CCBC, Spring 2021	School of Mathematics and Science				
	Biology Department				
BIOL 230: Microbiology	Sections CMW (CN1) - 20181; CP1 - 20543; CR1 -				
	20183; and CRW - 22901				

Course Description and Prerequisites¹: Students survey concepts related to the study of bacteria, viruses, protozoa, and fungi. These microorganisms maintain both beneficial and pathogenic relationships with humans, and concepts related to both types of relationships will be examined. Basic laboratory techniques such as microscopy, staining, and aseptic techniques are emphasized.

Pathway: When you enroll at CCBC you are assigned a Pathway based on your declared major. Your specific pathway will host activities that are designed to keep you excited about your career choice and help you be successful in your transfer and career goals. Be sure to visit your Pathway Blackboard organization to learn about upcoming activities including field trips, information about career opportunities, and tutoring sessions. Go to <u>Pathway Pages</u> and then click on your Pathway.

Prerequisite: BIOL 110 with a final grade of "C" or higher; MATH 073 or MATH 083

Modality:

1. Lecture: Asynchronous lectures are available on Blackboard 24/7 and will consist of Softchalk lessons along with Zoom videos of these lectures.

2. Lab: Labs will meet face-to face and will be supplemented by Softchalk lab instructions and Zoom videos.

3. **Exams and Quizzes:** Due to the COVID-19 pandemic, <u>your 4 lecture unit exams</u>, <u>your final exam</u>, <u>and your 5 major lab quizzes will be given online using Respondus Monitor with web cam</u>. Lab quizzes will be taken online during the time regularly scheduled for your lab and you won't have to come to lab on those days. Lecture Unit Exams will be given on the days indicated in your BIOL 230 Class Calendar, anytime between 1:00am and 11:59pm on the scheduled day. For details, please see your Blackboard Announcements. The only exceptions are <u>the Getting Started Course Tour Quiz</u>, the Biology Review Exam, and your pre-lab quizzes. These will be taken on Blackboard using Respondus Lockdown Browser and Respondus Monitor with Web Cam. To install Respondus Lockdown Browser and Respondus Monitor with Web Cam on your computer, see the following Blackboard page</u>.

All materials for the course are delivered through <u>Blackboard</u>, CCBC's online learning management system. You will login to Blackboard to access lessons, take quizzes and exams, and submit assignments.

To be successful in this course, you should log into Blackboard regularly and establish a study schedule. Plan to spend at least the same amount of time that you would spend on a face-to-face class, if not more (see below). Give yourself time to practice using Blackboard in order to get the most out of your online learning experience.

Minimum Technical Requirements: To learn in a remote format at CCBC, you will need:

- 1. A reasonable level of computer literacy
- 2. Regular access to a reliable computer desktop, laptop, netbook, etc.
 - a. A mobile device can NOT be used.

- b. Must have a camera feature that enables students to take exams using Respondus Monitor with Web Cam.
- 3. A stable broadband internet connection.

4. A CCBC email account (free when you enroll), and access to Blackboard Learning Management System

View full list of technical requirements for online classes

I. Basic Course Information

A. Instructor: Gary E. Kaiser, Ph.D.

- B. Office: MASH 216, Catonsville campus Contact Information: 443-840-4289; <u>gkaiser@ccbcmd.edu</u>; I check email daily. You can
- expect me to return your message or respond to a general discussion post within 24 hrs. **C. Office Hours:** M,W 3:00-3:45; Tu,Th 12:45-1:15 and 3:45-4:15 in Mash-238 following your lab). Zoom office Hours TBA. (See Blackboard announcements for times and contact information regarding Zoom office hours.)
- D. **Department/School Phone Number:** Biology Department/Catonsville campus/School of Mathematics and Science; 443-840-4212.

