

## Environmental Health Professionals in Developed Countries

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### Abstract

An environmental health professional performs numerous job functions that have an impact on everyone's health and lifestyle. Their work is to prevent death and illness from environmentally related disease and injury. Moreover, the quality and safety of their air, food, water, and the infrastructure that supports vital environmental health services are one of the indicators separated many developed countries from undeveloped countries. This paper, environmental health professional in developed countries including the United State of America, United Kingdom, Canada, and Australia were discussed. It was revealed that the Registration of Environmental Health Specialist/Sanitaricians is a process that certifies the applicant has been found by the certifying body of each state/country to meet the qualifications to protect environmental health. The result of these reviews indicates that competencies of Environmental Health Officers (EHOs) of all selected developed countries are focused on facility and system inspections and compliance and enforcement of environmental health laws. Moreover, risk assessment and management, investigation, monitor and control, and promoting environmental and public health awareness are appeared in some countries. Thus, the experiences in selected developed countries for certification of Environmental Health Specialist or sanitarian could be used as a guideline for environmental health professional development in other countries.

**Keywords:** Environmental health professional; Competencies; REHS/RS; USA; UK, Canada, Australia

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### 1. Introduction

Environmental health is a key component of public health. According to the WHO report, the impact of the environment on health is unevenly distributed across the major disease groups as shown in Table 1. The largest number of deaths attributed to the environment is now caused by NCDs, contributing to 8.2 million people. The highest population attributable fractions are in the area of injuries, which are often largely conditioned directly by the environment. Moreover, WHO estimates that the environmental factors are responsible for an estimated 22 percent of the global burden disease in term of healthy life years lost and 23 percent of all deaths (WHO, 2016).

An environmental health professional performs numerous job functions that have an impact on everyone's health and lifestyle. Food inspections are one of the most common and most important duties performed by an environmental health professional. Another important function of the environmental health professional is keeping our water safe. Waterborne diseases are endemic in many countries and pose a threat to millions of people every day. In addition, the quality and safety of their air, food, and water, and the infrastructure that supports vital environmental health services are one of the indicators separated many developed countries from undeveloped countries (NEHA, 2014).

**Table 1.** Total and attributable deaths and disease burden to the environment in 2012

Disease group	Deaths			DALYs		
	Total deaths (million)	Attributable to the environment (million)	Population Attributable fraction (%)	Total DALYs (million)	Expert survey 2015	Population Attributable fraction (%)
Infectious, parasitic, maternal, neonatal and nutritional causes	12.8	2.5	20%	925	202	22%
Non-communicable diseases	37.7	8.2	22%	1506	276	18%
Injuries	5.1	2.0	38%	305	118	39%
<b>Total</b>	<b>55.6</b>	<b>12.6</b>	<b>23%</b>	<b>2736</b>	<b>596</b>	<b>22%</b>

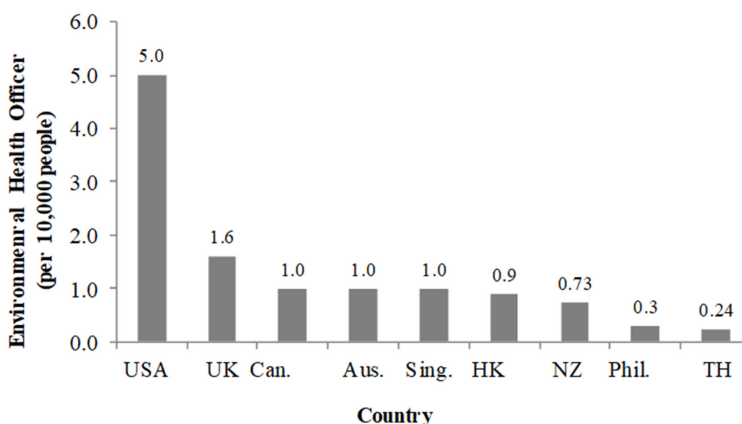
Source: World Health Organization (2016)

An environmental health professional performs numerous job functions that have an impact on everyone’s health and lifestyle. Food inspections are one of the most common and most important duties performed by an environmental health professional. Another important function of the environmental health professional is keeping our water safe. Waterborne diseases are endemic in many countries and pose a threat to millions of people every day. In addition, the quality and safety of their air, food, and water, and the infrastructure that supports vital environmental health services are one of the indicators separated many developed countries from undeveloped countries (NEHA, 2014).

