MEDICAL MICROBIOLOGY

Pathology Residents rotate for at least three months in Medical Microbiology. These rotations are designed to introduce the resident to Medical Microbiology and allow them to become familiar with the routine aspects of the microbiology laboratory as well as develop expertise in microbiology diagnostic testing, sensitivity testing and general laboratory administration. The rotations are divided into three separate topic areas.

1. General aerobic microbiology
2. Anaerobic microbiology, fungal and mycobacterium microbiology, and parasitology
3. Viral microbiology

In all microbiology rotations the resident is expected to:

1. Read from appropriate sources as much as possible about the topics that come up daily in the laboratory.
2. Be available to assist the laboratory technicians in interacting with the clinicians to obtain more information on a case or report and discuss results.
3. Be available to read the histoplasm buffy coat slides.
4. Be available to read the blood parasite slides.
5. Work up all unknown specimens assigned to them
6. Attend didactic sessions with the section director.
7. Prepare an interesting case to present at the Clinical Pathology interesting case conference.
8. Attend the weekly infectious disease conference if possible.
9. Attend the monthly Infection Prevention Committee meeting if possible.

Medical Microbiology I (1st month)

Medical Microbiology I is designed to introduce the resident to the microbiology laboratory and to general microbiology diagnosing techniques and sensitivity testing.

Patient Care

1. The resident will be able to discuss the appropriate sample, collection technique, and transport medium for the most common aerobic bacteria samples and be able to communicate this information to clinicians.
2. The resident will be able to discuss basic microbiology diagnostic testing, sensitivity testing, epidemiology, and pathology with clinicians, patients and patient's families and recommend further studies if warranted.

Assignments:

1. Read all assigned material and be able to discuss it.
2. Rotate through each of the aerobic stations and become familiar with diagnostic testing techniques and sensitivity testing.
3. Work with the laboratory technician to communicate results to the clinician.
4. Work up all unknown specimens assigned to them.
5. When asked by the technician obtain from the chart or the clinician further information that may be relevant to the case.
6. Be prepared to discuss diagnostic testing, sensitivity testing, epidemiology and pathology of individual cases with clinicians, patients or their families.

Coleman
5/30/2013
Medical Knowledge

1. The resident will be able to discuss the transport conditions, culture requirements and media requirements for each type of specimen received in the Microbiology laboratory.
2. The resident will be able to describe the colony characteristics of the more common aerobic bacterial isolates.
3. The resident will be able to explain how and when diagnostic tests and sensitivity tests are performed and understand the biological and chemical basis of each test. To include but not exclusive of Gram stain, nutritional requirements, catalase test, oxidase test, indole test, urease test, PYR test, hippurate test, CAMP test, esculin hydrolysis, oxidation and fermentation tests, fluorescence test, multiple other immunological tests, colorimetry, turbidity, Vitek, broth dilution, disc diffusion, E-test, beta lactamase detection, and Kirby-Bauer test.
4. The resident will be able to discuss the epidemiology, pathology and prognosis of infection with following aerobic organisms Staphylococcus aureus, Staphylococcus epidermidis, other Staphylococcus species, Streptococcus pneumoniae, Streptococcus pyogenes, Streptococcus viridans, other Streptococcus species, Enterococcus species, Neisseria species, Pseudomonas species, Hemophilus species, Listeria, Campylobacter species, Escherichia coli, Shigella species, Salmonella, Yersinia species, Klebsiella species, Proteus species, Serratia species, other Enterobacteriaceae, Corynebacterium species, Vibrio species, Aeromonas species, Bacillus anthracis, Bacillus species, Gardenella species, Erysipelothrix species, Nocardia species, Actinomadura species, Bordetella species, Aeromonas species, Eikenella species, Pasteurella species, Bartonella species, Helicobacter pylori, Legionella pneumophila, Brucella species, Francisella tularensis, and others designated by the section director.

