**How can Environmental Health Practitioners contribute to ensure population safety and health during the COVID-19 pandemic?**

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**Highlights**

The role of Environmental Health Practitioners (EHPs) during pandemic is discussed. EHPs have played an essential and influential role in the response to COVID-19. COVID-19 EHP roles were discussed across each of the three core public health functions: assessment, policy development and assurance.

Limited human public health resources may potentially increasing other public health and safety risk factors.

Future policies should reflect value of local intervention, community based knowledge and expertise.

**How can Environmental Health Practitioners contribute to ensure population safety and health during the COVID-19 pandemic?**

**Abstract**:

The COVID-19 pandemic highlighted the relevance of public health professionals all over the world, in particular Environmental Health Practitioners (EHPs), who played a major role in the containment of the novel coronavirus, SARS-CoV-2. However, as in past disasters, their involvement was oriented towards urgent tasks, and did not fully utilize EHPs' competences and skills. Additionally, due to limited resources, during emergencies EHPs may temporarily transition away from their day-to-day role, potentially increasing other public health and safety risk factors without appropriate surveillance or intervention. To overcome this and prepare for possible future pandemics, it is important to identify and discuss the key roles of EHPs in different countries, providing a common framework for practices that can contribute to population safety and health. To this end, an international workgroup was established to discuss current environmental health practices and challenges across different countries during the pandemic. Findings from discussions concluded that, despite the observed differences across the countries, EHPs are one of the main public health emergency preparedness and response actors. However, since resources are still lagging significantly behind need, we argue that the role of these professionals during pandemics should be focused on practices that have higher impact to support population health and safety.

Keywords: Environmental Health; Emergency; Pandemic; Population Safety; Public Health.

## 1. INTRODUCTION

Environmental Health Practitioners (EHPs) play a significant role in all stages of disaster management due to their many and varied areas of expertise (Eldridge & Tenkate, 2006; Ryan et al., 2013). EHPs are well-placed to assess the impact of disasters on populations and conduct evaluations of responses due to their population-based focus and holistic approach (Degutis, 2008). Reports from past disasters around the world, such as Hurricane Katrina (United States), Pedrógão Grande fires (Portugal) or the chemical fire at Waste Control Pty Ltd in Bellevue (Australia), emphasized the value of environmental health interventions and practice. These include: (1) reducing the vulnerability of communities to hazards and increasing their ability to respond, withstand disruption and recover rapidly; (2) collaborating on hazard identification and risk assessment; (3) strengthening routine services so that the potential health effects of emergencies and disasters are minimized; (4) considering elements such as drinking water, hazardous waste, general waste, sanitation, food safety, communicable diseases, vector issues, or mass gatherings in the context of disaster response (Falk & Baldwin, 2006; Ryan et al., 2013; Ministério da Saúde, 2017).

Despite the relevance and competences of EHPs in disaster management, barriers that limit their practice have been identified in many countries around the world. Eldridge & Tenkate (2006) identified a set of relevant barriers, including ambiguity about these professionals' functions in disaster management and their limited representation in some phases, the low visibility and profile of the profession, as well as the positioning of environmental health within public health. Dhesi (2019) also found EHPs' (in)visibility was linked to a number of factors including a lack of understanding of the role and expertise among other professional groups and local politicians, leading to exclusion from decision-making committees. Additionally, there are reports that public health has been chronically underfunded. There is a global trend of decreasing funding for public health with the curative approach given precedence over the preventative approach (Moran, 2016;

Kirchhelle 2020; Sen-Crowe et al. 2020). In some countries, such as in the U.S. since the 2008 recession (Trust for America's Health, 2020), in England with policies of austerity that have led to a retreat to statutory functions (Dhesi, 2019) where, for example, Public Health funding has been cut by 700 million since 2015/16 (Local Government Association, 2019) and in Australia (https://www.aihw.gov.au/). This has left public health systems with insufficient human resources to deal with day-to-day activities; a constraint that becomes even more obvious during disasters.