Normally, the number of environmental health officer available in a country relative to the total population. World Health Organization suggested that the minimum

ratio of EHOs to a country’s population is 1:10,000 (WHO, 2003). The ratio of EHOs in the United State of America, United Kingdom, Canada, Australia, Singapore, Hong Kong, New Zealand, the Philippine, and Thailand are presented in Figure 1. It indicated that the number of EHOs in the United States, United Kingdom, Canada, Australia, and Singapore are greater than 1 per 10,000 people in their nation, achieving the target of WHO.

Therefore, this paper reviews the job description of environmental health professional and qualifications to become a Registered Environmental Health Specialist/Registered Sanitarian (REHS/RS) in selected countries. The result of this study can be used as a guideline for environmental health profession development in other countries.



**Figure 1.** Ratio of environmental health officer in 2003

## 2. Definition of Environmental health

The definition of environmental health was defined by various organizations. However, the basic principle remains the same. The definitions from World Health Organization and National Environmental Health Association are presented below.

“**Environmental Health**” addresses all the physical, chemical, and biological factors external to a person, and all the related factors impacting behaviors. It encompasses the assessment and control of those environmental factors that can potentially affect health. It is targeted towards preventing disease and creating health-supportive environments. This definition excludes behavior not related to the environment, as well as behavior related to the social and cultural environment, and genetics (WHO, 2018).

“**Environmental health**” is the science and practice of preventing human injury and illness and promoting well-being by identifying and evaluating environmental sources and hazardous agents and limiting exposures to hazardous physical, chemical, and biological agents in air, water, soil, food, and other environmental media or settings that may adversely affect human health (NEHA, 2012).

Also, State Board of Sanitarian Registration, Ohio stated that “**Environmental Health Science**” means the aspect of public health science that includes, but is not limited to, the following bodies of knowledge: air quality, food quality and protection, hazardous and toxic substances, consumer product safety, housing, institutional health and safety, community noise control, radiation protection, recreational facilities, solid and liquid waste management, vector control, drinking water quality, milk sanitation, and rabies control (State Board of Sanitarian Registration, Ohio, 2014).

“**Environmental health**” means the science and art which pertains to the protection of human health through the assessment, management, control and prevention of environmental factors that may adversely affect the health, comfort, safety or well being of individuals or the environment (Wisconsin State Legislature, 2018).

## 3. Competencies of Environmental health professionals

Environmental health professionals may be known as environmental health officers, public health inspectors, environmental health specialists, environmental health practitioners, or sanitarians. The legal title used will depend on the definitions found in local legislation/jurisdiction. The competencies of environmental health professionals in selected developed countries are described below.

### 3.1 United State of America

America Public Health Association’s Project, with funding from the National Center for Environmental Health (NCEH) at the Centers for Disease Control and Prevention (CDC) has provided broadly accepted guidelines and recommendations to local public health leaders for the core competencies needed by local environmental health practitioners working in local health departments (LHDs) (APHA, 2001). Environmental health responsibilities include food safety, drinking water safety, solid and liquid waste disposal, hazardous waste disposal, vector control, and institutional health. Every state of the USA uses the NEHA REHS/RS examination. When the Registered Sanitarian Advisory Committee approves the application, a confirmation letter will be returned to the applicant. This letter must be forwarded to NEHA requesting a date and time to take the examination.

Moreover, 14 content areas of NEHA’s Registered Environmental Health Specialist/Registered Sanitarian (REHS/RS) Exam are concluded in Table 2. Also, percentage and description of each content area were defined. It indicated that food protection is the major area of the exam because the role of environmental health professionals in food safety is protecting the public from foodborne illness through prevention, intervention and rapid response, coordinating these retail food safety activities with industry, state, federal and other local stakeholders in the food safety system (Massachusetts Department of Public Health, 2013; City of Chicago, Department of Human Resources, 2011).

Moreover, The REHS/RS credential identifies six different content areas in which a credential holder must demonstrate having knowledge and skill (NEHA, 2018).