CRN	Section	Days	Start Time	End Time	Room	Instructor				
20183	CR1 Lab	MW	4:10pm	5:35pm	MASH 238	Rajkumar, Lakshmi				
20183	CR1 Lec*					Kaiser, Gary				
20181	CMW Lab	TuTh	11:10am	12:35pm	MASH 238	Kaiser, Gary				
20181	CMW Lec*					Kaiser, Gary				
20543	CP1 Lab	TuTh	2:20pm	3:45pm	MASH 238	Kaiser, Gary				
20543	CP1 Lec*					Kaiser, Gary				
22901	CRW Lab	MW	5:45pm	7:10pm	MASH 236	Rajkumar, Lakshmi				
22901	CRW Lec*					Kaiser, Gary				

E. Class Times, Days, and Locations:

*Asynchronous lectures, online, Blackboard, available 24/7

F. Statement of Student Out-of-Class Work Expectations: These expectations are the minimal requirements based on national standards and may not be decreased: in a standard 15-week semester, students are expected to spend 2 hours per week, per credit hour on work outside of class. This is a 4-credit course taught in a 15-week semester, and so you are expected to complete at least (8) hours of work per week outside of the class including reading, class preparation, homework, studying, etc. If this is an online blended section, an additional 4 hours are required per week. Students: please note that these are <u>minimal</u> requirements for any course, and that many students require more time than this for science courses.

G. Required Materials:

a. <u>BIOL 230 - Lecture Softchalk lessons, Zoom Videos of Softchalk Lessons, and PDF</u> <u>Copies of Softchalk Lessons (PDF copies are optional)</u> by Kaiser. These can be found under COURSE CONTENT: LECTURE on your BIOL 230 Blackboard site. Since they are optional, PDF copies of the lecture Softchalk lessons are not available in the college bookstore. If you desire a hard copies of the Softchalk lessons, you need to print them yourself. b. <u>The Grapes of Staph: A Microbiology Laboratory Manual</u> by Kaiser. The Laboratory Manual can be purchased at the college bookstore or you can print your own PDF copy under COURSE CONTENT: LAB on your BIOL 230 Blackboard site. Softchalk Instructions for Labs and Zoom Videos for Labs can also be found here.

c. A <u>full-length</u> lab coat that can be completely buttoned, available in the CCBC bookstore. You will need this beginning with Lab 1, our third lab class meeting of the semester. A face shield and gloves will be provided in lab. You must provide a face mask which must be worn the entire time you are on campus.

d. Webcam/Camera for proctoring technology: You must have a webcam or camera on your laptop to use this required proctoring product for your 4 Unit lecture exams, your final exam, and the 5 major lab quizzes. Directions for using the Lockdown Browser and Respondus Monitor are located in the Getting Started pages. In addition you must have access to a traditional PC or Mac (See CCBC Technical Requirements for an Online Course: <u>https://www.ccbcmd.edu/Programs-and-Courses/CCBC-Online/Online-Services-Resources/Online-Learning-Technical-Requirements.aspx</u>).

H. Additional basic information: This course is taken almost exclusively by students planning to go into nursing, pharmacy, physician assistant, pre-med, veterinary science, or dental hygiene- with an occasional biology major thrown in. As a result, I've designed this course to present the student with the general microbiological concepts found in any introductory microbiology course, and apply those concepts throughout the course to infectious diseases and related medical problems, with a special emphasis on the biological basis of hostmicrobe interaction. (See the last page of the course syllabus for more detail.) This optimizes the relevance to the vast majority of students taking this course. By its nature and the intended population, this is a serious and challenging course for the motivated student wishing to enter the professions mentioned above. What I have tried to do over the many years is make the course as organized and comprehensible as possible by constructing a wide variety of learning tools geared to multiple learning styles. I've created your textbook for this course as a series nesting Learning Objects available as Softchalk lessons, each with its own learning objectives, illustrations, photographs, and/or animations, activities, and selfassessment components. The lab manual is constructed in a similar manner. There are over 1000 original illustrations, photographs, and photomicrographs included, in addition to many others used with permission from other sites. I've also created over 250 original animations to illustrate processes and concepts. Every lab exercise and almost every lecture Learning Object has its own Concept Map to graphically present knowledge concepts and the relationship between those concepts. There are also extra credit crossword puzzles for each lecture unit and each lab quiz to help learn vocabulary.

II. Course Goals Overall A. Course Objectives¹:

Upon completion of this course, students will be able to:

1.classify organisms using appropriate terminology related to their structure, metabolism, genetics, and ecology;

2. explain the functions of key microbial structures in the prokaryote cell and their contribution to disease development;

3. explain the differences among Gram negative cell walls, Gram positive cell walls, and atypical cell walls, and their effects on differential staining in the Gram stain;

4. differentiate the metabolic processes of aerobic respiration, anaerobic respiration, and fermentation;

5. differentiate gene regulation through quorum sensing and gene regulation via an operon;
6. delineate the processes of the three different types of horizontal gene transfer and the

different mechanisms that allow bacteria to generate diversity and acquire resistance elements; 7. discuss the differences between opportunistic and pathogenic microorganisms and hostpathogen interactions that result in infection and/or disease;

