

University of Toronto
Public Health and Preventive Medicine Residency Program
Communicable Diseases 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 Communicable Diseases 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 Communicable Diseases rotation is to gain a solid understanding of the role of public health and the PHPM specialist in the prevention and control of communicable diseases. During this rotation, the PHPM resident will have the opportunity to develop essential skills through participation in case and contact management, outbreak investigation, and programmatic activities. Residents are responsible for learning about of breadth of communicable diseases, best practices for their prevention and control, reportable disease surveillance, and relevant legislation.

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 .

Additional sources for the rotation-specific goals, objectives, and activities described here include the McMaster University Public Health and Preventive Medicine program [rotation objectives](#) and the Royal College of Physicians and Surgeons of Canada's [Objectives of Training in the Specialty of Public Health and Preventive Medicine](#) (2014) and [Specific Standards of Accreditation for Residency Programs in Public Health and Preventive Medicine](#) (2014).

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

Core Curriculum Topic Areas	Learning Objectives and Activities	Suggested Resources	RCPS Rotation-Specific Objectives
General	<ul style="list-style-type: none"> Meet with Director(s) and Managers involved in Communicable Diseases (CD) in your organization to discuss their roles and responsibilities, and the activities of their teams Participate in CD management meetings Participate in case and contact management, preferably to reflect the breadth of communicable diseases Participate in on-call activities as the Professional Association of Residents of Ontario (PARO) allows or as negotiated with supervisor Observe response to media requests regarding CD issues and take increasing responsibility with appropriate support (e.g., participating in mock interviews, preparing key messages in concert with staff, responding to media requests when approved by staff) Write or review and update a relevant policy or procedure Write or review and update a medical directive Prepare a Board of Health report related to a CD issue 	<ul style="list-style-type: none"> Ontario Public Health Standards, Infectious Diseases Protocol, Disease-Specific Chapters and Provincial Case Definitions Public Health Agency of Canada (PHAC), Notifiable Diseases Surveillance System Epidemiology in Action course, Canadian Field Epidemiology Program, Public Health Agency of Canada (PHAC) Chief Public Health Officer's Reports on the State of Public Health in Canada: Infectious Disease – The Never Ending Threat (2013) <p><i>Textbook (recommended):</i></p> <ul style="list-style-type: none"> Heymann DL. Control of Communicable Diseases Manual, 20th ed. APHA Press, October 2014 <p><i>Textbook (optional):</i></p> <ul style="list-style-type: none"> American Academy of Pediatrics (AAP). The Red Book, 29th ed. AAP Publishing, 2012. 	<ul style="list-style-type: none"> 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) Advise on and coordinate public health action in the light of existing local, provincial, and national policies and guidelines (Medical Expert) Present health information effectively to the public or media about a health issue (Medical Expert) 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) Participate effectively in interprofessional and interdisciplinary interactions, including but not limited to team meetings (Collaborator) Demonstrate leadership in a health team, where appropriate (Collaborator)
Legislation and jurisdiction	<ul style="list-style-type: none"> Describe the legislation that governs the reporting, prevention and control of infectious diseases in Ontario, Canada, and internationally Be involved in legal proceedings (e.g., HPPA section 22 orders) 	<ul style="list-style-type: none"> Health Protection and Promotion Act (Ontario) Mandatory Blood Testing Act (Ontario) Immunization of School Pupils Act (Ontario) Quarantine Act (Canada) International Health Regulations (WHO) <p><i>Textbook (optional):</i></p> <ul style="list-style-type: none"> Speakman J et al. Public Health Law and 	<ul style="list-style-type: none"> Debate the relative importance of individual and societal decisions for health and ethical issues related to public health practice (Medical Expert) Describe the roles and responsibilities of the PHPM specialist to other professionals, especially in circumstances involving legislative authority or emergency situations (Collaborator)