1. Conducting Facility Inspections: food manufacturing, restaurants, hotels, recreational waters, homes, waste, bio-medical
2. Conducting System Inspections: workplace/occupational safety and health, wastewater, drinking water
3. Conducting Investigations: epidemiology, air quality, complaints
4. Ensuring Compliance: local, state, federal regulations
5. Promoting Environmental Public Health Awareness: public health assessment, education, partnerships, outreach
6. Responding to Emergencies: risk assessment, emergency preparedness

Although a majority of REHS’s work for the government, many are also employed by the private sector. Some typical program responsibilities include food protection, land use, recreational swimming areas, onsite septic systems, drinking water quality, housing, vector control, disaster sanitation, and solid, liquid, and hazardous materials management.

Typical duties of a REHS in local government include inspections of various facilities such as food establishments, public swimming pools, community drinking water systems, landfills, and underground storage tanks in order to determine compliance with federal, state, and local statutes, regulations, and ordinances (County of Los Angeles – Department of Public Health Environmental Health, 2012).

**Table 2.** Content areas of NEHA’s Registered Environmental Health Specialist/Registered Sanitarian (REHS/RS) Exam

<b>Content Areas</b>	<b>Percentage of total</b>	<b>Description</b>
Statutes and Regulations	6%	Knowledge of legal authority, a law about inspections, agency administrative actions (e.g., embargo, seizure, nuisance abatement), federal environmental health acts, laws, agencies, and regulations.
Food Protection	15%	<ul style="list-style-type: none"> <li>- Knowledge of inspection/investigation procedures of food establishments.</li> <li>- Knowledge of food safety principles, protection, quality, and storage.</li> <li>- Knowledge of temporary food service events.</li> <li>- Knowledge of proper food transport.</li> </ul>
Potable Water	9%	<ul style="list-style-type: none"> <li>- Knowledge of sanitary survey principles regarding potential or existing water systems and watersheds.</li> <li>- Understanding of testing/sampling methods, water supply systems, water treatment processes, and diseases associated with contaminated water.</li> </ul>
Wastewater	10%	<ul style="list-style-type: none"> <li>- Knowledge of inspection/investigation procedures of wastewater systems.</li> <li>- Knowledge of soil characteristics and analysis methods, land use issues, wastewater treatment systems and processes, and disease-causing organisms associated with wastewater.</li> </ul>
Solid and Hazardous Waste	10%	Knowledge of waste-management systems, waste classifications, landfill methods, hazardous waste disposal methods, and health risks associated with poor waste management.
Hazardous Materials	5%	Knowledge of inspections and investigations of hazardous materials, self-protection procedures, and types of hazardous materials.

**Table 2.** Content areas of NEHA’s Registered Environmental Health Specialist/Registered Sanitarian (REHS/RS) Exam (cont.)

<b>Content Areas</b>	<b>Percentage of total</b>	<b>Description</b>
Vectors, Pests, and Weeds	8%	Knowledge of control methods for vectors, pests, and weeds; life cycle; different types of vectors, pests, and weeds; diseases and organisms associated with vectors, pests, and weeds; and public education methods.
Radiation Protection	4%	Knowledge of inspections/investigations of radiation hazards, types of radiation, common sources of exposure, protection methods, health risks of radiation exposure, and testing equipment and sampling methods used to detect radiation.
Occupational Safety and Health	4%	Knowledge of inspection/investigation procedures of occupational settings, common health and safety hazards at worksites, and general OSHA principles.
Air Quality and Noise	4%	Knowledge of inspection and investigation procedures to assess ambient air quality and environmental noise, air pollution sources, air and noise sampling methods and equipment, air and noise pollution control equipment and techniques, and health risks associated with poor air quality and excessive noise.
Housing	6%	Knowledge of inspection and investigation procedures of public and private housing and mobile home and recreational vehicle parks, health and safety risks of substandard housing, housing codes, heating, ventilation, and cooling systems, child safety hazards such as lead, and utility connections.
Institutions and Licensed Establishments	9%	Knowledge of the health hazards and sanitation problems commonly associated with correctional facilities, medical facilities, licensed establishments (tanning salons, massage clinics, tattoo parlors, and cosmetology salons) child-care facilities and schools; common disease-causing organisms and transmission modes; epidemiology; and heating, ventilation, and cooling systems.
Swimming Pools and Recreational Facilities	7%	<ul style="list-style-type: none"> <li>- Knowledge of inspection and investigation procedures for swimming pools and spas, recreational areas and facilities, amusement parks, temporary mass gatherings (e.g., concerts, county fairs, etc.).</li> <li>- Knowledge of common organisms and resultant diseases associated with swimming pools and spas, water treatment systems, water chemistry, safety issues, and sampling and test methods.</li> </ul>
Disaster Sanitation	3%	<ul style="list-style-type: none"> <li>- Knowledge of disaster preparation, site management of disaster situations, and post-disaster management.</li> <li>- Knowledge of emergency response procedures, a chain of command, supply needs, temporary shelter and facilities and services, and remediation methods.</li> </ul>

