**University of Toronto**

**Public Health and Preventive Medicine Residency Program**

**Environmental Health Rotation - Objectives & Resources Guide\***

**Purpose:**

The purpose of this document is to provide guidance on core curriculum, resources, and activities for Public Health and Preventive Medicine (PHPM) residents during their Environmental Health field rotations. It is intended for use by PHPM residents to assist in meeting their learning objectives and to prepare them for independent practice as PHPM specialists. This document is also intended to meet the Royal College of Physicians and Surgeons of Canada (2014) objectives of specialty training specific to this rotation.

**Prior to the rotation:**

Prior to the rotation, residents should review this document with their preceptors, as well as the rotation expectations document. This will assist in planning the activities and readings required to meet the rotation-specific objectives as well as personal objectives.

Note that this document is based on the 2014 Royal College objectives, but the ITER is based on the previous version of the objectives. The 2014 objectives are more detailed, but both versions cover similar material.

**During the rotation:**

The goal of the Environmental Health rotation is for residents to assume a role as part of a multidisciplinary team responsible for identifying and investigating health hazards and protecting the public from such hazards. Resident responsibilities include learning about important environmental toxins and contaminants, ensuring food, water and air safety, familiarity with and interpretation of salient laws and regulations, communication of environmental health results and risks to varied audiences, and contribution to policy development in this area.

The readings and resources here should be reviewed regularly. If additional resources and readings are identified by the resident and/or preceptor, this should be brought to the attention of the Associate Program Director so they can be added to the document for all residents completing this rotation. Please email [onye.nnorom@mail.utoronto.ca](mailto:onye.nnorom@mail.utoronto.ca) .

Additional sources for the rotation-specific goals, objectives, and activities described here include the McMaster University Public Health and Preventive Medicine program [rotation objectives](http://fhs.mcmaster.ca/ceb/phpm/objectives.htm) and the Royal College of Physicians and Surgeons of Canada’s [Objectives of Training in the Specialty of Public Health and Preventive Medicine](http://www.royalcollege.ca/cs/groups/public/documents/document/y2vk/mdaw/~edisp/tztest3rcpsced000887.pdf) (2014) and [Specific Standards of Accreditation for Residency Programs in Public Health and Preventive Medicine](http://www.royalcollege.ca/cs/groups/public/documents/document/y2vk/mdaw/~edisp/tztest3rcpsced000753.pdf) (2014).

***\*Modified from the Northern Ontario School of Medicine’s Public Health and Preventive Medicine Residency Program Core Rotation Guide (Christine Navarro), 2014.***

