Session title: **Infectious Disease Laboratory Session - FACULTY**

**Learning objectives:**

**At the end of this lab session you will be able to**

Identify etiologic bacterial organisms from clinical case studies based on the following:

1. Discriminating between pathogenic and commensal organisms
2. Performing and microscopically examining a Gram stain
3. Interpreting metabolic and biochemical tests
4. Assessing antibiotic sensitivity

Session title: **Bacterial Classification, Morphology and Cell Structure – HONER ZU BENTRUP**

**Learning objectives:**

**At the end of this learning module you will be able to:**

1. Recognize the shapes and arrangements of common bacteria
2. Explain the principle of the Gram stain and its purpose
3. Explain how the cell wall affects Gram staining characteristics
4. Compare and contrast the structure and chemistry of the Gram positive and Gram negative cell walls
5. Explain the significance of lipid A and the O antigen of LPS
6. Discuss the basic structure and biosynthesis of Peptidoglycan and LPS
7. Explain how the cell wall affects susceptibility to penicillin and lysozyme
8. Contrast the bacterial ultrastructure (internal structures, cell envelope) with that of eukaryotic cells
9. Distinguish the various bacterial external structures (capsule, appendages)

**Knowledge of these basics will let you appreciate**

- how physicians think when confronted with a bacterial infection
- the importance of bacterial classification in treatment
- the importance of knowing the etiology of organ system based infection

Session title: **Bacterial Metabolism, Growth, and Genetics – LAWSON AND HONER ZU BENTRUP**

**At the end of this learning module you will be able to:**

1. Define the factors that regulate bacterial growth and metabolism
2. Explain how specific growth characteristics are relevant in identification of pathogenic organisms
3. Identify the phases of the typical bacterial growth pattern
4. Discuss bacterial spore formation and germination and the conditions under which each might occur
5. Describe the formation of biofilms and what role they play in bacterial pathogenesis
6. Examine bacterial gene expression and list therapeutic targets in transcription and translation
7. Explain bacterial replication
8. Briefly describe the mechanisms for transformation, transduction, transposition, and conjugation in bacteria.
10. Discuss the consequences of horizontal gene transfer
11. Discuss the development and transfer of antibiotic resistance in bacteria.
12. Define genetic recombination and describe the processes used by bacteria to transfer DNA from one organism to another.
13. Compare the mechanisms of genetic recombination in bacteria.
14. Describe the functions of plasmids and transposons.
15. Develop an understanding of bacterial genetic systems and how they relate to important bacterial processes

Session title: Mechanisms of Microbial Pathogenesis – HONER ZU BENTRUP

Learning objectives:

At the end of this learning module you will be able to:

1. Define and discuss the terms normal flora, commensal, opportunist, and pathogen.
2. Explain the concept of carrier state.
3. Discuss the benefits derived from normal flora as well as the disadvantages.
4. Compare and contrast the levels of non-specific immunity. Specify how non-specific immunity defends against infection.
5. Review how bacteria gain entry into the body and attach to target cells.
6. Explain why and how biofilms form and their role in disease.
7. Analyze the pathogenic actions of bacteria, including the role of virulence factors:
8. Describe how bacteria are able to evade the immune system.
9. Illustrate how transmission of pathogens occurs between hosts.
10. Explain why there is a problem with antimicrobial resistance today.
11. Discuss strategies for preventing and controlling antibiotic resistance.

Session title: Gram-positive cocci of medical importance – HONER ZU BENTRUP

Learning objectives:

At the end of this learning module you will be able to:
1. Describe the virulence factors of *Staphylococcus aureus*
2. Explain the function of superantigens.
3. Contrast *Staphylococcus aureus* with *Staphylococcus epidermis* in terms of virulence factors
4. Discuss the structural and enzymatic features and toxins of *Staphylococcus* that allow it to evade the body's defenses and be pathogenic.
5. Describe the prevention and symptoms of staphylococcal food poisoning.
6. List, describe and discuss the most important diseases caused by *Staphylococcus* and *Streptococcus*.
7. Describe how staphylococcal species are distinguished from one another during diagnosis.
8. Discuss briefly the history of staphylococcal resistance to antimicrobial drugs.
9. Explain the classification of streptococcal strains.
10. Describe those structures in *Streptococcus pyogenes* that allow this organism to survive the human defense mechanisms.
11. Identify the enzymes and toxins that facilitate the spread of *Streptococcus pyogenes* in the body.
12. Interpret the conditions under which Group A streptococci cause disease.
13. Contrast Group A with Group B *Streptococcus* in terms of structure.
14. List and describe the most important Group B (*Streptococcus agalactiae*) infections.
15. Describe how the structure of *Streptococcus pneumoniae* affects its pathogenicity.
16. Follow a *Streptococcus pneumoniae* bacterium on an imaginary path through the body, describing the chemical and physical properties that allow the bacterium to cause pneumonia.
17. Discuss the lab identification/diagnosis of pneumococcal diseases.
18. Identify species of *Enterococcus* and describe their pathogenicity, diagnosis and prevention of their diseases.