Assignments

1. Read all assigned material and be able to discuss it.
2. Rotate through each station 1) receiving, 2) nasopharyngeal, 3) sputum, 4) urine, 5) feces, 6) blood. Work with a technician to learn what is done at each station.
3. Learn the colony characteristic, microscopic appearance and Gram stain characteristics of each isolate.
4. Perform at least the following procedures. Enter the sample in the computer, determine the media required for each sample, streak the plates, Gram stain, catalase test, indole test, disc diffusion test, E-test, set up and run a Vitek card, report the results to the clinician, enter the results in the computer.
5. When asked by the technician obtain from the chart or the clinician further information that may be relevant to the case.

Practice-Based Learning and Improvement

1. The resident will be able to discuss the regulations governing the microbiology laboratory including CLIA, HIPPA and CAP.
2. The residents will demonstrate an understanding of proficiency testing.
3. The resident will demonstrate a proficiency in computer skills including entering samples reporting results, and retrieving data from the patient's electronic chart.
4. The resident will demonstrate knowledge of safety regulations and requirements (CAP, JCAHO).
5. The resident will demonstrate an ability to search, find and download scientific literature from the internet.

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Assignments:

1. Read all assigned reading material:
2. Attend the monthly Clinical Laboratory and Departmental performance improvement meetings.
3. Attend the weekly Clinical Pathology conference.
4. Attend the yearly departmental safety in-service.
5. Perform the following enter samples into the computer and report results.

Interpersonal and Communication Skills

1. The resident will demonstrate an ability to report results and discuss the epidemiology, pathology, prognosis and antimicrobial sensitivity testing with the clinician, patient and patient's family.
2. The resident will demonstrate an ability to work and communicate with the technical staff.
3. The resident will demonstrate an ability to write and present a clear concise report during the weekly microbiology rounds and the interesting case conference.

Assignments:

1. Read all assigned reading material
2. Work with the laboratory technician to communicate results to the clinician.
3. When asked by the technician obtain from the chart or the clinician further information that may be relevant to the case.
4. Present an interesting case to the residents and faculty during the end of the month interesting case conference.
5. Be prepared to discuss diagnostic testing, sensitivity testing, epidemiology and pathology of individual cases with clinicians, patients or their families

Professionalism

1. The resident will demonstrate professionalism it all interactions with staff, patients and patient’s families.
2. The resident will respect diversity in the patient as well as staff.
3. The resident will demonstrate ethical principles at all times.

Assignments:

1. Read all assigned material
2. Complete the hospital compliance training
3. Attend any of the ethics in medicine conferences

System-Based Practice

1. The resident will demonstrate a working understanding of the hospital computer system.
2. The resident will demonstrate an understanding of the medical legal issues involved in the microbiologic lab and their further impact on the clinician and the hospital.

Coleman
5/30/2013
Assignments:

1. Read all assigned material
2. Work with the laboratory technician to communicate results to the clinician.
3. When asked by the technician obtain from the chart or the clinician further information that may be relevant to the case.
4. Perform the following enter samples into the computer and report results
5. Attend when possible the CPC and medicine grand rounds conferences

Assessment

1. Oral examination based on day to day question and answers by the section director.
2. Evaluation based upon observations by the section director and the chief technician.
3. To include but not exclusive of attendance, computer skills, communication skills, the ability to interact with staff and patients, and medical knowledge

Medical Microbiology II (2nd month)

Medical Microbiology II is designed to introduce the resident to anaerobic microbiology diagnosing techniques and sensitivity testing. Medical Microbiology II is also designed to introduce the resident to fungal, parasitological and Tuberculosis microbiology diagnosing techniques and sensitivity testing.