		<p>Practice in Ontario: Health Protection and Promotion Act. Carswell, 2008</p>	<ul style="list-style-type: none"> Discuss and analyze health law and common law relevant to public health policy and healthy public policy (Health Advocate)
Infectious disease epidemiology	<ul style="list-style-type: none"> Define the following epidemiologic concepts, including but not limited to: epidemiologic triad, agent, reservoir, host, carrier, case, contact, communicable period, incubation period, latent period, reproductive rate, infectivity, attack rate, case fatality ratio, point source, common source, Koch's postulates, epidemic, pandemic, endemic Describe the hierarchy of disease control activities and the principle indicators of eradicability 	<ul style="list-style-type: none"> The Principles of Disease Elimination & Eradication. MMWR 1999; 58(SU01); 23-7 <p><i>Textbook (optional):</i></p> <ul style="list-style-type: none"> Porta M. A Dictionary of Epidemiology, 6th ed. Oxford University Press, 2014. 	<ul style="list-style-type: none"> Apply knowledge of the fundamental biomedical, clinical, and public health sciences relevant to PHPM practice (Medical Expert) Discuss and apply guidelines for assessing causality, using Koch's postulates and Bradford-Hill criteria (Medical Expert)
Infection prevention and control	<ul style="list-style-type: none"> Describe and demonstrate ability to apply the general framework of chain of transmission Describe the following concepts, including but not limited to: direct contact, indirect contact, vehicle-borne, vector-borne, airborne, aerosol, droplet, quarantine, isolation Describe principles of and demonstrate ability to apply routine precautions and additional precautions Describe steps for the investigation of an infection control breach; participate in or lead an investigation of an infection control breach Describe the epidemiology, case and contact management, and prevention of hospital-associated infections of public health importance, including but not limited to <i>Clostridium difficile</i> infection, antibiotic resistant organisms (VRE, MRSA) 	<ul style="list-style-type: none"> Provincial Infectious Diseases Advisory Committee (PIDAC) Best Practice Documents Risk Assessment and Inspection of Facilities Protocol, OPHS Infection Prevention and Control in Licensed Day Nurseries Protocol, OPHS Infection Prevention and Control in Personal Services Settings Protocol, OPHS Infection Prevention and Control Practices Complaint Protocol, OPHS OMHLTC, 2009. Infection Prevention and Control Best Practices for Personal Service Settings CDC. Steps for Evaluating an Infection Control Breach 	<ul style="list-style-type: none"> Describe the principles of infection control and their application to effective and appropriate procedures and policies to reduce risk (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) Lead or take a major role in the investigation and management of a significant incident, including but not limited to a communicable disease outbreak, non-infectious disease incident, or a look back (Medical Expert) Describe the principles of infection control and their application to effective and appropriate procedures and policies to reduce risk of infection (Manager) Investigate and intervene when a potential health hazard is identified in a clinical

	<ul style="list-style-type: none"> • Meet with an infection prevention and control practitioner at your public health agency and at a long-term care facility or hospital • Participate in the inspection of a day nursery, personal service setting (e.g., tattoo and body piercing studios), and/or out-of-hospital premise 		<p>setting (Manager)</p>
<p>Surveillance</p>	<ul style="list-style-type: none"> • Describe criteria for making a disease reportable • Describe the following types of surveillance: passive, active, enhanced, sentinel, syndromic surveillance • Describe the surveillance systems used in Canada for reportable diseases, including strengths and limitations of data sources • Describe an approach for the evaluation of surveillance systems 	<ul style="list-style-type: none"> • Population Health Assessment and Surveillance Protocol, OPHS • Doherty JA. Final report and recommendations from the National Notifiable Diseases Working Group. <i>CCDR</i> 2006; 32(19) • CDC. Updated Guidelines for Evaluating Public Health Surveillance Systems. <i>MMWR</i> 2011 (50) RR-13 	<ul style="list-style-type: none"> • Use and interpret information from a range of sources, including but not limited to, mortality, hospital admission, census, primary care, communicable diseases, cancer registries, reproductive and sexual health data, and health surveys to support public health activities in an evidence informed, resource-effective and ethical manner (Medical Expert) • Use a range of methods to assess morbidity and burden of disease within and between populations (Medical Expert) • Define, develop, select and interpret relevant social, demographic, and health indicators from a variety of data sources including but not limited to vital statistics, administrative databases, registries, and surveys (Medical Expert) • Discuss and take into account the limitations in these datasets and their use (Medical Expert) • Appraise the validity and relevance of data and data systems in order to assess their quality and appropriateness for purpose (Medical Expert) • Use data with consideration of the legal and ethical aspects of data collection, manipulation, retention, and release in order to balance societal benefit with