Session title: **Gram positive Toxigenic Rods – HONER ZU BENTRUP**

**At the end of this learning module you will be able to:**

1. List the methods of transmission of anthrax.
2. Describe the clinical manifestations and diagnosis of infections by *Bacillus anthracis* and *B. cereus*.
3. Characterize the two major species of *Bacillus*.
4. Characterize the four major species of *Clostridium*.
5. Identify the mechanisms accounting for the pathogenicity of *Clostridium perfringens*.
6. Describe the clinical manifestations and diagnosis of infections by *Clostridium perfringens*.
7. Explain the role of antimicrobial drugs in the development of gastrointestinal diseases of *Clostridium difficile*.
8. Discuss the diagnosis and prevention of infection by *Clostridium difficile*. 
9. Compare and contrast the different manifestations of botulism poisoning.
10. Describe the diagnosis of botulism poisoning and explain how to prevent it.
11. Review the epidemiology of tetanus.
12. List preventative measures against infection by *Clostridium tetani*.
13. Characterize the morphology of *Corynebacterium*.
14. Describe the transmission of *Corynebacterium diphtheriae* and the effect of diphtheria toxin.
15. Discuss the diagnosis and prevention of diphtheria.

Session title: **Enterobacteriacea – HONER ZU BENTRUP**

**Learning objectives:**

**At the end of this learning module you will be able to:**

1. Describe how members of the family *Enterobacteriaceae* are distinguished from members of other Gram-negative bacteria.
2. Discuss how members of the family *Enterobacteriaceae* are distinguished in the laboratory.
3. List the virulence factors found in the family *Enterobacteriaceae*.
4. Describe diagnostic methods and prevention of diseases of enteric bacteria.
5. Compare and contrast *Escherichia, Klebsiella, Serratia, Enterobacter, Citrobacter, Salmonella, Shigella, Proteus and Yersinia*.
6. Describe and contrast the pathogenesis and diseases of *ETEC, EHEC, EIEC, EAEC, and EPEC*.
7. Describe the diseases caused *Salmonella* and *Shigella* species.
8. Describe the life cycle of *Yersinia pestis* and contrast bubonic and pneumonic plague.

Session title: **Gram-negative Cocci and Coccobacilli – HONER ZU BENTRUP**

**At the end of this learning module you will be able to:**

1. Discuss how members of the gram-negative cocci and coccobacilli are distinguished in the laboratory.
2. Describe diagnostic methods and prevention of diseases of gram-negative cocci and coccobacilli.
3. List the main features of *Neisseria* that contribute to its pathogenicity.
4. Discuss the difficulties researchers face in developing an effective vaccine against *Neisseria gonorrhoeae*.
5. Describe how meningococci survive and thrive in humans.
6. Discuss the epidemiology of meningococcal diseases.
7. Identify and describe the main diseases caused by species of *Haemophilus*.
8. Describe the main virulence factors of *Bordetella pertussis*. 
9. Identify the different disease phases of pertussis.
10. Describe how Legionella cause disease in humans.
11. Describe the main symptoms of Legionnaires disease.

Session title: **Gram-Negative, Oxidase-Positive Motile Rods - LAWSON**

**Learning objectives:**

At the end of this learning module you will be able to:

1. Identify the clinically-relevant Gram-negative, oxidase-positive species
2. List the defining properties of *Pseudomonas aeruginosa, Campylobacter jejuni, Helicobacter pylori, and Vibrio cholera*
3. Describe how these bacteria are transmitted
4. Recognize the major virulence factors of these organisms
5. Identify the most common diseases associated with each organism

Session title: **Mollicutes, filamentous bacteria, and Bacteroides – HONER ZU BENTRUP**

**Learning objectives:**

At the end of this learning module you will be able to:

1. List the main characteristics of Mycoplasma.
2. Explain why Mycoplasma can’t be classified as Gram+ or Gram- organisms.
3. Summarize the damage done to respiratory epithelial cells by *Mycoplasma pneumoniae*.
4. Recognize those Mycoplasma that are associated with urinary and genital tract infections.
5. Compare and contrast *Nocardia* and *Actinomyces* in terms of appearance, cell wall composition, and pathogenicity.
6. List the main characteristics of *Bacteroides*.

Session title: **Mycobacteria – HONER ZU BENTRUP**

**Learning objectives:**

At the end of this learning module you will be able to:

1. Characterize *Mycobacteria* in terms of cell wall composition, growth rate, and resistance to antimicrobial drugs.
2. Identify the distinguishing characteristics of the cell wall of *Mycobacteria*
3. Describe the transmission of *Mycobacterium tuberculosis* and its subsequent action within the human body.
4. Discuss diagnosis and prevention of tuberculosis.
5. Compare and contrast tuberculoid leprosy with lepromatous leprosy.
6. Discuss the diagnosis and prevention of leprosy.
7. Explain why the number of reported cases of infection with *Mycobacterium avium-intracellulare* complex (MAC) has been rising, even though this strain was long thought to be harmless to humans.

