

Queen's University Course Description

EPID-851 - Medically Relevant Microbiology in Infection Prevention and Control

Instructor and General Information

Instructor: Prameet M. Sheth MSc. PhD. D(ABMM), F(CCM)
Clinical Microbiologist and Director
Molecular Microbiology and Infectious Disease Sequencing, KHSC
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Course Information

Course Title and Number: EPID-851 Medically Relevant Microbiology in Infection Prevention and Control

Classroom Location: Carruthers Hall 102

Course Description: This course provides foundational and applied information to support learners' development of infection prevention and control (IPAC) practices within various healthcare and public health settings. Students will gain an understanding of the basics of medical microbiology and how it relates to core competencies for IPAC. Students will be able to apply their understanding of pathogens to appropriate IPAC interventions and concepts to ensure appropriate IPAC interventions. Three term hours. Offered Winter term annually.

Prerequisites: There are no specific prerequisites. This course is designed for students enrolled in the Infection Prevention and Control (IPAC) track of the Master of Public Health (MPH) program at Queen's University. If spaces are available and with consent of the instructor, the course may be of interest to students in other programs.

Learning Outcomes: Upon successful completion of the course, students will be able to:

1. Develop an understanding and conceptualize key components of medically relevant pathogens that include bacteria, viruses, fungi, parasites and prions
2. Describe basic physiological mechanisms which underly processes of human infection.
3. Describe and demonstrate critical thinking to apply the foundational practices to prevent and control the spread of pathogens in health care and community settings.
4. Apply knowledge and concepts of microbiology to better understand pathogens, the host and their interplay to determine infection prevention and control interventions in appropriate settings and populations.

5. Identify and describe pathogen virulence factors and the importance of appropriate cleaning protocols based on pathogen characteristics (e.g., OH, disinfection, reprocessing, construction, environmental services).

Rationale: To meet the demands of this evolving field, advance the profession, and equip infection control professionals (ICPs) to meet current and future challenges. This course will provide ICP's with the necessary background and understanding in medical microbiology required for any ICP to practice in the community or in an institutional environment. The course will prepare ICP's through assessments, evaluations, surveillance, outbreak management and to communicate effectively with patients, their families, and physicians.

Assessment:

Students will be evaluated and graded on a variety of activities including assignments (x2), class quizzes (x4), midterm (x1) and group project (x1).

Assignment	Description	Due date	Weight
1	Assignments (x2)	TBD	30%
2	Class quizzes (x4)	Various	30%
3	Midterm	TBD	20%
4	Group project	TBD	20%
			100%

After the end of the term when all grades have been submitted, students will be asked to evaluate the course via an online survey. Feedback will be sent to the MPH Program Director.

Course Materials

Textbook: Red Book, 2018. Committee on Infectious Diseases; American Academy of Pediatrics; David W. Kimberlin, MD, FAAP; Michael T. Brady, MD, FAAP; Mary Anne Jackson, MD, FAAP; Sarah S. Long, MD, FAAP

Course Schedule

Week	Topic	Learning Objectives	Assessment
1, 2	Introduction to Medical Microbiology	<ol style="list-style-type: none"> 1. Introduction to the four Kingdoms - Bacteria, Viruses, Parasites and Fungi. 2. Prion disease. 3. Important physical and chemical characteristics of and their importance to IPAC 4. Identify key components of each pathogen group. 5. Pathogen Virulence factors. 	
3, 4	Host-Pathogen Interactions	<ol style="list-style-type: none"> 1. Describe host-pathogen interactions. 2. Introduce the role of the innate and adaptive immune responses. 3. Pathogen evasion strategies and their roles in disease, transmission and IPAC. 4. The importance of Immunization. 	Week 3: Quiz #1
5	The Pathogen Chain of Transmission	<ol style="list-style-type: none"> 1. Pathogen transmission – role of vectors and the environment. 2. Breaking the chain of transmission – how to develop an effective pathogen-focused IPAC intervention. 	Week 4: Assignment #1 Week 5, Quiz #2
6,	Introduction and mechanisms of Antibiotics, and Antifungals.	<ol style="list-style-type: none"> 1. Introduction to difference classes and mechanisms of Antibiotics and Antifungals. 	Week 6, Midterm
7, 8	Antibiotic and Fungal Resistance	<ol style="list-style-type: none"> 1. Resistance mechanisms – deciphering the sea of acronyms. 2. Mobile gene elements and their importance in IPAC 3. Describe the impact of monitoring Antibiotic resistance in institutional and community settings. 	Week 7: Quiz #3 Week 8; Assignment #2

9	Rise of Superbugs	<ol style="list-style-type: none"> 1. Global and Canadian Epidemiology 2. Precautions to mitigate the spread of multidrug resistance. Transmission/dissemination of MRSA, VRE, ESBL, CRO, C. auris. 3. The role of surveillance and introduction to antibiograms. 	
10	How clean is clean?	<ol style="list-style-type: none"> 1. Review definitions of sterilization and disinfection (high/intermediate/low) 2. Spaulding classification of medical items 3. Review the different methods of sterilization and disinfection 4. To review protocols of management of CJD with respect to disinfection and sterilization 	Week 10, Quiz #4
11	Pathogens with special relevance to IPAC	<ol style="list-style-type: none"> 1. Measles, TB, Scabies, Coronaviruses, Influenza, Norovirus, Varicella, Brucella, Shigella, Bordetella, RSV, Hemorrhagic fevers 2. Describe their incubation periods, introduction to Ro, strategies to prevent dissemination. 3. Introduction to Genomics and it's use in IPAC. 	
12	Using the Microbiology laboratory.	<ol style="list-style-type: none"> 1. Laboratory techniques and technologies. 2. The use of Genomics for Outbreak investigations. 3. The future of IPAC and providing personalized patient care. 	Week 12: Group project