Patient Care

1. The resident will be able to discuss the appropriate sample, collection technique, and transport medium for the most common anaerobic bacteria samples and be able to communicate this information to clinicians.
2. The resident will be able to discuss basic microbiology diagnostic testing, sensitivity testing, epidemiology, and pathology with clinicians, patients and patient's families and recommend further studies if warranted.
3. The resident will be able to discuss the appropriate sample, collection technique, and transport medium for the most common fungal organisms, parasitic organisms and Mycobacterium bacteria samples and be able to communicate this information to clinicians.
4. The resident will be able to discuss basic microbiology diagnostic testing, sensitivity testing, epidemiology, and pathology with clinicians, patients and patient's families and recommend further studies if warranted

Assignments:

1. Read all assigned material and be able to discuss it.
2. Rotate through the anaerobic station and become familiar with diagnostic testing techniques and sensitivity testing.
3. Learn the procedures involved in collecting, transporting and culturing anaerobic bacteria.
4. Work with the laboratory technician to communicate results to the clinician.
5. When asked by the technician obtain from the chart or the clinician further information that may be relevant to the case.
6. Be prepared to discuss diagnostic testing, sensitivity testing, epidemiology and pathology of individual cases with clinicians, patients or their families.

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7. Rotate through the fungal and Mycobacterial stations and become familiar with diagnostic testing techniques and sensitivity testing.
8. Review the CAP proficiency slides from previous proficiency test for parasitology.
9. Review parasitology case collection and parasitology slide set with section director.

**Medical Knowledge**

1. The resident will be able to discuss the transport conditions, culture and media requirements for each type of specimen received in the Microbiology laboratory.
2. The resident will be able to describe the colony characteristics of the more common anaerobic bacterial isolates.
3. The resident will be able to explain how and when diagnostic tests and sensitivity tests are performed and understand the biological and chemical basis of each test. To include but not exclusive of Gram stain, nutritional requirements, catalase test, oxidase test, indole test, urease test, PYR test, hippurate test, CAMP test, esculin hydrolysis, oxidation and fermentation tests, fluorescence test, multiple other immunological tests, colorimetry, turbidity, Vitek, broth dilution, disc diffusion, E-test, beta lactamase detection, Hodge test and Kirby-Bauer test.
4. The resident will be able to discuss the epidemiology, pathology and prognosis of infection with following anaerobic organisms Clostridium perfringens, Clostridium tetani, Clostridium botulinum, Clostridium difficile, Actinomyces species, Bacteroides fragilis, Bacteroides species, Peptostreptococcus species, Lactobacillus species and others designated by the section director.
5. The resident will be able to describe the colony characteristics of the more common fungal and mycobacterial bacterial isolates.
6. The resident will be able to discuss the epidemiology, pathology and prognosis of infection with following Candida species, Mucor species, Altenaria species, Blastomyces species, Histoplasma species, Penicillium species, Sporothrix species, Coccidioides species, Aspergillus species, Rhizopus species, Piedraia species, Fonsecaea species, Fusarium species, Claosporium species, Malassezia species Mycobacterium tuberculosis, Mycobacterium avium complex, other Mycobacterium species, Entamoeba histolytica, Entamoeba coli, other Entamoeba species, Endolimax nana, Iodamoeba butschlii, Giardia species, Dientamoeba fragilis, Trichomonas species, Balantidium coli, Cryptosporidium parvum, Sarcocystis species, Naegleria fowleri, Acanthamoeba species, Toxoplasma gondii, Pneumocystis carinii, Ascaris lumbricoides, Enterobius vermicularis, Ancylostoma duodenale, Necator americanus, Trichuris trichiura, Trichinella spiralis, Hymenolepis species, Taenia species, Echinococcus species, Plasmodium species, Leishmania species, Trypanosoma species, Wuchereria bancrofti, Brugia species, Loa loa, Onchocerca volvulus, Schistosoma species, Fasciolopsis buski, Clonorchis sinensis, Paragonimus westermani, Fasciola hepatica, and others designated by the section director.

**Assignments:**

1. Read all assigned material and be able to discuss it.
2. Rotate through the anaerobic station Work with a technician to learn culture identification and antimicrobial sensitivity testing techniques. Learn the colony characteristic, microscopic appearance and Gram stain characteristics of each isolate.

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3. Present an interesting case to the residents and faculty during the end of the month interesting case conference.