8. use proper terminology to describe various types of infectious disease, the stages of a disease, and means of transmission;

9. describe the general steps in a productive and a latent viral replication cycle using proper terminology to identify key viral structures in those cycles;

10. explain innate immune responses such as phagocytosis, complement, and inflammation as they apply to the infectious disease process;

11. explain which cells and cytokines are involved in adaptive responses and how their interactions lead to a primary response;

12. describe the concept of memory and how it allows for the acquisition of immunity, both natural and artificial;

13. explain the principles of certain physical and chemical methods used in the control of microorganisms;

14. describe the modes of action that enable antibiotics to inhibit or kill bacteria, as well as the common mechanisms that enable bacteria to resist these antibiotics;

15. demonstrate appropriate laboratory skills and techniques related to the isolation and staining of microorganisms;

16. demonstrate proper use and care of the compound light microscope;

17. identify an unknown microorganism using phenotypic methods; and

18. develop the ability to work both independently and with others in the laboratory and draw appropriate conclusions from laboratory results.

B. Major Topics¹:

I. Introduction to microbiology

II. Prokaryote cell anatomy

III. Classification of microorganisms: bacteria, viruses, protozoans, and fungi

IV. Microbial growth and reproduction

V. Microbial metabolism

VI. Microbial genetics

VII. Microbial mechanisms of pathogenicity

VIII. Innate and adaptive immune responses

IX. Control of microorganisms

X. Microorganisms and human diseases

XI. Laboratory techniques

a. Microscopy

b. Aseptic technique

c. Staining of microorganisms

- d. Identification of bacteria and viruses
- e. Control of microorganisms

C. Rationale: The rationale of the course is to meet the needs of students who are interested in the biology of microorganisms and the laboratory skills needed to culture, manipulate and control bacteria; or who may choose an allied health field; may wish to pursue a biology, physical education, zoology, pre-medical or nursing major; or are actively engaged in an allied health field and which to reinforce or update their knowledge. This course contains a laboratory component. This course is a Science core course, Science elective, and an Arts and Sciences elective.

III. Evaluation

A. Exams, Quizzes, and Assignments

Course Tour Quiz - <u>It is essential that you complete this course tour before doing anything</u> <u>else</u>. Your first assignment is a quiz taken on Blackboard that must be completed by MIDNIGHT FRIDAY, THE FIRST WEEK OF CLASS. The questions are based on this "Getting Started/Course Tour" link, the "Detailed Course Information" link, and your "Syllabus" link. You can take this course introduction quiz as many times as you like until you receive a perfect score. Again, this is essential for doing well in this course.

Lecture Requirements

1. All lecture exams are a combination of matching, multiple choice, and true/false questions. Questions will directly **test your understanding of the Detailed Learning Objectives** provided at the beginning of each new Softchalk lesson. Objectives indicated by (*) indicate content that is a common theme throughout the course; objectives indicated by (**) need to be known in greater depth and also represent a common theme throughout the course. **These questions will not only test your knowledge of the topic but also your ability to understand processes and apply that knowledge.** These exams will be **taken on Blackboard using Respondus Monitor plus web cam**. After you complete your exam your score will be posted on Blackboard. While exams will not be returned, you may go over the exam with your instructor during office hours if you wish. **Unit Exams 5 and 6 will be combined and given as your Final Exam.**

2. To succeed in this class, it is essential that students have a good understanding of protein structure, enzymes, DNA, RNA, and protein synthesis learned in your prerequisite Biology course. To this end, all students are required to complete a take home exam reviewing molecular genetics (protein structure, enzymes, DNA, RNA, protein synthesis, and mutation). Since this is a review of topics covered in your general biology course, you will do this on your own using information found both on my BIOL 230 website at Molecular Genetics Review for Take Home Exam as well under "Take Home Review Exam" in the course Blackboard menu. You can take the Respondus Take

Home Review Exam by clicking on "Take Home Review Exam" link in the course Blackboard menu. After you complete the exam your score will be posted on Blackboard. You can take this exam 2 times with the highest grade being recorded.