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| **Core Curriculum Topic Areas** | **Learning Objectives and Activities** | **Suggested Resources** | **RCPSC Rotation-Specific Objectives** |
| General | * Meet with Director(s) and Managers of Environmental Health in your organization to discuss their roles and responsibilities, and the activities of their teams * Participate in EH team meetings * Meet with partners (e.g., Ministry of the Environment, First Nations and Inuit Health, Ministry of Labour) and describe their various roles in Environmental Health in your region * Participate in on-call activities as the Professional Association of Residents of Ontario (PARO) allows or as negotiated with supervisor * Produce a Board of Health report related to an Environmental Health issue | * [National Collaborating Centre for Environmental Health](http://www.ncceh.ca/)   *Textbooks (optional):*   * Friis RA. [Essentials of Environmental Health](http://www.jbpub.com/essentialpublichealth/friis/), 2010 * Frumkin H (ed). [Environmental Health: From Global to Local](http://ca.wiley.com/WileyCDA/WileyTitle/productCd-0470404876.html), 2nd edition, 2010 * Detels R et al (ed). [Oxford Textbook of Public Health](http://oxfordmedicine.com/view/10.1093/med/9780199218707.001.0001/med-9780199218707), 5th ed, 2009 | * Participate effectively and appropriately in an interprofessional and interdisciplinary team and with other partners, including but not limited to the community partners and populations served as well as sectors outside the health field (Collaborator) * Describe the roles and responsibilities of other professionals within the health team (Collaborator) * Participate effectively in interprofessional and interdisciplinary interactions, including but not limited to team meetings (Collaborator) * Demonstrate leadership in a health team, where appropriate (Collaborator) * Demonstrate the ability to work on initiatives with non health sector organizations and staff/volunteers (Collaborator) |
| Toxicology | * Understand basic concepts of toxicology, including but not limited to: dose-response, half-life, bioavailability, bioaccumulation, biomagnification, NOAEL, LOAEL, benchmark dose, reference dose, total daily intake, acceptable daily intake, estimated daily intake, margin of exposure, hazard quotient, uncertainty factors | * [NLM Toxicology Tutorials](http://sis.nlm.nih.gov/enviro/toxtutor.html) * US Agency for Toxic Substances and Diseases Registry (ATSDR) [Toxic Substances Portal](http://www.atsdr.cdc.gov/substances/index.asp) | * Apply knowledge of the fundamental biomedical, clinical, and public health sciences relevant to PHPM practice (Medical Expert) |
| Legislation and jurisdiction | * Understand the roles and responsibilities of governmental (e.g., public health agencies, Ministry of the Environment, Ministry of Natural Resources, OMAFRA, Canadian Food Inspection Agency) and non-governmental (e.g., industry, health care) organizations in relation to environmental health, emergency management, and occupational medicine * Be involved in legal proceedings (e.g., HPPA section 13 orders) | *Federal:*   * [Canadian Environmental Protection Act](http://laws-lois.justice.gc.ca/eng/acts/C-15.31/) * [Food and Drugs Act and Regulations](http://www.hc-sc.gc.ca/fn-an/legislation/acts-lois/act-loi_reg-eng.php) * [Emergencies Act](http://laws-lois.justice.gc.ca/eng/acts/E-4.5/index.html) * [Emergency Management Act](http://laws-lois.justice.gc.ca/eng/acts/E-4.56/index.html) * [Safe Foods for Canadians Act](http://www.inspection.gc.ca/about-the-cfia/acts-and-regulations/regulatory-initiatives/sfca/eng/1338796071420/1338796152395)   *Ontario:*   * [Health Promotion and Protection Act](http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90h07_e.htm) (HPPA) * [Ontario Public Health Standards](http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/default.aspx?/index.html) (OHPS) * [Environmental Protection Act](http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90e19_e.htm) * [An Act Respecting Safe Drinking Water](http://www.e-laws.gov.on.ca/html/source/statutes/english/2002/elaws_src_s02032_e.htm) * [Ontario Water Resources Act](http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_900903_e.htm), wells regulation * [Occupational Health and Safety Act](http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o01_e.htm) | * Describe the roles and responsibilities of the PHPM specialist to other professionals, especially in circumstances involving legislative authority or emergency situations (Collaborator) * Demonstrate knowledge and an understanding of the professional, legal and ethical codes of practice (Professional) * Fulfil the regulatory and legal obligations required of current practice in PHPM (Professional) |