### 3.2 Canada

In Canada, environmental health officers are responsible for carrying out for public health protection, including administrating and enforcing provincial legislation related to environmental health and providing support to minimize health and safety hazards. They are involved in a variety of activities, for example inspecting

food facility, investigation public health nuisances, and implementing public health control. In addition, environmental health officer is focused on prevention, consultation, investigation, and education of the community regarding health risks and maintaining a safe environment (ECO Canada, 2018). Skill and ability need are shown below.

1. Identify health hazards and implement control measures.
2. Investigate food-related complaints and ensure food is hygienically prepared, stored, served, and sold by inspecting restaurants and food-processing plants and by collecting food samples for chemical and microbiological analysis.
3. Monitor and control water, air, and noise pollution and collect samples for chemical and microbiological analysis to make certain they are within existing limits.
4. Prepare policy documents, guidelines, pamphlets, and brochures relating to environmental health matters.
5. Undertake risk assessments for activities that could affect community health.
6. Ensure compliance with federal and provincial health regulations and municipal by laws and enforce laws where necessary.
7. Create and deliver programs in areas of infectious disease control, food safety, health hazard investigation, injury prevention, and water quality.
8. Assist in the development of new health and safety laws and policies.
9. Participate in boards, committees, and working groups.

### 3.3 United Kingdom

In the United Kingdom, Environmental Health Practitioners (EHPs) are the main health practitioners within local government providing regulatory services. They are key partners in local and national efforts to protect and improve health and the quality of life, reducing health inequalities of the individuals and communities. In local authorities, EHPs are often called Environmental Health Offices (CIEH, 2010).

Environmental health is a scientific discipline. EHPs need a wide range of skills and an understanding of a complex range of issues. Therefore, the areas where necessary and proportionate regulation is carried out by EHPs are shown as follows (CIEH, 2015).

1. air quality
2. carbon emission
3. contaminated land
4. food safety
5. health protection
6. housing conditions
7. noise and other nuisances
8. pest control
9. pollution control
10. public health
11. smoke free public places
12. workplace safety and health and well being

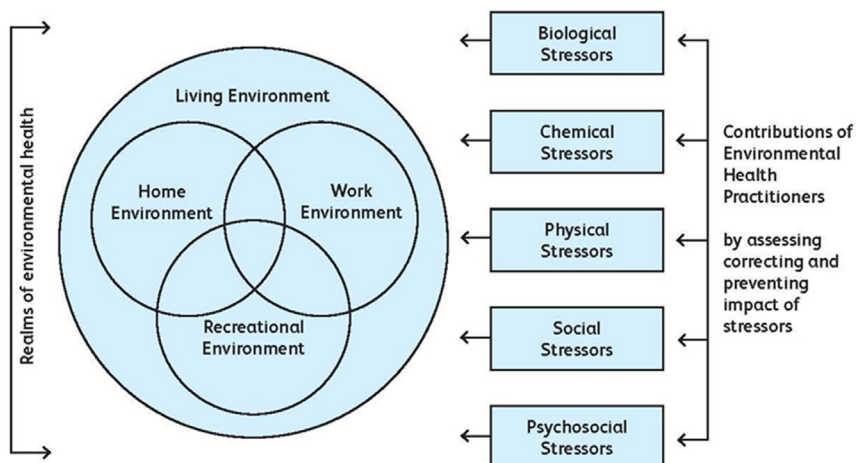


Figure 2. Responsibility of EHPs in local government (CIEH, 2015)

Moreover, EHPs need a wide range of skill and an understanding of a complex range of issues. Figure 2 show the responsibility for alleviating all kinds of stressor that affect our lives and in all setting. The education, training, and experiences of EHPs make them exceptionally adept at problem-solving, working in partnership with others and seeking holistic solutions.