3. Labs 12, Lab 14, Lab 15, and the Final Group Project are all case study-based identification of bacterial unknowns. You will be turning in a detailed lab report as Blackboard assignments for Lab 12, Lab 15, and your Final Lab Project. Since these reports combine lecture and lab content, they will be a part of your lecture grade rather than your lab grade. For further information, look in that specific lab in your Lab Manual, or look under the "Detailed Course Information" link in the menu of your course Blackboard site.

4. There is also an optional **Creative Project** worth 5 points extra credit. The purpose of this is to have some fun with microbiology. It could be a drawing, painting, poster, mobile, sculpture, song, poem, game, something edible -- virtually anything creative that also shows an understanding of some aspect of microbiology. The Creative Project is due by the date of Lab Quiz 5. These extra credit points will be added to the total number of points you have earned in lecture.

Lab Requirements

 Because lab provides a critical hands-on component to the understanding of Microbiology as well as an opportunity to work in small groups to solve problems. The following 12 lab exercises are considered "core labs" and students will be graded on their mastery of lab techniques for each of these labs: Lab 1. Introduction to the Microscope and Comparison of Size and Shape of Microorganisms; Lab 2. Aseptic Technique and Transfer of Microorganisms; Lab 3. Isolation of Pure Cultures from Mixed Populations; Lab 4. Enumeration of Microorganisms; Lab 5. Direct Stain and Indirect Stain; Lab 6. Gram Stain and Capsule Stain; Lab 8. Biochemical Testing to Identify Microorganisms; Lab 12. Isolation and Identification of *Enterobacteriaceae* and *Pseudomonas*: Part 1; Lab 13. Isolation and Identification of Streptococci; Lab 15. Isolation and Identification of Staphylococci; and Lab 19. Use of Chemical Agents to Control Microorganisms.

2. Student performance during each of these 12 core labs is worth a total of 159 points. Points earned for each of these12 core labs include points earned on:

a. A <u>Prelab Quiz based on YouTube videos to be watched prior to attending</u> <u>that lab</u>. These quizzes are worth between 5 and 20 points, depending on the lab, and must be taken no later than 2 hours prior to the start of your lab. These quizzes are to prepare you for that day's lab and <u>cannot be made up</u> <u>after the deadline period</u>. These quizzes are taken on Blackboard. To see links to the YouTube videos and to take the Prelab Lab Quizzes, go to your course Blackboard site menu and click on "Prelab Lab Quizzes" under "Course Content."

b. Points earned for being prepared for that lab, correctly following directions, and following all safety rules (5 points per lab).

Your instructor will allow you to **miss only one core lab** and only for a valid and documented reason. **Unless you can attend one of the other lab sections doing the lab you miss the week it is missed, there is no way to make up a missed core lab.**

3. There will be **five lab quizzes** worth between 45 and 60 points each. One will be given after approximately every four labs. Lab quizzes will be a combination of multiple choice, matching, short answer, and practical questions. Questions will come directly from the Performance Objectives found at the end of each lab exercise. Lab quizzes will be given in lab prior to beginning that day's assigned lab exercise.

B. Grading Policy

Lecture – 70% of your grade is based on a Getting Started Course Tour quiz, a general biology review test covering molecular genetics, and 5 lecture exams covering your Softchalk lecture units. Each of the lecture units also has an extra credit crossword puzzle worth 1 point each. These must be emailed to me prior to taking each lecture unit exam. Your lecture grade will also include your 3 lab reports mentioned above. No one will be allowed to make up more than one missed lecture exam during the course and only for a valid and documented reason.

Laboratory: - 30% of your grade is based on 5 lab quizzes, 12 pre-lab quizzes covering laboratory techniques that will be taken on Blackboard, and 3 case study-based lab reports submitted as assignments on Blackboard. Since we use lab to teach both lab content as well as a critical hands-on learning activity where you learn to work in small groups to solve problems, we make lab worth 30% of your final grade rather than the more usual 25%. If you miss a lab quiz, you will not be allowed to make it up unless you have a valid excuse. No one will be allowed to make up more than one missed lab quiz during the course

You must pass both lab and lecture with a grade of 60% or higher to pass the class. If either your lab average or your lecture average is below 60% you will receive a final grade of F for the course.

For a more detailed explanation of requirements in lecture and lab, go to your course **Blackboard site** and click on **"Detailed Course Information" link** in the menu.