| Risk assessment and risk management | * Describe and demonstrate ability to apply the steps of risk assessment * Describe and demonstrate ability to apply the steps of a health impact assessment * Participate in a risk assessment of a health hazard or a health impact assessment and make recommendations for mitigating risks to human health * Understand the concepts of precautionary principle, de minimis risk, ALARA * Understand key general frameworks, including but not limited to: epidemiologic triad, Bradford-Hill criteria * Describe the International Agency for Research on Cancer (IARC) classifications of human carcinogens and understand the type of evidence considered and scientific criteria for evaluating risks * Obtain a basic understanding of major industries and their human health impacts, including but not limited to energy production, forestry, mining, agriculture, manufacturing, transportation, waste and wastewater management | * Klassen C. [Casarett and Doull’s Toxicology](http://www.mheducation.co.uk/html/0071769234.html), 8th ed, 2013. Chapter 4: Risk Assessment * [Human Health Risk Assessment](http://www.epa.gov/risk/health-risk.htm), US EPA Risk Assessment Portal * [Public Health Assessment Guidance Manual](http://www.atsdr.cdc.gov/hac/PHAManual/toc.html), US ATSDR * [Health Canada Decision-Making Framework for Identifying, Assessing, and Managing Health Risks](http://www.hc-sc.gc.ca/ahc-asc/pubs/hpfb-dgpsa/risk-risques_tc-tm-eng.php) * [Identification, Investigation and Management of Health Hazards Protocol](http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/identification_health_hazards.pdf), OPHS * [Health Impact Assessment](http://www.ncchpp.ca/54/Health_Impact_Assessment.ccnpps), National Collaborating Centre for Healthy Public Policy * Health Canada, 2004. [Canadian Handbook on Health Impact Assessment. Volume 4: Health Impacts by Industry Sector](http://publications.gc.ca/collections/Collection/H46-2-04-363E.pdf) * Weir E. [A Canadian framework for applying the precautionary principle to public health issues](http://journal.cpha.ca/index.php/cjph/article/viewFile/2635/2275). Can J Public Health 2010; 101: 396-98. * [IARC Monographs on the Evaluation of Carcinogenic Risks to Humans](http://monographs.iarc.fr/index.php) and [preamble](http://monographs.iarc.fr/ENG/Preamble/index.php) to the monographs | * Perform a consultation effectively, including the presentation of well-documented assessments and recommendations in written and/or oral form, in response to a request from a variety of sources (Medical Expert) * Identify known or potential health effects associated with a particular hazard relevant to health protection in a population, drawing on expertise as appropriate (Medical Expert) * Characterize the hazard identified, both quantitatively and qualitatively (Medical Expert) * Assess the degree of risk associated with exposure to a health hazard found in a population (Medical Expert) * Integrate hazard identification, characterization, and assessment into an estimate of the adverse events likely to occur in a population, based on a hazard found in the population (Medical Expert) * Perform an assessment of the health impact of a policy or project for a defined population and make recommendations (Medical Expert) * Use evidence from health and non-health sources, including qualitative and quantitative studies, to answer a defined question, taking into account relative strengths and weaknesses of evidence used (Medical Expert) * Use an appropriate framework to critically appraise evidence, including but not limited to ecological, qualitative, etiological, interventional, and economic studies (Medical Expert) * Formulate a balance, evidence-informed recommendation explaining key public health concepts using appropriate reasoning, judgement and analytic skills for a public health setting (Medical Expert) * Ascertain, in a timely fashion, key public health information from a range of documents, including but not limited to briefings, policies, news reports, and use it appropriately and in relation to wider public health knowledge (Medical Expert) * Incorporate relevant legal and ethical frameworks into assessment of evidence (Medical Expert) * Discuss and apply guidelines for assessing causality, using Bradford-Hill criteria (Medical Expert) * Calculate and interpret measures of risk including but not limited to relative risk, risk difference, attributable risk, odds ratio, etiologic fraction and preventive fraction (Scholar) |
| Risk communication | * Describe the factors that influence risk perception * Participate in risk or crisis communications (e.g., developing key messages regarding a health hazard, preparing media releases for drinking water advisories or heat alerts, observing and/or participating in media interviews, evaluating effectiveness of messages, attending a community meeting) | * [Peter Sandman’s Risk Communication Website](http://www.psandman.com/index-intro.htm) * PHAC, 2006. [Strategic Risk Communications Framework Within the Context of Health Canada and the PHAC's Integrated Risk Management](http://www.phac-aspc.gc.ca/publicat/2007/risk-com/index-eng.php#10) * US EPA’s [Seven Cardinal Rules for Risk Communication](http://www.epa.gov/care/library/7_cardinal_rules.pdf) * CDC, 2012. [Crisis and Emergency Risk Communication](http://emergency.cdc.gov/cerc/index.asp) manuals and online module | * Present health information effectively to the public or media about a health issue (Communicator) * Present epidemiological data and risk information to affected individuals, the public, other professionals, and the media using a variety of modalities (Communicator) * Apply risk communication theory and communication styles (Communicator) * Develop and implement a communication plan about a public health issue, including a media component (Communicator) * Respond effectively to public and media enquiries about specific health issues using various media channels, as indicated (Communicator) * Evaluate the effectiveness of different types of media, including but not limited to print, broadcast and web-based, for reaching the intended audience (Communicator) * Elicit and synthesize accurately relevant information and perspectives of individuals, families, groups, organizations, communities and populations, including colleagues and other professionals (Communicator) * Address challenging communication issues effectively, such as obtaining informed consent, delivering bad news, and addressing anger, confusion, misunderstanding, and conflicting priorities (Communicator) |