The COVID-19 pandemic emphasized the relevance of public health professionals all over the world, in particular EHPs, who are recognized participants in emergency preparedness and response (Gamboa-Maldonado, 2012). In mid-November 2020, the number of confirmed cases of COVID-19 across the planet has passed 50 million, a number that has been increasing dramatically (https://covid19.who.int).To contain the spread of SARS-CoV-2, a variety of environmental health measures were implemented. In different countries, EHPs were called to act as agents of public health in many different roles. They were uniquely placed to help deal with the crisis caused by this pandemic, having an important role in responding both to immediate threats and longer-term implications. Their diverse roles and responsibilities relating to promoting safety and health across occupational, domestic, and commercial settings are uniquely valuable in the context of a major pandemic. However, these same assets are also required for dayto-day management of important environmental issues. Given limited human resources, EHPs may be required to temporarily abandon their day-to-day role, creating gaps in services and performance of critical activities essential to public health and safety (e.g. surveillance of food premises, water quality, built environments, etc).

To better understand the role of EHPs in ensuring population safety and health during the COVID-19 pandemic in different countries, a workgroup was formed to discuss current and prospective roles and responsibilities of EHPs in the COVID-19 response.

Below we present the methodology adopted by the workgroup, as well as the activities of EHPs from the countries that are represented on the workgroup as identified by its members. By sharing this information, we open our discussion to other workgroups, academics, practitioners and decision-makers around the world, in order to provide relevant information to design the most appropriate strategies to control the pandemic and to inform actions in future emergencies. We desire to open new topics and collaborations for discussion and research.

## 2.     INTERNATIONAL WORKGROUP AND INFORMATION COLLECTION

Snowball sampling, in this case exponential non-discriminative snowball sampling (Goodman 1961; Etikan et al. 2016), was used to recruit members of to the workgroup. This group became a "community of practice", an informal learning organization (Li et al. 2009; Wensger 1998) that consisted of academics and representatives of professional associations from different countries, including Portugal, USA, Australia, and UK. The working group has met every two weeks. During the meetings, themes and areas are raised and the information for each country is collected by research leaders. Researchers consulted practitioners, professional associations and published reports of their countries. Figure 1 summarizes the methodological approach taken by the workgroup.
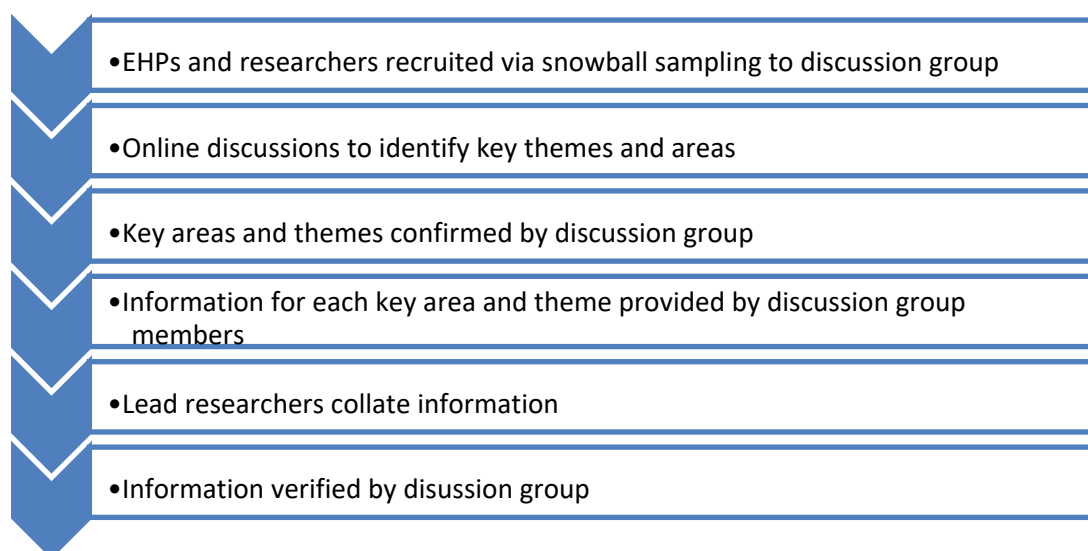
- EHPs and researchers recruited via snowball sampling to discussion group
- Online discussions to identify key themes and areas
- Key areas and themes confirmed by discussion group
- Information for each key area and theme provided by discussion group members
- Lead researchers collate information
- Information verified by disussion group

Figure 1: Methodological adopted by the workgroup

Outputs from the group's discussion included information about EHPs' professional activities in each of the represented countries, information about current constraints that the EHPs are facing that can jeopardize their work, as well as identifying opportunities for research in this scope, which is presented and discussed in the following section.