Session title: **Spirochetes – HONER ZU BENTRUP**

**At the end of this learning module you will be able to:**

1. Define the general features and physiology of spirochetes and how these influence pathogenesis and diagnosis
2. List and identify the diseases caused by *Treponema pallidum*
3. Define the different stages of untreated syphilis and their treatment.
4. Differentiate the treponemal and non-treponemal tests in the diagnosis of syphilis
5. List the diseases caused by non-venereal species of *Treponema*.
6. Review Lyme disease, its vector, and its causative agent.
7. Describe the stage-specific phases of Lyme disease and their relevance in the diagnosis and treatment of Borrelia infection
8. Compare and contrast the two types of relapsing fever, including their causes and vectors.
9. Describe *Leptospira interrogans* and zoonotic leptospirosis.

Session title: **Chlamydiae and zoonotic intracellular bacteria – HONER ZU BENTRUP**

**Learning objectives:**

**At the end of this learning module you will be able to:**

1. Describe the life cycle of *Chlamydia*, including the two cellular forms.
2. Specify the diseases associated with the various *Chlamydia trachomatis* Serovars, with *Chlamydophila psittaci*, and with *Chlamydophila pneumoniae*
3. Discuss the prevention of chlamydial infections.
4. List the species of *Rickettsia* that are responsible for human infections.
5. Identify the cause, vectors, and reservoirs of the various Rickettsial species.
6. Compare and contrast the rash and petechiae of Rocky Mountain spotted fever (RMSF) with rickettsial typhus, Rickettsialpox and Ehrlichiosis
7. Compare and contrast the life style of *Rickettsia, Ehrlichia, Bartonella*, and *Coxiella burnetii*
8. Describe the mode of transmission of Q fever
9. Identify the features of *Listeria monocytogenes* that allow for its pathogenicity.
10. Discuss diagnosis and prevention of disease from *Listeria monocytogenes*. 
11. Explain the difference between trench fever, cat-scratch disease, and bacillary angiomatosis
12. Describe the cause and symptoms of Brucellosis and Tularemia

Session title: **Basic Biology of Fungi - FREYTAG**

**Learning objectives:**

**At the end of this learning module you will be able to:**

1. Compare and contrast fungi and bacteria
2. Describe fungal morphology and understand dimorphism
3. Summarize the complexities of identifying, treating, and preventing fungal infections.
4. State the most significant modes of transmission for mycoses.
5. Describe the basic biology, pathogenesis, virulence/transmission and characteristics of infections caused by fungal pathogens
6. Compare and contrast mycotoxicoses, mycoses, and fungal allergies.
7. Compare and contrast true fungal pathogens with opportunistic fungi.
8. Identify factors that predispose people to experiencing opportunistic fungal infections.
9. Discuss why the diagnosis of opportunistic infections in immunocompromised patients is difficult.
10. Describe the primary ways that mycoses manifest clinically.
11. Describe general approaches for treatment and diagnosis of these fungal infections.

Session title: **Virus classification, structure and replication – VOSS**

**Learning objectives:**

**At the end of this learning module you will be able to:**

1. Classify several major human pathogens
2. Describe the structure of the viral particle
3. Explain the advantages and disadvantages of viral envelopes
4. List the different types of viral genomes
5. Describe each step of viral replication
6. Explain the strategies employed by viruses for gene expression
7. Identify the cellular factors required for replication of all viruses

Session Title: **Mechanisms of Viral Pathogenesis - VOSS**

**Learning Objectives:**

**At the end of this session, you will be able to:**

1. Define productive, abortive, and latent viral infection
2. Identify acute, chronic, and latent viral infections associated with human diseases
3. Discuss the concept of viral pathogenesis as it relates to virus replication
4. Describe direct induction of pathology associated with viral infection and cite specific examples
5. Describe host-derived induction of pathology associated with viral infection and cite examples
6. Discuss the differences between transmission and dissemination and the impact of those on viral disease progression in an individual and the community

Session Title: RNA viruses - VOSS

Learning Objectives:

At the end of this session, you will be able to:

1. Recognize the phylogenetic relationships and structural hallmarks of the RNA virus families associated with human disease
2. Describe the clinical presentation associated with infection by selected RNA viruses
3. Identify therapeutic or vaccine options for select RNA viruses

Session title: DNA viruses – VOSS

Learning objectives:

At the end of this learning module you will be able to:

1. Identify the main families of DNA viruses
2. Understand the variety of diseases caused by DNA viruses
3. Describe available treatment options for DNA virus infections
4. Briefly explain viral transformation
5. Discuss lytic versus latent lifestyles and the advantages to each