| Cluster investigations | * Describe the steps and limitations of investigating individual clusters of disease * Participate in the response to a request for a cluster investigation (e.g., assessment, risk communication, epidemiologic study) | * CDC. [Investigating suspected cancer clusters and responding to community concerns](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6208a1.htm?s_cid=rr6208a1_w). MMWR 2013; 62(RR-8):1-24. * Rothman KJ. 1990. A sobering start for the cluster busters' conference. Am J Epidemiol 132: S6-13. * Neutra RR. 1990. Counterpoint from a cluster buster. Am J Epidemiol 132: 1-8. | * Perform a consultation effectively, including the presentation of well-documented assessments and recommendations in written and/or oral form, in response to a request from a variety of sources (Medical Expert) * Gather information about a health situation, including the beliefs, concerns, expectations, and experiences of all those involved (Communicator) * Identify and explore problems to be addressed, including stakeholders’ context, responses, concerns, and preferences (Communicator) |
| Food safety | * Describe the role of public health in the prevention and reduction of food-borne illness * Understand how food safety is monitored and regulated at national, provincial, and local levels * Participate in the inspection of a food premise and other settings in which foods are sold (e.g., farmers’ market, other special event) * Describe the seven principles of HACCP * Participate in food handlers’ training, if available * Participate in response to a foodborne illness outbreak (e.g., health risk assessment, epidemiologic or environmental investigation) | * [Food safety protocol](http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/food_safety.pdf), OPHS * Canadian Food Inspection Agency, [Hazard Analysis and Critical Control Point](http://www.inspection.gc.ca/about-the-cfia/newsroom/food-safety-system/haccp/eng/1346306502207/1346306685922) (HACCP) approach to food safety * Health Canada, 2011. [Weight of Evidence: Factors to Consider for Appropriate and Timely Action in a Foodborne Illness Outbreak Investigation](http://www.hc-sc.gc.ca/fn-an/pubs/securit/2011-food-illness-outbreak-eclosion-malad-ailments/index-eng.php) * Health Canada, 2011. [Food Safety for First Nations People of Canada: A Manual for Healthy Practices](http://publications.gc.ca/collections/collection_2013/sc-hc/H34-236-2011-eng.pdf) * [Report of the Independent Investigator into the 2008 Listeriosis Outbreak](http://epe.lac-bac.gc.ca/100/206/301/aafc-aac/listeriosis_review/2012-06-28/www.listeriosis-listeriose.investigation-enquete.gc.ca/index_e.php) (Weatherill report), 2009 and [Action on Weatherill Report Recommendations to Strengthen the Food Safety System](http://epe.lac-bac.gc.ca/100/206/301/aafc-aac/listeriosis_review/2012-06-28/www.inspection.gc.ca/english/fssa/transp/prog/finale.shtml), 2011 * PHAC, 2013. [Estimates of Food-borne Illness in Canada](http://www.phac-aspc.gc.ca/efwd-emoha/efbi-emoa-eng.php) * PHO, 2013. [Update on raw milk consumption and public health](http://www.publichealthontario.ca/en/eRepository/PHO_Technical_Report_Raw_Milk_2013.pdf) | * Identify known or potential health effects associated with a particular hazard relevant to health protection in a population, drawing on expertise as appropriate (Medical Expert) * Develop, implement and evaluate health protection programs applying knowledge of common environmental hazards, including but not limited to water and sewage treatment and quality control of water, soil, air and food (Medical Expert) |
| Air quality | * Describe the sources of exposure and related human health effects for each outdoor air pollutant, including but not limited to: nitrogen oxides, sulfur dioxide, particulate matter, ozone, carbon monoxide, lead, volatile organic compounds (VOCs) * Understand how outdoor air quality and air pollutants are monitored and regulated at national and provincial levels * Describe the sources of exposure and human health effects for each indoor air pollutant, including but not limited to: radon, mould, carbon monoxide, environmental tobacco smoke, particulate matter, ozone, VOCs * Describe interventions to mitigate health risks related to outdoor and indoor air pollution targeted at individuals and populations | *Outdoor air pollution:*   * [Environment Canada](https://www.ec.gc.ca/Air/default.asp?lang=En&n=14F71451-1) website on outdoor air quality, air pollutants, and monitoring * US ATSDR [Toxic Substances Portal](http://www.atsdr.cdc.gov/substances/index.asp) * PHO, 2013. [Review of air quality index and air quality health index](http://www.publichealthontario.ca/en/eRepository/Air_Quality_Indeces_Report_2013.pdf) * BC CDC, 2014. [Guidance