development, while minimising population exposure to harmful compounds associated with ICSs.

Accordingly, information on the pollution of air, water, soil, food as well as consumer products may be used in more than one way to recognise multiple links with health, wellbeing and environmental sustainability, and support activities directed at maximising these. For this to be

feasible, appropriately aggregated and linked data needs to be shared with a wide range of users, who can both contribute and gain data and interpretative frameworks consistent with their respective sphere of activity. Legal, ethical, professional and technical aspects need to be addressed for such linkages to be feasible and for access to data by users who can contribute to relevant activities.

Traditionally, environmental health problems have been addressed by controlling a single pollutant or exposure. However, today's complex environmental health problems require more innovative and holistic solutions that address not only a single pollutant or exposure, but the multifactorial effects of the environmental and environmental change on human health, and the systems that guide those effects. Considerations also need to be made at the individual, local, national and international levels. Public health surveillance of ICSs is likely to play a role in supporting the capacity of society to monitor the harmful aspects of an ICS as well as providing a tool for documenting any benefit attributable to actions aimed at remediation or more widely regeneration of ICSs alongside their urban or rural context [4].

For environmental public health, the ability collect and use data is an essential service in addressing community environmental public health problems. Environmental public health tracking (EPHT) has been proposed and developed as an approach to public health surveillance when environmental factors affecting health are involved. 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" [5].

There are a number of strengths of the EPHT approach including the use of existing public health surveillance systems. EPHT may also be more widely used in countries where quantitative risk assessment and epidemiological capacity and capability are limited. This surveillance can be carried out at the local level, for example at a community level, as well as nationally. Public health surveillance is a key tool in understanding the health profile of a community. Public health surveillance data can also be analysed to understand global patterns and differences in health outcomes. This paper aims to show how EPHT advances global health efforts by sharing recent global EPHT activities and resources with those working in this field and also describes some experiences of systems.

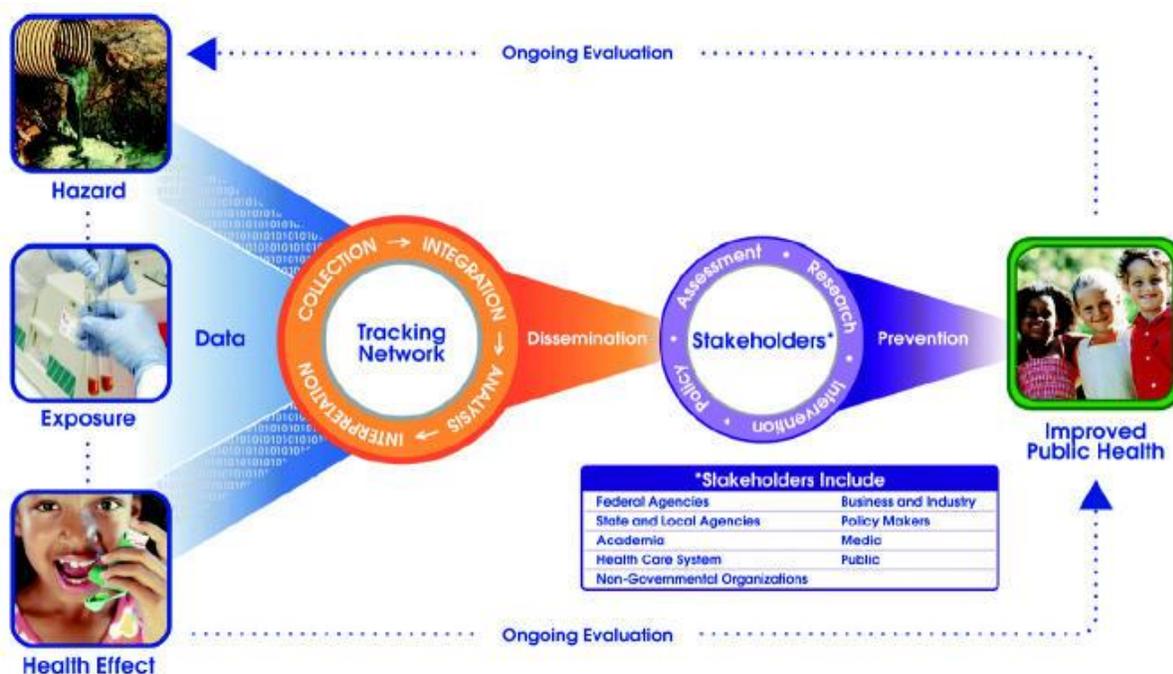
Environment and Public Health Tracking Can Help Environment and Health Integration

EPHT aims to promote a resilient society by analysing complex datasets, addressing different audiences and supporting environmental health messaging tailored to each audience: The public: information to support individual changes in attitudes and collective actions; Professionals and stakeholders: tailored information to health professionals, land planners, environmental managers and researchers; Decision-makers: integrated health and environmental information to inform decisions and create opportunities to reduce the multiplicative impacts associated with rapid urbanisation, globalization and climate/social/economic change. Such general and generic categories also include resource managers, planners, economists, conservationists, indigenous and locally impacted communities, community developers and many other essential stakeholders. They are all strategically important, taking into account the dynamics which interrelates the two central issues on how population health may be improved: individual behaviour and social and economic factors [6,7].