Session title: Introduction to Parasitology - MCLELLAN

Learning objectives:

At the end of this learning module you will be able to:

1. Articulate several ways in which parasitic pathogens differ from less complex pathogens
2. List several factors which contribute to the pathogenicity of parasites
3. Discuss in general how these factors can affect the clinical presentation of infection with parasites
4. Recognize the major groups of parasites

Session title: **Constitutive Defenses of the Body (Innate Immunity) - MCLACHLAN**

**Learning Objectives**

**At the end of this learning module you will be able to:**

1. Describe the various innate physical resistances to infection and what functions they each perform
2. Describe the role of macrophages, neutrophils, and NK cells during infection
3. Describe the process by which leukocytes can enter inflamed tissue
4. Define the interactions between pattern recognition receptors and pathogen associated molecular patterns and what outcomes this leads to
5. Define what a cytokine is and what functions they serve during infection
6. Distinguish between different cytokines and what functions they each have during infection
7. Define the three pathways of the complement system and the basic components of each
8. Pathway

Session title: **Induced Defenses of the Body (Adaptive Immunity) - MCLACHLAN**

**Learning Objectives**

**At the end of this learning module you will be able to:**

1. Describe the different types of lymphoid tissue and what functions they each serve during an immune response
2. Describe the basic structure and function of antibody molecules
3. Define antibody isotype and differentiate between various isotype functions
4. Describe the different functions of helper (CD4) T cells versus cytotoxic (CD8) T cells
5. Explain the role of MHC in antigen presentation in the activation of each T cell type
6. Differentiate between type 1 (Th1) and type 2 (Th2) immune responses
7. Explain how T cell cytokines affect the outcome of an immune response

Session title: **Microbial Diagnostics and Vaccines - LAWSON**

**Learning objectives:**
At the end of this learning module you will be able to

1. Identify the common types of laboratory assays/tests used for diagnosis of infectious diseases
2. Describe the basis of immunological assays used in microbial diagnostics
3. Discuss the basis of nucleic acid detection methods for microbial diagnostics
4. Explain the use of vaccines in prevention of viral and bacterial diseases
5. Develop an understanding of issues related to immunization practices
Session title: **TBL Module - Human Herpesviruses - Cindy Morris, PhD, Elise Occhipinti, MD**

**Learning objectives:**

**At the end of this exercise you will be able to**

1. Discuss the structure, properties, and replication of herpesviruses.
2. Discuss the pathogenesis and clinical syndromes caused by each of the herpesviruses that commonly infect man.
3. Explain how each herpesvirus is transmitted and where each establishes latency.
4. Discuss laboratory diagnosis of each herpesvirus.
5. Explain underlying causes for symptoms associated with each herpesvirus.
6. Discuss treatments, mechanism of actions of drugs used to treat herpesvirus infections (if they can be treated), and what vaccines are or are not available to prevent herpesvirus infections.
7. Determine which herpesvirus is associated with symptoms in various clinical situations.
8. Generate a table comparing the herpesviruses, the diseases they cause, the symptoms of the diseases, the diagnoses of the diseases and the mechanisms of pathogenesis for each virus.

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Session title: **HIV/AIDS**

**Topic distribution for lectures:**

**Garry** - phylogenetic origin of virus, viral structure, biology, life cycle, current and potential targets in life cycle for therapeutic intervention

**McLellan** - history of HIV as human disease, epidemiology, transmission, natural history of HIV, major opportunistic infections

**Mushatt** - clinical care of HIV-infected patient, prophylaxis, monitoring, therapeutic decision-making (when to start, change, stop), issues of adherence, IRIS

**Mondal** - classes of HIV drugs, pharmacologic characteristics, toxicities, drug interactions

**Moroz** - pathology of HIV related complications and opportunistic infections

**Learning objectives – GARRY – RETROVIRUSES**

**This lecture is intended to enable attendees to:**

1. Distinguish retroviruses from other viruses based on physical and molecular characteristics.
2. Develop an overview of the pathogenesis of members of the retrovirus group which contains HIV, and other important human pathogens.
3. Discuss issues involved in retrovirus therapy
4. Discuss issues related to development of retroviral vaccines.
5. Discuss strategies and potential problems of medical treatment/management of HIV infection.