			<p>individual privacy (Medical Expert)</p> <ul style="list-style-type: none"> Integrate different types of data, using complex data sets or data from a variety of sources, to draw appropriate conclusions (Medical Expert)
Outbreak management	<ul style="list-style-type: none"> Describe the steps involved in an outbreak investigation Demonstrate ability to draw, describe and interpret epidemic curves Understand the roles and responsibilities of different levels of government in outbreak investigation and management Participate in or lead the investigation of a communicable disease outbreak, including writing an outbreak summary report 	<ul style="list-style-type: none"> Infectious Diseases Protocol, Institutional/Facility Outbreak Prevention and Control Protocol, OPHS Association of Faculties of Medicine in Canada (AFMC) Primer on Population Health. Patterns of disease development in a population: the epidemic curve <p><i>Textbook (recommended):</i></p> <ul style="list-style-type: none"> Gregg M. Field Epidemiology, 3rd ed. Oxford University Press, 2008 	<ul style="list-style-type: none"> Apply and interpret appropriate quantitative methods and analytic tests to explain differences in health and health related behaviours (Medical Expert) Demonstrate effective problem-solving and judgement in addressing health problems, including interpreting available data and integrating information to develop and implement management plans (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) Lead or take a major role in the investigation and management of a significant incident, including but not limited to a communicable disease outbreak, non-infectious disease incident, or a look back (Medical Expert) Apply the principles of infectious diseases epidemiology to the investigation and management of communicable disease outbreaks in individuals, families, groups, organizations, communities and populations (Medical Expert)
Vaccine-preventable diseases	<ul style="list-style-type: none"> Define the following concepts, including but not limited to: immunogenicity, passive immunization, active immunization (live attenuated, inactivated vaccines), antigen, adjuvant, preservative, antigenic 	<ul style="list-style-type: none"> PHAC. Canadian Immunization Guide, evergreen edition; National Advisory Committee on Immunization (NACI); Provincial/Territorial Immunization Programs 	<ul style="list-style-type: none"> 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)

	<p>drift, antigenic drift, vaccine efficacy, vaccine effectiveness, herd immunity</p> <ul style="list-style-type: none"> • Describe the epidemiology, case and contact management, and prevention of reportable vaccine-preventable diseases, including but not limited to diphtheria, <i>Haemophilus influenzae</i> infection, measles, mumps, rubella, meningococcal disease, pertussis, polio, invasive pneumococcal disease, rotavirus, tetanus, varicella, herpes zoster • Describe and demonstrate ability to apply criteria for the analysis of immunization programs (Erickson and DeWals' framework) • Describe how vaccine safety is ensured in Canada, including authorization for marketing, quality monitoring, adverse event reporting, and communicating risk to the public • Review the immunization coverage reports for your region and Ontario; describe how coverage rates are derived, barriers to accurate estimation, and potential solutions • Describe the requirements of maintaining the vaccine cold chain and response to cold chain incidents (e.g., electricity disruption) • Describe an approach to planning and conducting mass vaccination clinics • Attend a routine immunization program (e.g., school-based) and/or contact management immunization event 	<ul style="list-style-type: none"> • PHAC. Guidelines for the Prevention and Control of Measles Outbreaks in Canada. CCDR 2013; 39 (ACS-3) • PHAC. Guidelines for the Prevention and Control of Meningococcal Disease. CCDR 2005; 31 (Suppl 1) • Erickson LJ et al. An analytical framework for immunization programs in Canada. Vaccine 2005; 23(19): 2470-76 • PHAC, 2007. National Vaccine Storage and Handling Guidelines for Immunization Providers • PHAC, National Immunization Strategy and Immunization Coverage in Canada (2002 to 2012) • Immunization Management Protocol, OPHS • Vaccine Storage and Handling Protocol, OPHS • Immunize BC, Immunization Communication Tool for Immunizers 	<ul style="list-style-type: none"> • Design and effectively implement and evaluate primary, secondary, and tertiary interventions relevant to PHPM (Medical Expert) • Identify and interpret the impact of health behaviours of individuals, groups, and populations, particularly with respect to nutrition, physical activity, use of tobacco and other substances, sexuality, risk taking, immunization, and participating in recommended prevention and screening programs (Medical Expert)
<p>Respiratory infections and pandemic</p>	<ul style="list-style-type: none"> • Describe the epidemiology, case and contact management, and prevention of reportable respiratory infections, including 	<ul style="list-style-type: none"> • PHAC, FluWatch, Canadian Pandemic Influenza Plan for the Health Sector; Emerging Respiratory Pathogens 	<ul style="list-style-type: none"> • Describe the natural history, epidemiology, risk factors and health burden of the major communicable and non-communicable