## 3. COVID-19 ENVIRONMENTAL HEALTH PRACTITIONERS ROLES

EHPs have had a variety of roles across the three core public health functions of assessment, policy development, and assurance (Centers for Disease Control and Prevention, 2011), which are summarized in Figure 2. The public health response was determined by each jurisdiction's (country or state) legislation, guidelines by the Ministry/Department/Directorate-General of Health, local reporting requirements and available resources. Public health agencies directed their resources to rapidly investigate and manage outbreaks.
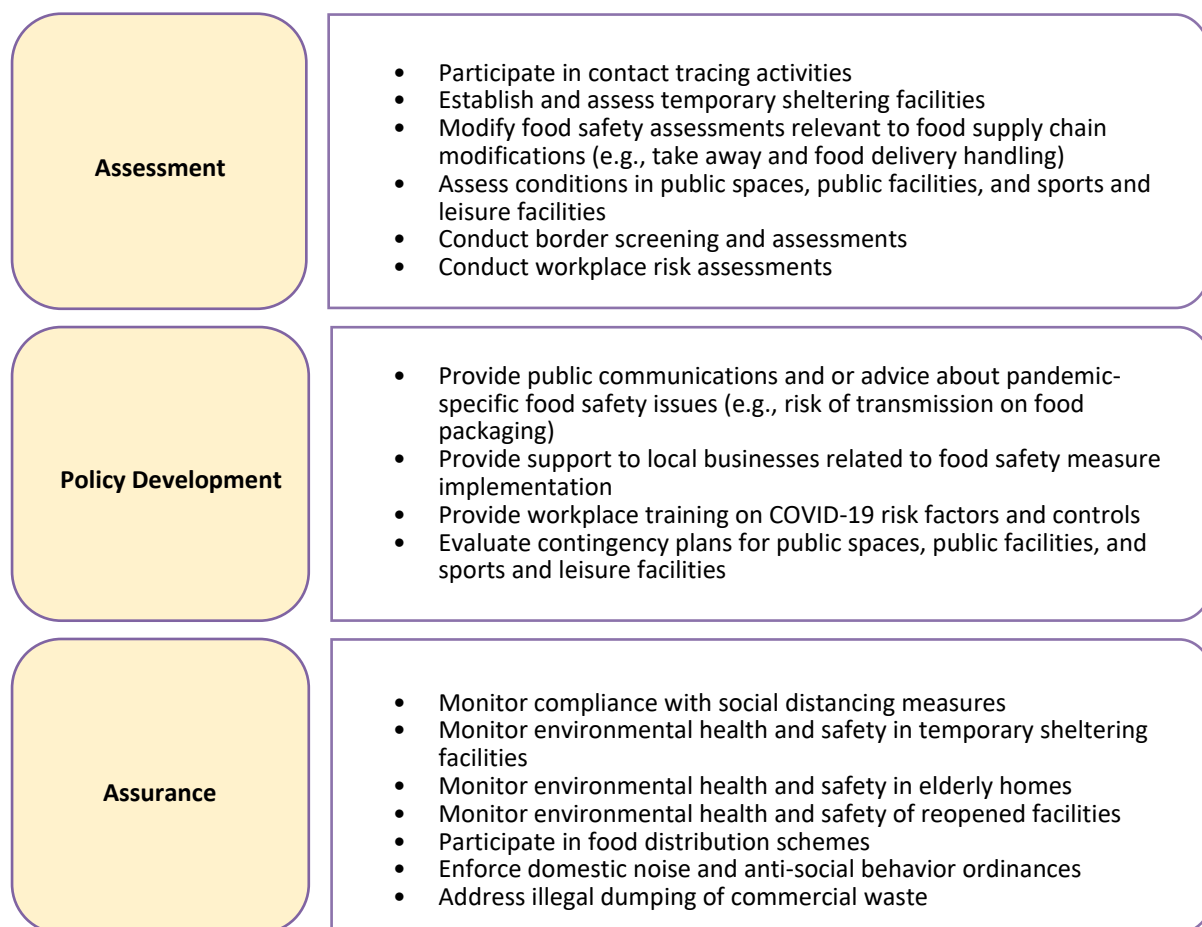
| | |
|---|---|
| **Assessment** | • Participate in contact tracing activities<br>• Establish and assess temporary sheltering facilities<br>• Modify food safety assessments relevant to food supply chain modifications (e.g., take away and food delivery handling)<br>• Assess conditions in public spaces, public facilities, and sports and leisure facilities<br>• Conduct border screening and assessments<br>• Conduct workplace risk assessments |
| **Policy Development** | • Provide public communications and or advice about pandemic-specific food safety issues (e.g., risk of transmission on food packaging)<br>• Provide support to local businesses related to food safety measure implementation<br>• Provide workplace training on COVID-19 risk factors and controls<br>• Evaluate contingency plans for public spaces, public facilities, and sports and leisure facilities |
| **Assurance** | • Monitor compliance with social distancing measures<br>• Monitor environmental health and safety in temporary sheltering facilities<br>• Monitor environmental health and safety in elderly homes<br>• Monitor environmental health and safety of reopened facilities<br>• Participate in food distribution schemes<br>• Enforce domestic noise and anti-social behavior ordinances<br>• Address illegal dumping of commercial waste |