**Learning objectives: - MCLELLAN**

**At the end of this exercise you will be able to**

1. Explain the most accepted theory of the origin of HIV
2. Describe the most common patterns of transmission in a population in terms of epidemiology
3. Discuss risk factors for transmission among individuals
4. Propose interventions to prevent transmission in various situations
5. Predict what a patient’s CD4 and Viral Load are likely to be at a given stage of HIV-related disease
6. Recognize the presentation of the most common opportunistic infections in the US

**Learning objectives: - MUSHATT**

**At the end of this exercise you will be able to**

1. Describe the criteria for initiating HAART
2. List the predictors of poor HAART adherence
3. Diagnose acute HIV infection
4. List the opportunistic infections (OIs) in AIDS that merit prophylaxis

**Session title: Opportunistic fungal infections - FREYTAG**

**Learning objectives:**

**At the end of this exercise you will be able to**

1. List the fungal genera most commonly associated with opportunistic fungal infections.
2. Describe the clinical conditions conducive to infection by opportunistic fungal pathogens (OFP).
3. Describe general approaches for diagnosis of fungal infections caused by OFP.
4. Understand the epidemiology of infections caused by OFP.
5. Describe the basic biology, pathogenesis, virulence/transmission and characteristics of infections caused by:
   a. Invasive OFPs: *Candida albicans, Cryptococcus neoformans, Pneumocystis jiroveci, Aspergillus fumigatus, Zygomycetes, Histoplasma, Blastomyces & Coccidioides*
   b. Superficial OFPs: *Candida spp., Malassezia spp., Trichophyton spp., Epidermophyton spp*
Session title: **Fungal infections: Superficial, Cutaneous (Dermatophytes) and Subcutaneous** – SELF STUDY/FREYTAG

**Learning objectives:**

**At the end of this learning module you will be able to:**

1. Demonstrate an understanding of the differences between the Superficial, Cutaneous and Subcutaneous Mycoses.
2. Describe symptoms, clinical presentation and causative agents of the superficial mycosis: *Tinea (Pityriasis) versicolor*, Tinea nigra, Black piedra and White piedra.
3. Describe symptoms, clinical presentation and causative agents for cutaneous infections caused by the **Dermatophytes** (dermatophytoses, “ringworm”).
4. Describe the symptoms, clinical presentation and causative agents of the subcutaneous infections: *Sporotrichosis*, Chromoblastomycosis, and Mycotic mycetoma (eumycetoma).
5. Describe the general procedures to diagnose and treat these infections
6. Describe the basic immune responses generated by these infections

Session title: **Blood and Tissue Parasites** – MCLELLAN

**Learning objectives:**

**At the end of this exercise you will be able to**

**FILARIAL INFECTIONS**

1. describe the typical life cycle of the filaria
2. predict the most common pathologies seen
3. identify risk factors for acquisition of filarial infections
4. devise a reasonable diagnostic strategy to determine if a patient is infected
5. recommend appropriate control measures to reduce incidence

**LARVA MIGRANS**

1. describe how larva migrans syndromes are acquired
2. predict the most common pathologies seen
3. identify risk factors for acquisition of larva migrans syndromes
4. devise a reasonable diagnostic strategy to determine if a patient is infected
5. recommend appropriate control measures to reduce incidence

Session title: **Viral Hemorrhagic fever (VHF) viruses** – VOSS

**Learning objectives:**

**At the end of this exercise you will be able to**

1. Name the virus families associated with hemorrhagic fever in humans, describing their genome arrangement, structural characteristics, replication strategies, and global distribution
2. Describe the general clinical presentation for Arenavirus, bunyavirus, filovirus, and flavivirus-mediated hemorrhagic fever in humans
3. Describe the role of antigen presenting cells in the pathogenesis of VHF
4. Describe the role of endothelium in the pathogenesis of VHF
5. Discuss possible treatment strategies for selected VHF’s in humans
Session title: **Endocarditis, Pericarditis, Myocarditis, and Line Infections – HONER ZU BENTRUP AND DERY**

**Learning objectives:**

**At the end of this exercise you will be able to**

1. Describe the circumstances in which endocarditis occurs, the related microbial etiology, and the difference between acute and subacute endocarditis.
2. Describe the signs and symptoms by which endocarditis is diagnosed, the pitfalls in diagnosis (especially the effect of prior antibiotic therapy) and the differential diagnosis of endocarditis.
3. Describe the cardiologic and systemic complications of endocarditis and indicate which constitute a medical emergency.
4. Describe the principles of the treatment of endocarditis and the antibiotic regimens that are employed, and describe the concept of bacteriostatic and bactericidal antibiotics.
5. Describe the indications for endocarditis prophylaxis, the deficiencies in the data by which such recommendations are promulgated, and the relevance of congenital variants such as the prolapsing mitral valve syndrome.
6. Identify and discuss the causative agents of Myocarditis/Pericarditis
7. Understand the findings a/w ID causes of MC/PC (?)
Learning objectives for IID – Renal block

Session title: Urinary Tract Infections (UTIs) – FREYTAG AND RAJAN

Learning objectives:

At the end of this exercise you will be able to

1. Demonstrate an understanding of the epidemiology and the clinical presentations of UTI.
2. Understand the clinical significance of simple vs complicated UTI
3. Describe the etiology and pathogenesis of UTI (including urolithiasis)
4. Know the role of the main virulence determinants of uropathogenic *Escherichia coli*
5. Understand the difference between P-pili and Type 1 pili
6. Know the role of Type-1 pili in the pathogenesis and recurrence of UTI
7. Describe the virulence factors and host factors that determine susceptibility to UTI
8. Discuss different clinical presentations and their pathogenesis
9. Interpret laboratory markers of infection
10. Discuss the principles of prevention and treatment of UTI.
Session title: Opportunistic Bacterial Respiratory Infections - MORICI

Learning objectives:

At the end of this exercise you will be able to

1. Describe the circumstances in which opportunistic respiratory infection occurs, the related microbial etiology, and the difference between acute and chronic infections.
2. Describe the antimicrobial drug resistance associated with opportunistic bacteria
3. Describe the clinical significance of bacterial opportunists in the cystic fibrosis patient

Session title: Frank Fungal Pathogens – FREYTAG

Learning objectives:

At the end of this exercise you will be able to

1. Describe the basic biology, pathogenesis, virulence/transmission and characteristics of infections caused by the following overt pathogens:
   a. Histoplasma capsulatum
   b. Blastomyces dermatitides
   c. Coccidioides immitis
   d. Paracoccidioides brasiliensis
2. Describe general approaches for treatment and diagnosis of these fungal infections

Session title: Respiratory Viruses - VOSS

Learning objectives:

At the end of this exercise you will be able to

1. Name the virus families associated with respiratory infection in humans, describing their genome arrangement, structural characteristics, replication strategies, and global distribution
2. Describe the range of clinical presentations associated with respiratory viral infection in humans
3. Describe the role of host response in respiratory virus infection-mediated disease
4. Understand the link between viral respiratory infection and secondary bacterial infection and its importance in guiding patient care
5. Discuss the role of antiviral therapy in treatment of respiratory infections in humans

Session title: Toxin-producing Respiratory Agents - LAWSON
Learning objectives:

At the end of this exercise you will be able to

1. Differentiate exotoxins from endotoxins
2. Explain the role of exotoxins in respiratory diseases associated with
   a. *Bordetella pertussis*
   b. *Corynebacterium diphtheriae*
   c. *Bacillus anthracis*
3. Describe the role of superantigens in toxic shock

Session title: Pneumonia – HONER ZU BENTRUP AND MCLELLAN

Learning objectives:

At the end of this exercise you will be able to

1. Differentiate between upper and lower respiratory tract infections
2. Describe the clinical characteristics of a “typical”, “atypical”, or “aspiration” type pneumonia
3. Explain the use of the terms “community-acquired”, “hospital-acquired”, “ventilator-associated”, and “healthcare-associated” pneumonia
4. Predict the likely pathogens causing the above types of pneumonia and identify the features of these associated pathogens.
5. Differentiate between upper and lower respiratory tract infections
6. Describe the clinical characteristics of a “typical”, “atypical”, or “aspiration” type pneumonia
7. Explain the use of the terms “community-acquired”, “hospital-acquired”, “ventilator-associated”, and “healthcare-associated” pneumonia
8. Predict the likely pathogens causing the above types of pneumonia

Session title: Tuberculosis - MORICI

Learning objectives:

At the end of this exercise you will be able to

1. Describe the epidemiology, clinical manifestations, diagnosis procedures, and prevention strategies for tuberculosis
2. Identify the causative agent, its mode of transmission, and its virulence factors
3. Define the role of Th1 immune responses in combating disease
Learning objectives:

At the end of this exercise you will be able to

1. Understand the concepts and clinical relevance of antigenic drift and antigenic shift as they pertain to influenza virus epidemics and pandemics. Compare and contrast with bacterial means of evading innate immunity.
2. Compare and contrast the possible causative agents, modes of transmission, virulence factors, diagnostic techniques, and prevention/treatment for each of the diseases infecting the LRT: Tuberculosis, community-acquired acute and atypical pneumonia, hospital-acquired pneumonia.
3. Identify the clinical presentation and likely pathogens that cause granulomatous chronic pneumonia resembling tuberculosis. Associate erythema nodosum with pulmonary infections.
4. Recognize the clinical presentation and risk factors for pulmonary abscesses. Compare and contrast pulmonary abscess and empyema. List and differentiate the predisposing conditions that may cause pulmonary abscesses.
5. Identify the clinical presentation and the role of infection in an acute exacerbation of chronic bronchitis. Identify the most common bacterial cause of an acute exacerbation of COPD.
6. Diagnose the most common bacterial cause of gram-negative bacterial pneumonia. Associate the findings of thick gelatinous sputum with Klebsiella pneumonia in debilitated and malnourished people.
7. Describe the mechanisms that lead to secondary bacterial pneumonia in children and healthy adults after viral illnesses. Associate rapidly progressive tissue destruction in the lung with the virulence factors of Staphylococcus aureus.
8. Diagnose infectious rhinitis apply an appropriate treatment strategy.
9. List the correct sequence layers and function of the cells that make up the microscopic structure of the alveolar walls from blood to air.
Session title: Non-Viral Infections – Liver and Gallbladder - MCLELLAN