<p>planning</p>	<p>but not limited to seasonal influenza, tuberculosis, invasive group A streptococcal disease</p> <ul style="list-style-type: none"> • Describe the epidemiology, case and contact management, and prevention of emerging respiratory pathogens, including but not limited to variant influenza viruses, coronaviruses • Attend TB case conferences • Field visits to tuberculosis clinic and with DOT (directly observed therapy) tuberculosis nurse • Review your public health agency’s pandemic plans, understanding plan components and roles and responsibilities of various stakeholders 	<ul style="list-style-type: none"> • OMHLTC, Ontario Health Plan for an Influenza Pandemic 2013; The H1N1 Pandemic – How Ontario Fared: A Report by Ontario’s Chief Medical Officer of Health • CDC, Guidelines for Large-Scale Influenza Vaccination Clinic Planning • Association of Medical Microbiology and Infectious Disease (AMMI) Canada. The use of antiviral drugs for influenza: A foundation document for practitioners. Can J Infect Dis Med Micro 2013; 24 (Suppl SC) • WHO, 2005. Checklist for Influenza Pandemic Preparedness Planning • Canadian Thoracic Society and PHAC, 2013. Canadian Tuberculosis Standards, 7th ed. • Tuberculosis Prevention and Control Protocol, OPHS • PHAC. Guidelines for the Prevention and Control of Invasive Group A Streptococcal Disease. CDR 2006; 32 (Suppl 2) 	<p>diseases, including injury, of public health surveillance (Medical Expert)</p> <ul style="list-style-type: none"> • Design and effectively implement and evaluate primary, secondary, and tertiary interventions relevant to PHPM (Medical Expert) • Describe the general principles of emergency planning and incident management (Medical Expert)
<p>Sexually transmitted and blood-borne infections</p>	<ul style="list-style-type: none"> • Describe the epidemiology, case and contact management, and prevention of reportable sexually transmitted and blood-borne infections, including but not limited to gonorrhea, chlamydia, syphilis, human papillomavirus infection, hepatitis B virus infection, hepatitis C virus infection, HIV/AIDS • Describe the components of harm reduction programs for drug users • Attend STI case conferences • Field visits to your public health agency’s healthy sexuality clinic and harm reduction program (e.g., needle exchange program) 	<ul style="list-style-type: none"> • PHAC. Canadian Guidelines on Sexually Transmitted Infections, evergreen edition • Public Health Ontario, 2013. Guidelines for Testing and Treatment of Gonorrhea in Ontario • Provincial Infectious Diseases Advisory Committee (PIDAC), 2009. Sexually Transmitted Infections Case Management and Contact Tracing Best Practice Recommendations • Sexual Health and Sexually Transmitted Infections Prevention and Control Protocol, OPHS • PHAC, 2013. Human immunodeficiency virus HIV Screening and Testing Guide • PHAC, 2013. HIV Transmission Risk: A 	<ul style="list-style-type: none"> • 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 and interpret the impact of health behaviours of individuals, groups, and populations, particularly with respect to nutrition, physical activity, use of tobacco and other substances, sexuality, risk taking, immunization, and participating in recommended prevention and screening programs (Medical Expert) • Design and effectively implement and evaluate primary, secondary, and tertiary interventions relevant to PHPM (Medical