As previously mentioned, environmental public health tracking is the ongoing collection, integration, analysis, and dissemination of data from these three components: environmental hazard monitoring, human exposure tracking, and health effect surveillance. EPHT aims to merge, integrate, analyse and interpret environmental hazards, exposures and health data (Figure 1) to provide information for public health decision-makers to reduce the environmental burden of disease.

Accurate and timely surveillance data permit public health authorities to determine disease impacts and trends, recognise clusters and outbreaks, identify populations and geographic areas most affected, and assess the effectiveness of public health interventions [8]. By effectively linking standardised environmental and health data in an ongoing manner, and translating it into meaningful information, EPHT can help to protect the health of the public.

Figure 1. Environmental public health tracking.



Source: INPHET: International Network on Public Health & Environment Tracking. Available online: <http://inphet.org/>

The EPHT approach strives to achieve its vision of “Healthy Informed Communities” by empowering environmental and public health practitioners, healthcare providers, community members, policymakers and others to make information-driven decisions that affect health while maintaining appropriate data protection measures [9]. According to Horton and Lo [10], now we need a global perspective, demanding “new coalitions and partnerships across many different disciplines”. These challenging objectives should be delivered from the perspective of providing comprehensive integration within a “planetary” framework for environmental and public health outcomes; this must be considered the ultimate goal [11–13]. In summary, EPHT is an instrument which can support the cross-sectoral integration of information to assist decision-making in support of the greatest ambitions for global and planetary health outcome by means a comprehensive and ecological public health prevention approach.

Application of the EPHT

Martin-Olmedo et al. [14], reported that the application of EPHT has taken a number of forms, with a variety of terms used to describe it. For example, in Europe air pollution monitoring and modelling has been used as a tool for public health surveillance with little reference to EPHT terminology, while comparable activities in the USA have been developed using EPHT as a descriptor. Lead surveillance programmes in France and USA have been implemented as specifically designed surveillance activities, while in England it is part of an EPHT programme. In Italy, monitoring of mesothelioma as an indicator of exposure to asbestos has taken place, at times described as tracking, with successful results in terms of identification and management of a newly identified hazard. Other EPHT success stories of relevance to ICSs include using environmental health indicators for assessment and planning in Colorado.

The differences in terminology and topics across Countries reflect variation in history and culture. However, several shared dimensions have been agreed, such as the aim to provide public-health decision makers with timely, accurate, and systematic data to inform and develop policies that reduce environmental health burdens and prevent disease efficiently and cost-effectively. EPHT has been proposed as part of the 'wicked' solutions to the prevention and management of preventable non-communicable disease (NCDs) and protection and promotion of planetary health. Developing surveillance of ICSs using an EPHT approach may provide a framework for further documenting health and social impacts of existing sites, and for strengthening the capacity to attribute any changes in health to interventions in specific locations or across sites in the same sector.

United States Experience with EPHT

In 2000, the Pew Environmental Health Commission released a report on the state of environmental public health in the United States [15]. They recommended the development of a system to track and link environmental agents, exposures and related diseases because there was a lack of basic information that could document possible links between these factors. In 2002, the National Environmental Public Health Tracking Program (Tracking Program) was created at the Center for Disease Control and Prevention (CDC). Since its inception, the Tracking Program has worked closely with a community of funded state and local health departments to build capacity and infrastructure to develop the National Environmental Public Health Tracking Network (Tracking Network), an integrated network of environmental health surveillance data at the local, state and national levels. The Tracking Network currently provides surveillance data on 20 different environmental and health topic areas [16] and there are over 420 different environmental health measures that are publicly available. The application of these data is key to supporting evidence-based decision making and public health actions within state and local programs to help promote healthy and informed communities. For example, at the national level, Strosnider et al. [17] examined the associations between ground-level ozone and fine particulate pollution and emergency respiratory visits for asthma, chronic obstructive pulmonary disease (COPD) and respiratory infections. While previous studies focused on single cities, the authors leveraged the data available via the Tracking Program to look at the association between air pollution and respiratory emergency visits across hundreds of U.S. counties. At the state and local levels, there have been efforts to use tracking program resources and/or data in establishing unique and diverse partnerships, developing innovative ways to use the data and resources, and identifying

approaches to making the data more accessible, all to improve public health at the local, state and national levels [18].