Learning objectives:

At the end of this exercise you will be able to

1. Describe the pathophysiology of liver abscess and biliary tract disease
2. Differentiate between the primary causes of liver abscess
3. Predict the microbiology of liver abscess and biliary tract disease
4. Propose a reasonable diagnostic strategy for a patient suspected to have an infection of the liver or biliary tract

Session title: Hepatitis Viruses - SULLIVAN

Learning objectives:

At the end of this exercise you will be able to

1. Identify the major causes of viral hepatitis
2. Describe the virion structure, genome arrangement and replication strategy for each virus
3. Describe the pathogenesis associated with each virus
4. Understand the long term risk associated with infection by individual hepatitis viruses

Session title: Rotaviruses and other viral agents of Gastroenteritis - VOSS

Learning objectives:

At the end of this exercise you will be able to

1. Name the major virus families associated with GI disease in humans, describing their genome arrangement, structural characteristics, replication strategies, and global distribution
2. Describe the range of clinical presentations associated with viral GI infection in humans
3. Describe the pathogenesis of GI virus infection-mediated disease in humans
4. Understand the therapeutic and vaccine issues related to viral GI disease in humans.

Session title:

Learning objectives: Enteric Bacteria – Secretory Diarrhea - CLEMENTS
At the end of this exercise you will be able to

1. Describe the pathogenesis of *V. cholerae* and the associated virulence properties
2. Explain the mechanism of action of cholera toxin
3. Describe the available methods for prevention and treatment of cholera
4. Differentiate type of gastroenteritis caused by *E. coli* and list virulence mechanisms associated with each

Session title: Invasive and Tissue-damaging Enteric Bacteria - CLEMENTS

Learning objectives:

At the end of this exercise you will be able to

1. Describe the pathogenesis of *Salmonella sp.* and the related virulence properties
2. Describe the pathogenesis of *Shigella sp.* and the related virulence properties
3. Distinguish between infection and intoxication based on symptoms and time to onset of disease

Session title: Intestinal Protozoa and Fungi - WISER

Learning objectives:

At the end of this exercise you will be able to

1. Describe the fecal-oral life cycle and the risk factors associated with fecal-oral transmission
2. Name the most common protozoa and fungi found in human feces and describe the salient features of the disease caused by each
3. Summarize the pathology associated with infections for each of the pathogens
4. Evaluate the significance of the diagnostic tests and know what treatment is warranted for each of the infections

Session title: Intestinal Helminths - MCLELLAN

Learning objectives:

At the end of this exercise you will be able to

1. Able to describe the typical life cycles of *Ascaris*, hookworms, *Trichuris*, *Enterobium*, *Strongyloides*, *Taenia*, schistosomes, and GI flukes
2. Don’t get hung up on life cycles
3. Able to identify risk factors for acquisition of each of these helminths
4. Able to predict the most common pathologies seen with each of these helminths
5. Able to devise a reasonable diagnostic strategy to determine if a patient is infected by these helminths
6. Able to recommend appropriate control measures to reduce incidence

Session title: Intestinal Infections - OBERHELMAN

Learning objectives:

At the end of this exercise you will be able to

1. Describe the epidemiology of infectious diarrhea from a global perspective, including major risk factors based on age, nutritional status, and special high risk groups.
2. Describe the three major pathogenic mechanisms of infectious diarrhea and list the common bacterial, viral, and parasitic pathogens producing diarrhea by each mechanism.
3. Describe the general clinical approach to evaluation and empiric therapy for watery and dysenteric diarrhea.
4. Describe the major epidemiologic features of key pathogens producing infectious diarrhea.
5. Describe the key elements of the clinical history, physical exam, and laboratory evaluation for infectious diarrhea.
6. Describe non-specific treatment approaches for infectious diarrhea that do not involve antibiotic therapy.
7. Describe the physiologic basis for oral rehydration therapy, its clinical use, and modifications to standard oral rehydration that have been used to improve its efficacy
Session title: Infections in Diabetes - MCLELLAN

Learning objectives:

At the end of this exercise you will be able to

1. Discuss the characteristics of patients with Diabetes which make them more susceptible to infection
2. Propose a reasonable management strategy for the diabetic who presents with lower extremity infection
3. Recognize some of the rare but severe infectious processes which occur with increased frequency in diabetics

Session title: Bacterial STD's: Neisseria, Chlamydia - CLEMENTS

Learning objectives:

At the end of this exercise you will be able to

1. Classify Neisseria according to species, serotype, and clinical disease.
2. Describe how to differentiate between pathogenic and nonpathogenic Neisseria species.
3. Describe the pathogenesis of N. gonorrhea and N. meningitidis and the associated virulence properties.
4. Describe the pathogenesis of Chlamydia species associated with sexually transmitted diseases.
5. Describe the available methods for prevention and treatment of diseases caused by Neisseria species.