Figure 2: COVID-19 EHP roles across each of the three core public health functions

### 3.1.    Epidemiological investigation:

Epidemiological investigations of COVID-19 outbreaks are critical to halt the outbreak and to obtain information about causes and risk factors. This information can be used in the development of recommendations to prevent the occurrence of similar outbreaks, to address public concerns and to improve understanding of transmission mechanisms, among other factors (ESR (NZ), 2012). EHPs usually integrate field epidemiological investigations with other health professionals. However, during the pandemic, most of their activities were conducted remotely. In Portugal, some states of Australia, Wales, and Northern Ireland, several EHPs were dedicated to the investigation and follow-up of positive COVID-19 cases and their close contacts, as well as to the investigation of sources of infection. They identified and followed each chain of transmission. Additionally, they were responsible for collecting information from each confirmed case, as well as providing information about appropriate control measures. In fact, in countries like Portugal, several EHPs were exclusively or mostly dedicated to this activity. In England, EHPs were classed as "essential workers." In the U.S., according to a recent EHP workforce report. (www.neha.org/node/61651), 52% EHPs reported primary roles in contact tracing activities. However, the number of practitioners available to support this task was frequently noted as insufficient. In Portugal, new short-term contracts were established to meet the demand. In Wales, some EHPs appear to be less involved in following the chain of transmission. Both EHPs and trainees have been heavily involved in enabling compliance with new, COVID-19  specific regulations. All EHPs had a vital role in enforcing the closure of

premises and social distancing measures, and were anticipated to have a central role in the emerging track and trace systems alongside Public Health England/Wales.

### 3.2. Establishment of emergency facilities to support population safety and health:

The COVID-19 crisis called for specific measures for populations at disproportionate risk, including people experiencing homelessness, immigrants, individuals who were incarcerated, etc. (OECD, 2020). Additionally, there arose a need to create facilities to support people with COVID-19 infections that were unable to self-isolate at home or in their place of residence (e.g. assisted living facilities or in nursing homes (e.g. Portugal)). As a consequence, strategies to respond to isolation concerns were created and activated, including the creation of emergency shelters and municipal hotel acquisitions. In Portugal and in the U.S., EHPs served as integral parts of multidisciplinary teams, collaborating on the selection, installation, and operation of such facilities, as well as on the implementation of protection and safety measures, and procedural guidance for occupants and managers. In the U.S., 49% of EHPs report having direct participation in the development and implementation of policy at the local level

(www.neha.org/node/61651).

### 3.3. Food safety:

During the response, it was necessary to ensure food supply chain continuity. However, due to measures implemented to contain SARS-CoV-2, several activities at different points in the supply chain were modified. For example, many restaurants and other food establishments remained functional, but only for take-away or delivery services. While there is currently no evidence that food or food packaging is a major route of SARS-CoV-2 transmission (Rizou et al., 2020), it was necessary to control and monitor the transmission of SARS-CoV-2 in different ways. The World Health Organization recommends precautionary safety measures such as those to ensure social distancing and hygiene practices during food handling (WHO, 2020). Moreover, as food supply chain workers are at risk of being infected, procedures for assessing workers' safety and health were put into place.