		<p>Summary of Evidence</p> <ul style="list-style-type: none"> Canadian HIV/AIDS Legal Network, 2010. Addressing HIV Risk Behaviours: A Role for Public Health Legislation and Policy Working Group on Best Practice for Harm Reduction Programs in Canada, 2013. Best Practice Recommendations for Canadian Harm Reduction Programs that Provide Service to People Who Use Drugs and are at Risk for HIV, HCV, and Other Harms: Part 1. Exposure of Emergency Service Workers to Infectious Diseases Protocol, OPHS 	<p>Expert)</p> <ul style="list-style-type: none"> Identify the determinants of health for the populations that they serve (Health Advocate) Describe how public policy impacts on the health of the populations served (Health Advocate)
Gastrointestinal infections	<ul style="list-style-type: none"> Describe the epidemiology, case and contact management, and prevention of reportable gastrointestinal infections, including but not limited to amebiasis, botulism, campylobacteriosis, cholera, cryptosporidiosis, cyclosporiasis, giardiasis, hepatitis A virus infection, listeriosis, norovirus, salmonellosis, shigellosis, typhoid and paratyphoid, verotoxin-producing <i>E. coli</i>, yersiniosis See Environmental Health for safe food and water 	<ul style="list-style-type: none"> Health Canada, 2011. Weight of Evidence: Factors to Consider for Appropriate and Timely Action in a Foodborne Illness Outbreak Investigation OMHLTC, 2013. Control of Gastroenteritis Outbreaks in Long-Term Care Homes 	<ul style="list-style-type: none"> 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) Design and effectively implement and evaluate primary, secondary, and tertiary interventions relevant to PHPM (Medical Expert)
Travel medicine	<ul style="list-style-type: none"> Describe recommendations for travellers, including but not limited to: risk of injury, safe food and water, sexual health, vaccines and chemoprophylaxis based on assessment of risk Describe an approach to a evaluating fever or other illness in a returning traveller Attend a public health unit travel health clinic 	<ul style="list-style-type: none"> Committee to Advise on Tropical Medicine and Travel (CATMAT) statements <p><i>Textbook (optional):</i></p> <ul style="list-style-type: none"> CDC. Health Information for International Travel (The Yellow Book) 	<ul style="list-style-type: none"> Design and effectively implement and evaluate primary, secondary, and tertiary interventions relevant to PHPM (Medical Expert)

Sample Self Study Questions

- 1) List five characteristics of poliovirus infection which makes it a feasible candidate for eradication.
- 2) Your public health unit is investigating a suspect case of avian influenza in a 50 year old man who recently travelled to your region from Southeast Asia. Laboratory results are pending. Write three key messages to the public that you would like to cover in your statement to the media.
- 3) Your province is considering including herpes zoster vaccine for all adults 60 years and older in its publicly-funded immunization program. How would you approach this decision-making process?
- 4) What are three pros and three concerns for the use of HIV anti-retroviral treatment (ART) as prevention?
- 5) Describe the differences between the use of criminal law and public health interventions for persons unwilling to disclose HIV/AIDS status to their sexual partners.
- 6) A confirmed case of invasive meningococcal disease in a 3 year old child has been reported to your public health unit. Describe your approach.
- 7) Your public health unit has received the third report in the past month of confirmed active tuberculosis disease among men living at a local homeless shelter. What is your approach?
- 8) There was a 12-hour power outage in your region after wide-spread thunderstorms and flooding. The local community health centre calls the public health unit's after-hours service regarding their stock of vaccines. How should the public health unit respond?
- 9) You are the physician on-call when a suspected case of measles is reported by a physician at a walk-in clinic. What information do you need to know from the reporting physician? What further instructions will you give her?
- 10) There have been two confirmed cases of pertussis deaths in infants in your health region in the past month, occurring in a population with low vaccination rates. Write three key messages targeted to this vaccine-hesitant community.
- 11) What are the laboratory markers indicative of acute hepatitis B virus infection? Chronic HBV carrier status?
- 12) There have been three confirmed cases of hepatitis C virus infection in your rural community. The only possible risk factor that your investigator reports to you is recent colonoscopy at a local surgeon's clinic. What is your approach?
- 13) List four risk factors for *Clostridium difficile* infection.
- 14) List two advantages and two disadvantages for using syndromic surveillance in local emergency departments to detect outbreaks of influenza or emerging respiratory infections.
- 15) Fourteen of 22 grade-school students become ill with vomiting at the end of a day-long field trip to the science centre. List four agents that are on your initial differential diagnosis.
- 16) What are the population groups that are recommended to receive pneumococcal conjugate vaccine and pneumococcal polysaccharide vaccines in your province?
- 17) You are participating in a committee for antimicrobial stewardship in your regional health authority (RHA). List four policies or interventions which your committee should consider for recommendation to the hospitals in the RHA.
- 18) List four advantages of implementing a provincial immunization registry.
- 19) In the role as consultant for your provincial public health agency, you have been asked to evaluate the province's surveillance system for varicella. What three surveillance system attributes will you focus the evaluation on and why?

20) Describe and interpret the following epidemic curve.

Figure 1. Persons infected with the outbreak strain of *Salmonella* Heidelberg reported to PulseNet: New York, New Jersey, Pennsylvania, Maryland, Ohio, Minnesota, 2011. Source: <http://www.cdc.gov/salmonella/heidelberg-chickenlivers/011112/epi.html>