However, EHPs work in every sector of the United Kingdom's economy and in every community to keep people healthy and safe and to reduce health inequalities. They contribute to the local and national economy, specializing in one or more areas of environmental and public health practice, as consultants and trainers and working in central and local government. Moreover, job duty or competencies for environmental health practitioners in the UK are shown as follows (National Careers Service. Environmental health officer, 2018).

1. Inspection businesses for health and safety, hood hygiene and food standard
2. Follow up complaints and investigating outbreaks of food poisoning, infectious disease or pests
3. Collecting a sample for laboratory testing
4. Enforcing environmental health laws
5. Advising community groups and giving education talks
6. Giving evidence in court
7. Writing record and report
8. Advising employers on all environmental matters

### 3.4 Australia

In Australia, Environmental Health Officers (EHOs) assess risk and develop, regulate, enforce and monitor laws and regulations governing public health for both the built and natural environment, in order to promote good human health and environmental practices. EHOs skills, knowledge, and experience are structured in three parts, reflecting distinct types of skills and knowledge (Department of Health and Ageing, Canberra, 2009).

Part 1: adopts the generic learning outcomes required by the Australian Qualifications Framework (AQF) for degree level graduates to cover generic attributes of EHOs.

The minimum entry level training for EHOs is now a bachelor degree. The AQF requirements for this level are:

1. the acquisition of a systematic and coherent body of knowledge, the underlying principles and concepts, and the associated communication and problem-solving skills;
2. development of the academic skills and attributes necessary to undertake research, comprehend and evaluate new information, concepts and evidence from a range of sources;
3. development of the ability to review, consolidate, extend and apply the knowledge and techniques learned, including in a professional context;
4. a foundation for self-directed and lifelong learning; and
5. interpersonal and teamwork skills appropriate to employment and/or further study.

Part 2: describes underpinning skills and knowledge that supports environmental health work across a breadth of activities. The areas include Science, Public and environmental health concepts, research methods, political, legislative and policy context, Risk assessment and management, compliance and enforcement, communication, cultural awareness, and interpersonal skills, administration and management.

Part 3: describes activity-specific skills and knowledge. The area headings used to describe EHO roles and responsibilities form the basis for this section relating to:

1. Safe and suitable food,
2. Prevention and control of notifiable and communicable conditions,
3. Water management,
4. Environmental management,
5. Land use management,
6. Built environment,
7. Indigenous environmental health,
8. Sustainability and climate change,
9. Emergency and incident management

Overall, content areas of environmental health in the selected country are presented in Table 3. Competencies and skill of environmental officers are shown in Table 4.

**Table 3.**Content areas of environmental health in the selected country

<b>Content area</b>	<b>USA</b>	<b>UK</b>	<b>Canada</b>	<b>Australia</b>
Food safety	×	×	×	×
Portable water	×		×	×
Wastewater	×		×	×
Solid and hazardous waste	×			×
Vector and pest control	×	×		×
Air quality and noise	×	×	×	×
Housing	×	×		×
Institution and licensed establishment	×			
Swimming pool and recreation facilities	×			×
Disaster sanitation	×			×
Radiation protection	×			
Occupational safety and health	×	×		
Contaminated land		×		×
Carbon emission and climate change		×		×
Nuisance		×	×	×
Infectious waste				×

**Table 4.** Skill and competencies of the environmental health officer

<b>Competencies</b>	<b>USA</b>	<b>UK</b>	<b>Canada</b>	<b>Australia</b>
Identifying health hazard		×	×	
Risk assessment and management		×		×
Investigations	×		×	
Facility and system Inspection	×	×	×	×
Monitor and control		×	×	×
Collecting a sample for laboratory testing		×		
Ensuring compliance and enforcement	×	×	×	×
Promoting environmental public health awareness	×			×
Response to emergencies	×			
Administration and management				×