for BC Public Health Decision Making During Wildfire Smoke Events](http://www.bccdc.ca/healthenv/AirQuality/default.htm)   *Indoor air pollution:*   * Health Canada’s [Residential Indoor Air Quality Guidelines](http://www.hc-sc.gc.ca/ewh-semt/air/in/res-in/index-eng.php) * [Health Canada](http://www.hc-sc.gc.ca/ewh-semt/radiation/radon/index-eng.php) website on radon * U.S. EPA. [Indoor Air Pollution: An Introduction for Health Professionals](http://www.epa.gov/iaq/pubs/hpguide.html) | * Select, discuss and demonstrate an understanding of physical environmental factors, including but not limited to: air and water pollutants (Medical Expert) * Identify known or potential health effects associated with a particular hazard relevant to health protection in a population, drawing on expertise as appropriate (Medical Expert) * Develop, implement and evaluate health protection programs applying knowledge of common environmental hazards, including but not limited to water and sewage treatment and quality control of water, soil, air and food (Medical Expert) |
| Water quality | * Describe the role of public health in the prevention and reduction of water-borne illness * Understand how drinking water and recreational water are monitored and regulated at national, provincial, and local levels * Describe the components of the multi-barrier approach to safe drinking water * Understand the microbiological, chemical, and aesthetic indicators used in monitoring safety of drinking water and recreational water and response to adverse results, including but not limited to: total coliforms, E. coli, heterotrophic plate count, lead, chlorine disinfection by-products, nitrates, cyanobacterial toxins, turbidity * Describe an approach for issuing drinking water advisories * Participate in the inspection of recreational water facilities (e.g., public pools, splash pads) and/or surveillance of public beaches * Participate in the inspection of a small drinking water system * Field visit to water treatment plant (optional) * Describe the health benefits and risks of community water fluoridation | *Drinking water:*   * Health Canada. [Canadian Drinking Water Guidelines](http://www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php) and [Guidelines Technical Documents](http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/index-eng.php#tech_doc) * Canadian Council of Ministers of the Environment, 2004. [From Source to Tap: Guidance on the Multi-Barrier Approach to Safe Drinking Water](http://www.ccme.ca/assets/pdf/mba_guidance_doc_e.pdf) * Health Canada. [Procedure Manual for Safe Drinking Water in First Nations Communities South of 60o](http://www.ncceh.ca/sites/default/files/DW_Manual_E_2007_print-1.pdf) (2007); [Procedure for Addressing Drinking Water Advisories in First Nations Communities South of 60o](http://www.hc-sc.gc.ca/fniah-spnia/pubs/promotion/_environ/2007_water-qualit-eau/index-eng.php) (2007); [Procedural Guidelines for Waterborne Disease Events in First Nations Communities South of 60o](http://publications.gc.ca/collections/collection_2014/sc-hc/H34-228-2011-eng.pdf) (2011) * Health Canada. [What’s in Your Well? A Guide to Well Water Treatment and Maintenance](http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/well-puits-eng.php) * NCCEH. [Small Drinking Water Systems: Who Does What](http://ncceh.ca/en/major_projects/drinking_water/who_does_what) * NCCEH, 2013. [Understanding microbial indicators for drinking water assessment: interpretation of test results and public health significance](http://ncceh.ca/sites/default/files/Microbial_Indicators_August_2013.pdf) * CDC, 2013. [Drinking Water Advisory Communication Toolbox](http://www.cdc.gov/healthywater/emergency/dwa-comm-toolbox/) * [Drinking water protocol](http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/drinking_water.pdf), OPHS * [Walkerton Commission of Inquiry Reports](http://www.attorneygeneral.jus.gov.on.ca/english/about/pubs/walkerton/) key findings and recommendations * [Protocol for the Monitoring of Community Water Fluoride Levels](http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/water_fluoride_levels.pdf), OPHS * INSPQ, 2007. [Water Fluoridation: An Analysis of the Health Benefits and Risks](http://www.inspq.qc.ca/pdf/publications/705-WaterFluoration.pdf).   *Recreational water:*   * Health Canada. [Guidelines for Canadian Recreational Water Quality](http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/guide_water-2012-guide_eau/index-eng.php) * [Recreational water protocol](http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/recreational_water.pdf), OPHS * [Beach management protocol](http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/beach_management.pdf), OPHS | * Select, discuss and demonstrate an understanding of physical environmental factors, including but not limited to: air and water pollutants (Medical Expert) * Identify known or potential health effects associated with a particular hazard relevant to health protection in a population, drawing on expertise as appropriate (Medical Expert) * Develop, implement and evaluate health protection programs applying knowledge of common environmental hazards, including but not limited to water and sewage treatment and quality control of water, soil, air and food (Medical Expert) |