4. Perform at least the following procedures. Enter the sample in the computer, determine the media required for each sample, streak the plates,Gram stain, catalase test, indole test, disc diffusion test, report the results to the clinician, enter the results in the computer.

5. When asked by the technician obtain from the chart or the clinician further information that may be relevant to the case.

6. Perform at least the following procedures. Enter the sample in the computer, determine the media required for each sample, streak the plates, set up fungal cultures, report the results to the clinician enter the results in the computer.

**Practice-Based Learning and Improvement**

1. The resident will be able to discuss the regulations governing the microbiology laboratory including CLIA, HIPPA and CAP.
2. The residents will demonstrate an understanding of proficiency testing.
3. The resident will demonstrate a proficiency in computer skills including entering samples, reporting results, and retrieving data from the patient's electronic chart.
4. The resident will demonstrate knowledge of safety regulations and requirements (CAP, JCAHO).
5. The resident will demonstrate an ability to search, find and download scientific literature from the internet.

**Assignments:**

1. Read all assigned reading material,
2. Attend the monthly Clinical Laboratory and Departmental performance improvement meetings.
3. Attend the weekly Clinical Pathology conference.
4. Attend the yearly departmental safety inservice.
5. Perform the following enter samples into the computer and report results.

**Interpersonal and Communication Skills**

1. The resident will demonstrate an ability to report results and discuss the epidemiology, pathology, prognosis and antimicrobial sensitivity testing with the clinician, patient and patient's family.
2. The resident will demonstrate an ability to work and communicate with the technical staff.

**Assignments:**

1. Read all assigned reading material
2. Work with the laboratory technician to communicate results to the clinician.
3. When asked by the technician obtain from the chart or the clinician further information that may be relevant to the case.
4. Present an interesting case to the residents and faculty during the end of the month interesting case conference.
5. Be prepared to discuss diagnostic testing, sensitivity testing, epidemiology and pathology of individual cases with clinicians, patients or their families

**Professionalism**

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1. The resident will demonstrate professionalism in all interactions with staff, patients, and families.
2. The resident will respect diversity in the patient as well as staff.
3. The resident will demonstrate ethical principles at all times.

Assignments:

1. Read all assigned material
2. Complete the hospital compliance training
3. Attend any of the ethics in medicine conferences

System-based Practice

1. The resident will demonstrate a working understanding of the hospital computer system.
2. The resident will demonstrate an understanding of the medical legal issues involved in the microbiologic lab and their further impact on the clinician and the hospital.

Assignments:

1. Read all assigned material
2. Work with the laboratory technician to communicate results to the clinician.
3. When asked by the technician obtain from the chart or the clinician further information that may be relevant to the case.
4. Perform the following: enter samples into the computer and report results.
5. Attend when possible the CPC and medicine grand rounds conferences.

Assessment

1. Oral examination based on day to day question and answers by the section director.
2. Evaluation based upon observations by the section director and the chief technician.
3. To include but not exclusive of attendance, computer skills, communication skills, the ability to interact with staff and patients, and medical knowledge.

Medical Microbiology III (3rd month)

Medical Microbiology III is designed to introduce the resident to viral shell vial culture and diagnosing techniques.

Patient Care

1. The resident will be able to discuss the appropriate sample, collection technique, and transport medium for the most common viral samples and be able to communicate this information to clinicians.
2. The resident will be able to discuss basic viral diagnostic testing, epidemiology, and pathology with clinicians, patients, and patient's families, and recommend further studies if warranted.

Assignments:

1. Read all assigned material and be able to discuss it.
2. Rotate through the viral station and become familiar with diagnostic testing techniques and culture of viruses.
3. Work with the laboratory technician to communicate results to the clinician.
4. When asked by the technician obtain from the chart or the clinician further information that may be relevant to the case.
5. Be prepared to discuss diagnostic testing, sensitivity testing, epidemiology and pathology of individual cases with clinicians, patients or their families.