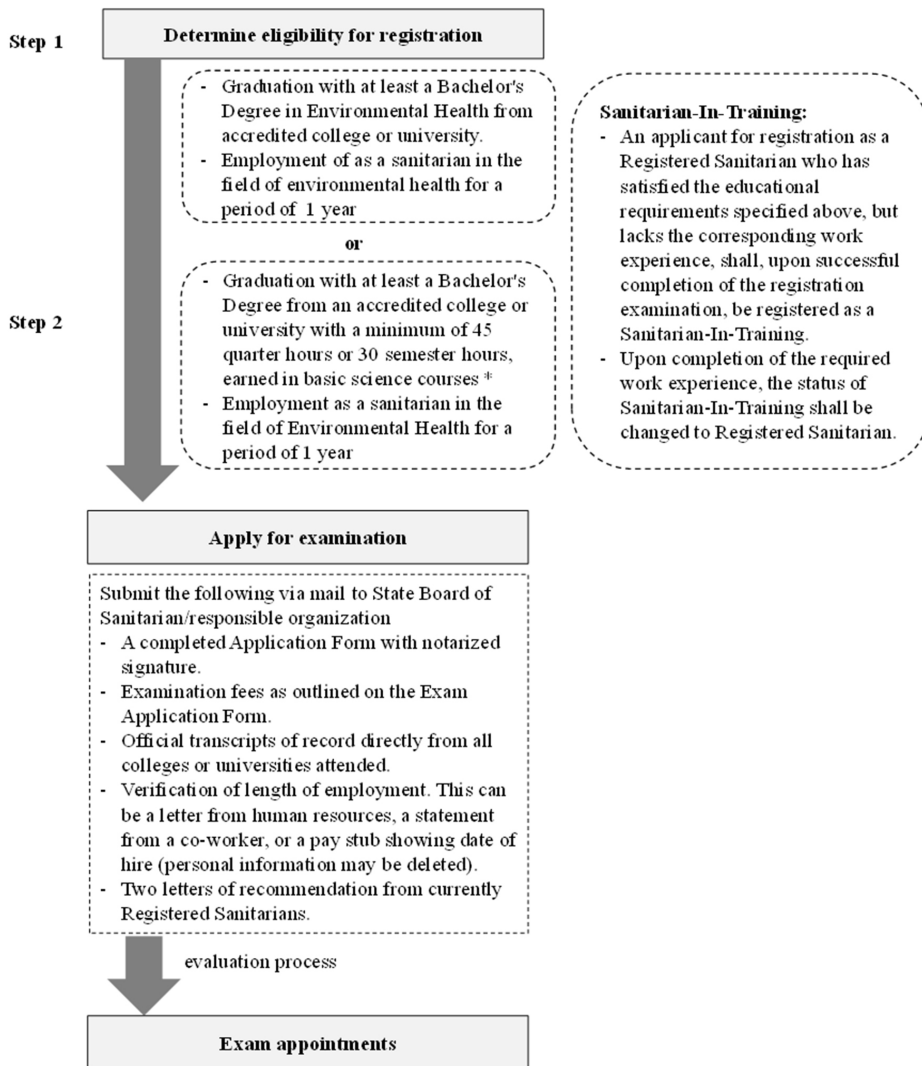
#### **4. Qualifications to become a Registered Environmental Health Specialist/ Registered Sanitarian (REHS/RS)**

##### *4.1 United States of America*

Applicants interested in obtaining a State Registered Sanitarian certification must graduate with at least a Bachelor’s Degree in Environmental Health from an accredited college or university. Also, other bachelor’s

degree is accepted with a minimum of 30 semester units of approved basic science courses. Note that, lists of basic course are depended on the requirement of each city. For example, the basic science course list required by Washington State Board of Registered Sanitarians is physic, microbiology, math, chemistry, bacteriological, civil engineering, environmental engineering, toxicology, epidemiology, statistics, environmental health, and biochemistry (Washington State Board of Registered Sanitarians, 2018).





**Figure 3.** Minimum application requirements for REHS/RS in the USA (County of Los Angeles – Department of Public Health Environmental Health.; Washington State Board of Registered Sanitarians. Requirements for Registration, 2018)

While, the basic science course list required by California Environmental Health Association (CEHA) is biology, inorganic chemistry, organic chemistry or physics, microbiology, and college algebra (third year) or pre-calculus (County of Los Angeles – Department of Public Health Environmental Health, 2012). However, a course designed for liberal art, general education, or non-science degrees are not acceptable for registration. The minimum requirement for applying for examination to be a Registered Environmental Health

Specialist/Registered Sanitarian in the USA are shown in Figure 3. The board shall provide a written examination which objective and practical and meet a requirement of the state. The applicant must obtain a required score on the given examination. The minimum passing score is set by each individual state. The passing score of Ohio and Montana State are set at least 70 and 68 percent, respectively (State Board of Sanitarian Registration, Ohio, 2014; Montana Environmental Health Association, 2018).