| Health hazards | * Understand how health hazards are monitored and regulated at national, provincial, and local levels * Describe the sources of exposure, human health effects, and risk management of chemical exposures, including but not limited to: arsenic, asbestos, cadmium, lead, mercury, persistent organic pollutants, other major pesticides (organophosphates, carbamates, atrazine, 2,4-D), major VOCs (benzene, trichloroethylene) * Describe the sources of exposure, human health effects, and risk management of physical exposures, including but not limited to ionizing and non-ionizing radiation, noise | * Health Canada, 2013. [Second Report on Human Biomonitoring of Environmental Chemicals in Canada](http://www.hc-sc.gc.ca/ewh-semt/pubs/contaminants/chms-ecms-cycle2/index-eng.php) * Government of Canada. [Chemical Substance Public Summaries](http://www.chemicalsubstanceschimiques.gc.ca/fact-fait/glance-bref/index-eng.php) * US ATSDR [Toxic Substances Portal](http://www.atsdr.cdc.gov/substances/index.asp) * [IARC Monographs on the Evaluation of Carcinogenic Risks to Humans](http://monographs.iarc.fr/index.php) * Royal Society of Canada (2014). [A Review of Safety Code 6 (2013): Health Canada's Safety Limits for Exposure to Radiofrequency Fields](https://rsc-src.ca/en/expert-panels/rsc-reports/review-safety-code-6-2013-health-canadas-safety-limits-for-exposure-to) | * Identify known or potential health effects associated with a particular hazard relevant to health protection in a population, drawing on expertise as appropriate (Medical Expert) * Develop, implement and evaluate health protection programs applying knowledge of common environmental hazards, including but not limited to water and sewage treatment and quality control of water, soil, air and food (Medical Expert) * Design and effectively implement and evaluate primary, secondary, and tertiary interventions relevant to PHPM (Medical Expert) |
| Climate change and extreme heat or cold weather | * Describe the potential impacts of climate change on human health * Describe the components of a heat alert response system * Participate in planning for or responding to a heat or cold alert | * Health Canada, 2008. [Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity](http://publications.gc.ca/collections/collection_2008/hc-sc/H128-1-08-528E.pdf) * [Intergovernmental Panel on Climate Change](http://www.ipcc.ch/) (IPCC) report summaries * Health Canada, 2012. [Heat Alert and Response Systems to Protect Health: Best Practices Guidebook](http://www.hc-sc.gc.ca/ewh-semt/pubs/climat/response-intervention/index-eng.php) (2012), [Extreme Heat Events Guidelines: Technical Guide for Health Care Workers](http://www.hc-sc.gc.ca/ewh-semt/pubs/climat/workers-guide-travailleurs/index-eng.php) (2011), [Communicating the Health Risks of Extreme Heat Events: Toolkit for Public Health and Emergency Management Officials](http://www.hc-sc.gc.ca/ewh-semt/pubs/climat/heat-chaleur/index-eng.php) (2011) * Canadian Centre for Occupational Health and Safety, [hot and cold environments](http://www.ccohs.ca/oshanswers/phys_agents/) | * Select, discuss and demonstrate an understanding of physical environmental factors, including but not limited to: effects of climate change that are relevant to investigate a given health context (individual, local, regional, provincial, national, global) (Medical Expert) * Identify known or potential health effects associated with a particular hazard relevant to health protection in a population, drawing on expertise as appropriate (Medical Expert) * Identify vulnerable or marginalized sub-populations within those communities and populations served and respond appropriately (Health Advocate) |
| Selected communicable diseases | * Describe the natural history, epidemiology, clinical presentation, laboratory diagnosis, case and contact management, and prevention of the following communicable diseases relevant to environmental health: Lyme disease, West Nile virus infection, mosquito-borne encephalitis, dengue, malaria, legionellosis, rabies * Understand approaches to vector-borne disease surveillance and management in Ontario * Participate in the public health management of vector-borne or zoonotic disease cases or outbreak and/or in developing related policies and procedures for your organization | * Heymann DL (ed). Control of Communicable Diseases Manual * [Infectious Diseases Protocol, disease-specific chapters, and provincial case definitions](http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/infdispro.aspx), OPHS * Public Health Agency of Canada [disease-specific web pages](http://www.phac-aspc.gc.ca/id-mi/index-eng.php) * [Rabies Prevention and Control Protocol](http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/rabies_prevention.pdf), OHPS * [Report of the Expert Panel on the Legionnaires’ disease Outbreak in the City of Toronto-September/October 2005](http://www.health.gov.on.ca/en/common/ministry/publications/reports/walker_legion/rep_final_120505.pdf). | * Describe the natural history, epidemiology, risk factors and health burden of the major communicable and non-communicable diseases, including injury, of public health surveillance (Medical Expert) * Identify known or potential health effects associated with a particular hazard relevant to health protection in a population, drawing on expertise as appropriate (Medical Expert) |