In countries like the U.S., Australia, and UK, EHPs played an active role in promoting appropriate conditions and practices in premises that changed to takeaway businesses due to the imposition of public health restrictions. In other countries, like Portugal, during the lockdown EHPs had a more limited involvement in this activity, particularly in the most affected regions, as the limited existing human resources were directed towards epidemiological investigation. In other stages of the epidemic, EHPs in many of the represented countries have worked with local businesses to provide advice and support related to the implementation of food safety and Occupational Safety & Health (OSH) requirements and recommendations. In some states in Australia and USA, EHPs were also actively involved with community education and advice about food safety. Some UK EHPs have been involved in local food distribution schemes.

### 3.4. Assessment of conditions in public spaces, public facilities, and sports and leisure facilities:

When national or regional outbreaks appeared to be decreasing, at the ending the first wave, countries/states started to reduce the number and type of containment measures implemented. In several countries, facilities like schools, nursing homes, markets and fairs, football stadiums, etc. started reopening to the public. Additionally, the involvement of many EHPs in immediate pandemic response activities was reduced at this stage. EHPs transitioned to roles to support safe community transition out of restrictive public health measures and prevention of future outbreaks. These included assessing conditions of such facilities and ensuring that appropriate control measures were

implemented. In the different countries represented in our workgroup, EHPs are also conducting health control and surveillance; evaluating contingency plans; developing and implementing training, awareness and prevention campaigns for employees, volunteers and public; assessing health and safety measures and operations of facilities reopening to the public, and conducting periodic inspections of such facilities.

### 3.5. Protecting occupational safety and health:

In Portugal, EHPs from the public health system are actively involved in promoting worker safety and health in the National Health Service (SNS). During the COVID-19 pandemic, they performed activities that included: workplace risk assessment and implementation of control measures; control of hygiene procedures and monitoring; management of Personal Protective Equipment (PPE); monitoring occupationally-related COVID-19 infections; and providing training on workplace risk factors and control measures related to SARS-CoV-2 infection. Including the other countries, they have also supported employers to carry out risk assessments and in Australia, EHPs were also involved with the implementation of staff wellness regimes, including virtual yoga and meditation.

### 3.6. Pollution Control:

In Wales and England, increases in certain areas of work were observed during the lockdown. EHPs addressed illegal dumping of domestic and commercial waste (flytipping) associated with increased work and closed public waste disposal facilities and were also involved in additional domestic noise, bonfire smoke, and anti-social behavior enforcement activities as people were confined at home.

### 3.7. Non-traditional roles:

In some countries, EHPs have been integrated into new roles such as dispersing crowds at large (illegal) social events. EHPs were involved in ensuring physical distancing in the US, and border screening and assessment was undertaken by EHPs in some states of Australia.

### 4. CONCLUSIONS

Our workgroup discussions illustrated that EHPs have played an essential and influential role in the response to COVID-19, and in support of return to normalcy, particularly on issues centered on community transmission. Their contributions are felt in safely reopening and restoring the economy, emergency operations centers, contact tracing, communications, and local policy. Given that EHPs are currently involved in delivering vaccinations in many countries already, it is likely that they will play a major supporting role in COVID-19 vaccine delivery. While the value of EHPs is often most visible and thus appreciated in the context of major crises, it is imperative that the critically important roles played by EHPs on a day-to-day basis and in the longer-term response to the impacts of the pandemic are supported by sufficient resources. Our workgroup's discussions highlighted the fact that limited human resource capacity in many health departments around the world often require EHPs to step away from their essential day-to-day functions to participate in disaster response activities. Additional sustained investments in day-to-day EHP capacity can promote essential function continuity, while meeting the increased environmental health service demands associated with pandemic or disaster response.

It is clear that successful public health interventions to the pandemic utilized a bottomup approach, which has been shown in other healthcare settings to be appropriate (Carey and Braunack-Mayer 2009; Sturmberg et al. 2017). This is illustrated by the shift in the UK where England is shifting to emulate Wales in their use of localized services and approach. The profoundly local nature of environmental health has positioned the discipline to provide timely, locally informed actions and

advice. Future policies should reflect this value of local, community based knowledge and expertise. Additionally, the global trend of decreasing funding for public health needs to be addressed as a matter of urgency.

Despite the differences in the role of EHPs' interventions in different countries during the COVID-19 pandemic, we believe that lessons from the experiences in different countries provide relevant information about the critical roles of EHPs in responding to, monitoring, and controlling the risk to population safety and health during a pandemic and in the aftermath. This information reaffirms the value of preparedness and can be used as a common framework to guide the preparation and training of emerging and existing EHPs.

## ACKNOWLEDGMENTS

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