Medical Knowledge

1. The resident will be able to discuss the transport conditions, culture requirements and media requirements for each type of specimen received in the Microbiology laboratory.
2. The resident will be able to describe the characteristics shell vial culture results.
3. The resident will be able to explain how and when diagnostic tests and cultures are performed and understand the biological and chemical basis of each test. To include but not exclusive of fluorescence antibody test, multiple other immunological tests, conventional culture, for historical interest, and shell vial culture,
4. The resident will be able to discuss the epidemiology, pathology and prognosis of infection with following viral organisms, Adenovirus, Arenavirus, Bunyavirus, Calicivirus, Coronavirus, Filovirus, Flavivirus, Hepadnavirus, Herpesvirus, Orthomyxovirus, Papovavirus, Paramyxovirus, Parvovirus, Picornavirus, Poxvirus, Reovirus, Retrovirus, Rhabdovirus, Togavirus and others designated by the section director.

Assignments:

1. Read all assigned material and be able to discuss it.
2. Rotate through viral station. Work with a technician to learn what is done at each station.
3. Learn the colony characteristic and culture microscopic appearance of each isolate.
4. Perform at least the following procedures: Enter the sample in the computer, determine the media and appropriate cell line requirement for each sample and set up shell vial cultures when appropriate, prepare fluorescence antibody stain and determine the results to the clinician and enter the results in the computer.
5. When asked by the technician obtain from the chart or the clinician further information that may be relevant to the case.

Practice-Based Learning and Improvement

1. The resident will be able to discuss the regulations governing the microbiology laboratory including CLIA, HIPPA and CAP.
2. The residents will demonstrate an understanding of proficiency testing.
3. The resident will demonstrate a proficiency in computer skills including entering samples, reporting results, and retrieving data from the patient's electronic chart.
4. The resident will demonstrate knowledge of safety regulations and requirements (CAP, JCAHO).
5. The resident will demonstrate an ability to search, find and download scientific literature from the Internet.

Assignments:

Coleman
5/30/2013
1. Read all assigned reading material,
2. Attend the monthly Clinical Laboratory and Departmental performance improvement meetings.
3. Attend the weekly Clinical Pathology conference.
4. Attend the yearly departmental safety in-service.
5. Perform the following: enter samples into the computer and report results.

Interpersonal and Communication Skills

1. The resident will demonstrate an ability to report results and discuss the epidemiology, pathology, prognosis and antimicrobial sensitivity testing with the clinician, patient and patient’s family.
2. The resident will demonstrate an ability to work and communicate with the technical staff.
3. The resident will demonstrate an ability to write and present a clear concise report during the interesting case conference.

Assignments:

1. Read all assigned reading material
2. Work with the laboratory technician to communicate results to the clinician.
3. When asked by the technician obtain from the chart or the clinician further information that may be relevant to the case.
4. Present an interesting case to the residents and faculty during the end of the month interesting case conference.
5. Be prepared to discuss diagnostic testing, sensitivity testing, epidemiology and pathology of individual cases with clinicians, patients or their families

Professionalism

1. The resident will demonstrate professionalism in all interactions with staff, patients and families.
2. The resident will respect diversity in the patient, patient’s families and staff.
3. The resident will demonstrate ethical principles at all times.

Assignments

1. Read all assigned material
2. Complete the hospital compliance training
3. Attend any of the ethics in medicine conferences

System-Based Practice

1. The resident will demonstrate a working understanding of the hospital computer system.
2. The resident will demonstrate an understanding of the medical legal issues involved in the microbiologic lab and their further impact on the clinician and the hospital.

Assignments

Coleman
5/30/2013
1. Read all assigned material
2. Work with the laboratory technician to communicate results to the clinician.
3. When asked by the technician obtain from the chart or the clinician further information that may be relevant to the case.
4. Perform the following: enter samples into the computer and report results.
5. Attend when possible the CPC and medicine grand rounds conferences.

Assessment:

1. Oral examination based on day to day question and answers by the section director.
2. Evaluation based upon observations by the section director and the chief technician.
3. To include but not exclusive of attendance, computer skills, communication skills, the ability to interact with staff and patients, and medical knowledge