Conclusion

The unique feature of the national EPHT network is the emphasis on data integration and standardization from all sources to improve data utility to the end user. With adequate funds, the EPHT network will provide valid scientific information on environmental exposures and adverse health effects that will bridge the existing data gap and provide a foundation for actions to improve community health.

References

1. Brulle, R.J.; Pellow, D.N. Environmental justice: human health and environmental inequalities. *Annu Rev Public Health*. 2006, 27:103-24.
2. McMichael, A.J.; Friel, S.; Nyong, A.; Corvalan, C. Global environmental change and health: impacts, inequalities, and the health sector. *BMJ* 2008;336(7637):191-94.
3. Gee, G.C.; Payne-Sturges, D.C. Environmental health disparities: a framework integrating psychosocial and environmental concepts. *Environ Health Perspect* 2004; 112(17):1645-53
4. Pasetto, R.; Martin-Olmedo, P.; Martuzzi, M.; Iavarone, I. Exploring available options in characterising the health impact of industrially contaminated sites. *Ann Ist Sanita* 2017;52(4):476-82.
5. McGeehin, M.A.; Qualters, J.R.; Niskar, A.S. National environmental public health tracking program: bridging the information gap. *Environ Health Perspect* 2004; 112(14):1409-13.
6. Baum, F.; Fisher, M. Why behavioural health promotion endures despite its failure to reduce health inequities. *Sociol. Health Illn*. 2014, 36, 213–225.
7. Logan, A.C.; Prescott, S.L.; Katz, D.L. Golden Age of Medicine 2.0: Lifestyle Medicine and Planetary Health Prioritized. *J. Lifestyle Med*. 2019, 9, 75–91.
8. California Policy Research Centre, University of California. Strategies for Establishing an Environmental Health Surveillance System in California. A Report of the SB702 Expert Working Group. 2004.
9. National Environmental Public Health Tracking: About the Program. Available from: <https://www.cdc.gov/nceh/tracking/about.htm>
10. Horton, R.; Lo, S. Planetary health: A new science for exceptional action. *Lancet* 2015, 386, 1921–1922.
11. Buse, C.G.; Oestreicher, J.S.; Ellis, N.R.; Patrick, R.; Brisbois, B.; Jenkins, A.P.; McFarlane, R.A.; Mckeller, K.; Kingsley, J.; Gislason, M.; et al. Public health guide to field developments linking ecosystems, environments and health in the Anthropocene. *J. Epidemiol. Community Health* 2018, 72, 420–425.
12. Gillingham, M.P.; Halseth, G.R.; Johnson, C.J.; Parkes, M.W. *The Integration Imperative Cumulative Environmental, Community, and Health Effects of Multiple Natural Resource Developments*; Springer: Berlin/Heidelberg, Germany, 2016.

13. Parkes, M.W.; Allison, S.; Harder, H.G.; Hoogeveen, D.; Kutzner, D.; Aalhus, M.; Chiasson, A.; Adams, E.; Beck, L.; Brisbois, B.; et al. Addressing the Environmental, Community, and Health Impacts of Resource Development: Challenges across Scales, Sectors, and Sites. *Challenges* 2019, 10, 22.
14. Martin-Olmedo, P.; Hams, R.; Santoro, M.; Ranzi, A.; Hoek, G.; de Hoogh, K.; S. Leonardi, G. Environmental and health data needed to develop national surveillance systems in industrially contaminated sites. *Epidemiol Prev.* 2018, 42 (5-6) Suppl 1:11-20.
15. Pew Environmental Health Commission. America's Environmental Health Gap: Why the County Needs a Nationwide Health Tracking Network: Technical Report. Baltimore, MD: Johns Hopkins University School of Public Health; 2000.
16. Wilson, H.E.; Charleston, A.E. Environmental Public Health Tracking Program Advances and Successes: Highlights From the First 15 Years. *Public Health Manag Pract.* 2017 Sep-Oct;23 (Suppl 5 ENVIRONMENTAL PUBLIC HEALTH TRACKING):S4–S8.
17. Strosnider, H.M.; Chang, H.H.; Darrow, L.A.; Liu, Y.; Vaidyanathan, A.; Strickland, M.J. Age-Specific Associations of Ozone and Fine Particulate Matter with Respiratory Emergency Department Visits in the United States. *Am. J. Respir. Crit. Care Med.* 2019, 199, 882–890.
18. Yip, F.Y. Environmental Public Health Tracking: From Data to Action. *J. Public Health Manag. Pract.* 2017, 23, S1–S3.