| Emergency management | * Describe the components of the following: emergency management cycle, hazard identification and risk assessment (HIRA), emergency response plans, continuity of operations plans, incident management system * Understand the roles and responsibilities of national, provincial, and local authorities in responding to emergencies, with emphasis on the role of public health at each level * Demonstrate ability to apply the emergency cycle to terrorism events (biological, chemical), natural disasters (flooding, forest fires, earthquakes, hurricanes, ice storm), technological emergencies (power failure, hazardous material spill, mine or nuclear facility emergency) * Review the emergency management plans for your public health organization * Participate in emergency preparedness and response activities as available (e.g., planning, training exercises, incident management or emergency response) | * Public Safety Canada. [Emergency Management Planning Guide 2010-2011](http://www.publicsafety.gc.ca/cnt/rsrcs/pblctns/mrgnc-mngmnt-pnnng/index-eng.aspx) * Emergency Management Ontario (EMO): [Provincial Emergency Response Plan](http://www.emergencymanagementontario.ca/english/emcommunity/response_resources/plans/provinicial_emergency_response_plan.html), [Mass Evacuation Plan Part 1: Far North](http://www.emergencymanagementontario.ca/english/emcommunity/response_resources/plans/mass_evacuation_plan.html), [Ontario Provincial HIRA](http://www.emergencymanagementontario.ca/english/emcommunity/ProvincialPrograms/hira/hira.html) and [HIRA workbook](http://www.emergencymanagementontario.ca/stellent/groups/public/@mcscs/@www/@emo/documents/abstract/ec160958.pdf) * EMO self-study course: [Introduction to Incident Management System](https://www.emergencymanagementontario.ca/english/emcommunity/professionaldevelopment/Training/ims100/ims100.html) * [Public Health Emergency Preparedness Protocol](http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/emergency_preparedness.pdf), OPHS * PHAC [Bioterrorism and Emergency Preparedness](http://www.phac-aspc.gc.ca/ep-mu/bioem-eng.php) website * CDC [Bioterrorism Overview](http://emergency.cdc.gov/bioterrorism/overview.asp) * US [Chemical Hazard Emergency Medical Management](http://chemm.nlm.nih.gov/) website | * Describe the general principles of emergency planning and incident management (Medical Expert) * Contribute to the development and utilization of a community, provincial, or federal emergency preparedness plan, including but not limited to measures to prevent and manage exposure to biological and chemical agents, and radiation-emitting agents and devices (Medical Expert) * Select, discuss and demonstrate an understanding of physical environmental factors, including but not limited to (Medical Expert):   + Hazardous emission and spills   + Natural disasters * Describe the roles and responsibilities of the PHPM specialist to other professionals, especially in circumstances involving legislative authority or emergency situations (Collaborator) * Advise on and coordinate public health action in the light of existing local, provincial, and national policies and guidelines (Medical Expert) |
| Occupational medicine | * Understand the legislation protecting the health and safety of workers * Describe human health effects of common workplace exposures, including but not limited to chemical (mineral dusts, heavy metals, volatile solvents, gases), biological (organic dusts, pathogens), physical, mechanical and ergonomical (noise, heat, cold, air pressure, vibration) * Understand psychosocial factors in the workplace, including Karasek’s Job Strain model and workplace wellness * Demonstrate ability to apply prevention at primary (hierarchy of industrial controls, WHMIS), secondary (medical surveillance) and tertiary (fitness to work) levels * Have an approach to the investigation of a possible occupational illness * Field visit with occupational health and safety offices of key local industries (e.g., mining, forestry) and/or an occupational medicine clinic (optional) | * [Workplace Hazardous Materials Information System](http://www.hc-sc.gc.ca/ewh-semt/occup-travail/whmis-simdut/index-eng.php) (WHMIS) * Canadian Centre for Occupational Health and Safety (CCOHS) [OSH Answers](http://www.ccohs.ca/oshanswers/), [Ontario Ministry of Labour](http://www.labour.gov.on.ca/english/hs/pubs/index.php), and US [National Institute for Occupational Safety and Health](http://www.cdc.gov/niosh/) (NIOSH) for specific occupations, workplaces, hazards, diseases and injuries * Taiwo OA. [Recognizing occupational](http://www.aafp.org/afp/2010/0715/p169.html)   [illnesses and injuries](http://www.aafp.org/afp/2010/0715/p169.html). Am Fam Phys 2010; 82(2):169-174.   * CCOHS [Workplace Health and Wellness Program](http://www.ccohs.ca/oshanswers/psychosocial/wellness_program.html) * Karasek RA. Job Demands, Job Decision Latitude, and Mental Strain: Implications for Job Redesign. Adm Sci Q 1979; 24 (2) pp. 285-308. | * Select, discuss and demonstrate an understanding of physical environmental factors, including but not limited to: noise (Medical Expert) * Identify known or potential health effects associated with a particular hazard relevant to health protection in a population, drawing on expertise as appropriate (Medical Expert) * Design and effectively implement and evaluate primary, secondary, and tertiary interventions relevant to PHPM (Medical Expert) |