#### 4.2 United Kingdom

The professional body for EHOs in the UK, the Chartered Institute of Environmental Health (CIEH) plays an active role in promoting the profession using strategies such as high profile press coverage of environmental health related issues. Therefore, EHOs are required to gain a certificate of registration from the Environmental Health Registration Board (EHRB). However, there are three requirements for registration.

- 1) Complete a degree in environmental health from a university accredited by CIEH
- 2) Complete a Learning Portfolio providing evidence of workbased learning
- 3) Complete the Professional Interview stage of Professional Examinations

Moreover, the applicant usually needs a degree in a science-based discipline or a subject closely related to environmental health. Candidates are required to register with the EHRB at least 21 days prior to making an application for any assessment.

In the United Kingdom, CIEH provides training, accreditation, and community for environmental health professionals working across the public, private and third sector. The members of CIEH benefit from outstanding

professional development, networking, and representation (CIEH, 2010). In addition, the approximate number of memberships for CIEH comparing with some existing environmental health associations of other countries in Europe is presented in Table 5. It indicates that a large membership can be useful in sharing the workload in those countries (Fitzpatrick, 2002).

#### 4.3 Canada

In Canada, practitioners in environmental health are required to obtain an approved bachelor's degree in environmental health or equivalent recognized by the Board of Certification, Canadian Institute of Public Health Inspectors (CIPHI) (ECO Canada, 2018).

#### 4.4 Australia

To become an environmental health officer in Australia, the applicant usually has to study environmental health, environmental science, public health or environmental management at university. These areas of study may be undertaken within a science, health science, social science or natural science degree. Prerequisite subjects, or assumed knowledge, in one or more of English, mathematics, biology, chemistry, and physics are normally required (Department of Health and Ageing, Canberra, 2009).

**Table 5.** Approximate membership of selected associations of environmental health professionals (Fitzpatrick, 2002; NEHA, 2019)

Country	Organization	Approximate membership
Chartered Institute of Environmental Health (CIEH)	United Kingdom	8,500
Environmental Health Officer Association	Ireland	200
Finish Communal Association of Environmental Health and Protection	Finland	400
Association Italian di Ingegneria Sanitaria-Ambientale	Italy	800
Miljø & Helse (Teknisk Hygienisk Forum)	Norway	520
Royal Environmental Institute of Scotland	Scotland	900
Swedish Environmental Health Officer Association	Sweden	1,000
Bundesverband der Lebensmittelkontrolleure	Germany	2,000
National Environmental Health Association	USA	5,000

## 5. Conclusion

An Environmental Health Specialist (ESH), or sanitarian, is a person qualified to plan, organize, manage, implement, and evaluate one or more program areas comprising the field of environmental health. Registration of Environmental Health Specialist/Sanitaricians is a process that certifies the applicant has been found by the certifying body of each state to meet the qualifications to protect environmental health. The result indicates that competencies of environmental health officer of all selected developed countries including USA, UK, Canada, and Australia are focused on facility and system inspections and compliance and enforcement of environmental health laws. Moreover, risk assessment and management, investigation, monitor and control, and promoting environmental and public health awareness are appeared in some countries.

Environmental Health Officer is required to obtain an approved bachelor's degree in environmental health or equivalent recognized by the responsible organization in each state or country, field training, and professional certification and registration. Moreover, Environmental health professionals are usually employed by local government or state health authorities to advice on and enforce public health standards. However, many are employed in the private sector. With many environmental concerns and hazards facing members of the public in developing countries (NIEHS, 2019), EHS plays an important role in many sectors in ensuring that appropriate standards are achieved to reduce disease deaths attributable to the environment including water-borne, food-borne, air-borne, and vector-borne disease. Thus, the need for EHS workers is on the rise to control those environmental factors that can potentially affect health.

Therefore, the experiences in selected developed countries for certification of Environmental Health Specialist or sanitarian could be used as a guideline for environmental health professional development in other countries.

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