Session title: Bacterial STD's - "The Others" – HONER ZU BENTRUP

Learning objectives:

At the end of this exercise you will be able to

1. List and identify the diseases caused by Treponema pallidum.
2. Define the different stages of untreated syphilis and their treatment.
3. Differentiate the treponemal and non-treponemal tests in the diagnosis of syphilis
4. Identify and describe the causative agents of Chancroid, Donovonosis (Granuloma inguinale), Vaginitis, and Vaginosis
5. Compare and contrast the two types of arthropod-borne STDs (Scabies, pubic lice) including their causes and vectors.

Session title: Congenitally Transmitted Infections, Reproductive - MCLELLAN
Learning objectives:

At the end of this exercise you will be able to

1. Name the most important pathogens responsible for congenital infections
2. Describe the most common clinical presentations of those congenital infections
3. Propose interventions to reduce the incidence of the major congenital infections

Session title: IID Self Study: HPV & Sperm

Learning objectives:

At the end of this exercise you will be able to

1. Explain the putative role of HPV on sperm parameters, fertility and implication of the use of infected sperm cells in assisted reproduction.

Session title: IID Self Study: STD Review

Learning objectives:

At the end of this exercise you will be able to

Explain the signs, symptoms, transmission, treatment and prevention of:

1. Bacterial Vaginosis (BV)
2. Chlamydia
3. Gonorrhea
4. Hepatitis, Viral
5. Herpes, Genital
6. HIV/AIDS & STDs
7. Human Papillomavirus (HPV)
8. Pelvic Inflammatory Disease (PID)
9. Syphilis
10. Trichomoniasis
11. Other STDs- Chancroid, Lymphogranuloma Venereum (LGV), Lice, Scabies
12. STDs & Pregnancy
13. STDs & Infertility
Session title: Tetanus, Botulism - CLEMENTS

Learning objectives:

At the end of this exercise you will be able to

1. Describe the Clostridium species associated with human disease.
2. Distinguish between infection and intoxication caused by Clostridium botulinum.
3. Describe the available methods for prevention and treatment of botulism and tetanus.
5. Describe the process by which Clostridium difficile causes pseudomembranous colitis

Session title: Rabies - GARRY

Learning objectives:

At the end of this exercise you will be able to

1. Distinguish rhabdoviruses from other viruses based on physical and molecular characteristics.
2. Develop an overview of the pathogenesis of members of the rhabdovirus group which contains rabies virus, an important human pathogen.
3. Discuss issues involved in post-exposure vaccination
4. Utilize vesicular stomatitis virus as a model to study replication of enveloped, negative stranded, RNA viruses.

Session title: Prions - LAWSON

Learning objectives:

At the end of this exercise you will be able to

1. Define “prions”
2. Explain the role of PrP protein in prion disease
3. Identify diagnostic techniques for prion diseases
4. Describe the characteristics of human prion diseases

Session title: Bacterial CNS Infections – HONER ZU BENTRUP

Learning objectives:

At the end of this exercise you will be able to

1. List the possible causative agents, modes of transmission, virulence factors, diagnostic techniques, and prevention/treatment for bacterial meningitis/neonatal meningitis.
2. Identify the most common and also the most deadly of the multiple possible causes of bacterial meningitis

Session title: Viral CNS Infections – VOSS

Learning objectives:

At the end of this exercise you will be able to

1. List the major viral agents of meningitis and encephalitis
2. Describe the transmission and dissemination of these viral agents
3. Define the disease symptoms associated with Poliomyelitis and West Nile encephalitis
4. Recognize when treatment for viral encephalitis or meningitis is warranted and describe the options available

Session title: Fungal CNS Infections - FREYTAG

Learning objectives:

At the end of this exercise you will be able to

1. Remember the basic biology hallmark features of fungi.
2. List fungal species generally associated with infections of the CNS.
3. Know the most common clinical presentations of CNS fungal infections
4. Know the clinical conditions that predispose hosts to fungal CNS infections.
5. Know the virulence factors that allow fungal pathogens to cause CNS infections.
6. Describe general approaches for diagnosis of fungal CNS infections.

Session title: CNS Cases – VAN SICKELS

Learning objectives:

At the end of this exercise you will be able to

1. Understand the changing epidemiology of meningitis
2. Know how to evaluate a patient with suspected meningitis or encephalitis
3. Be able to analyze and interpret basic cerebrospinal fluid studies
4. Name several common etiologies of aseptic meningitis in the United States
5. Use historical clues and exposure history to narrow your differential diagnosis of meningoencephalitis
6. Be aware of outbreaks in Louisiana