**Sample Self Study Questions**

1. What are the major health effects, environmental and occupational sources of exposure, and protection measures for arsenic, lead, mercury, cadmium, nickel, manganese? (Draw a table)
2. What are the major health effects and exposures to fluoride, benzene, atrazine?
3. Write three key messages for communicating to parents about the health risks of Wi-Fi in schools.
4. List two advantages and two disadvantages of the Air Quality Index and the Air Quality Health Index.
5. What are the main occupational health risks for health care workers?
   * What interventions can be taken to reduce those risks?
6. It is the summer recreational season. What advice would you give to recreational campers to reduce their risk of water-related illness and injury?
   * What water treatment options are available to recreational campers?
7. Write three key messages for the public regarding fish consumption, balancing risks related to mercury exposure and benefits of eating fish.
8. List criteria air pollutants and one health effect of each.
9. What health effects of climate change are expected to be exacerbated in Canada’s north?
   * Who are the most vulnerable populations?
10. What are the greenhouse gases and their major sources?
11. List two biological agents in each bioterrorism category.
    * List five characteristics that make an organism suitable use as a bioterrorism agent.
12. Explain the difference between a boil water and drinking water advisory.
    * What criteria would help you determine when to rescind a boil water advisory?
13. List five health effects of ultraviolet light exposure.
    * List two individual- and two population-level interventions to reduced risks related to UV light exposure.
14. List four population health measures to reduce the health effects of radon.
15. List five health effects of consumption of raw milk.
    * What are the federal and provincial regulations that govern the sale of raw milk?
16. List the phases of the emergency response cycle. Match them to the following activities:
    * Removal of debris from flooded homes
    * Activation of a municipal emergency operations centre
    * Community meeting to plan for housing for the homeless during heat alerts
    * Municipal tree planting and other greening efforts to reduce runoff into watersheds
17. Describe the internal responsibility system.
18. What are the advantages of using HAACP?
19. Using the host, agent, and environment framework, describe how climate change may increase the risk for malaria, Lyme disease or West Nile Virus in the north.
20. Interpret the following drinking water sample result: Coliforms 100; Ecoli 1
    * What are your next steps?