Biology Department Grading Policy

A = 90 - 100%B = 80 - 89.9%C = 70 - 79.9%D = 60 - 69.9%F = 0 - 59.9%

Do not come to your instructor the last week or two of the semester or after your final grade is posted and ask if there is any "extra credit" you can do or tests or quizzes you can retake to get a higher grade! If the course is important to you or you need a certain grade to graduate or get into nursing school or some other school, then you need to work hard to earn every point you can in both lab and lecture during the semester. You have the entire semester to earn your grade and that includes doing the extra credit crossword puzzles and creative project. After you turn in your final exam and it is graded and posted I will not respond to any requests to earn additional points or change your grade.

C. Instructor's attendance policy: Since lab provides a critical hands-on component to the understanding of Microbiology, attendance for labs is essential. Twelve of the lab exercises are considered "core labs" where you will be graded on your mastery of lab techniques for each of these labs, following all lab instructions and safety rules, and your score on the prelab quizzes given on Blackboard as mentioned above. In addition, Labs 12, Lab 14, Lab 15, and the Final Group Project are all case study-based identification of bacterial unknowns. Attendance is essential for both the core labs and the non-core labs that don't have prelab quizzes.

If you miss more than 5 total labs during the semester you will receive an F in lab and as mentioned earlier in the syllabus, you must pass both lab and lecture to pass the course.

D. Instructor's audit policy: Important notes: (1) you can no longer wait until mid-semester to decide that auditing a course is appropriate: the final date to change to an audit now coincides with the final date for withdrawing with a 50% refund, and (2) failure to participate in the class as follows will result in a grade of "W" instead of "AU."

Instructor's policy toward auditing students: Students who choose to audit the course or decide during the semester to change their registration to audit will not take any lecture or laboratory exams or quizzes. They must, however, attend lecture and lab on a regular basis. Any audit student not regularly attending lectures and labs will have their final grade changed to withdraw (W).

IV. Course Procedures

A. Course-related policies and procedures:

While any person may on occasion be late for class or may have to leave class early for a valid reason, students are expected to arrive for class on time and not leave early. Arriving late or leaving early is not only rude but is also disruptive to other students and classroom activities. Your lab start time is the time you must be in the lab, have your lab coat, goggles, and gloves on, and have your lab bench disinfected. If you are not in lab with your protective gear on and ready to hear instructions at the listed class start time, <u>2 lab core</u>

participation points will be deducted for each lab that you are late.

You need to <u>arrive at lab at least 15 minutes early</u> to wash your hands, put on all of your personal protective equipment, and disinfect your work area prior to the start of lab.

No student can make up more than one missed lab quiz and one missed lecture exam during the course. An incomplete grade will be given only when a student needs to make up one lecture exam and/or lab quiz. Students have six weeks after an incomplete grade is submitted to Records and Registration to make up the incomplete.

Cheating will not be tolerated. When honest students working hard to receive a good grade and obtain knowledge in the course see another student using a crib sheet or looking at another's exam or quiz, they do report this to the instructor. As stated below under Code of Academic Integrity, "Students who do not accept responsibility for the integrity of their own work will experience sanctions, including a written reprimand, failure of the assignment, failure of the course, and/or dismissal from the program. For repeat and extreme offenses, the College reserves the right to suspend or expel students." Anyone caught cheating will receive a "0" on that exam or quiz. In addition, your instructor will never write a letter of recommendation for a student he knows or strongly suspects cheated during the course.

- **B. College wide syllabus policies:** For college wide syllabus policies such as the Code of Conduct related to Academic Integrity and Classroom Behavior or the Audit/ Withdrawal policy, please go to the 'MySyllabiPolicies' Tab on the <u>MyCCBC page</u>. Please pay *particular* attention to the following sections of MySyllabiPolicies:
 - <u>Attendance Policy</u>
 - <u>Code of Conduct for Academic Integrity</u>
 - <u>Grades AU (The last day to switch to an audit this semester is: Friday, February 19,</u> 2021)
 - Grades -W (The last day to withdraw this semester is: Wednesday, April 14, 2021.)
- **C. Contact information for course-related concerns**: Addressing course concerns: Students should first attempt to take concerns to their instructor. If students are unable to resolve course-related concerns with the instructor they should contact Ms. Christine DeStefano, Assistant Dean of Science at 443-840-2673, cdestefano@ccbcmd.edu
- D. Additional Procedures: N/A

E. Course calendar/schedule:

Lecture	Date for	Date for	Laboratory	Date for	Date for
Exam	CR1 & CRW	CMW &	Quiz	CR1 &	CMW &
		CP1		CRW	CP1
Getting	02/05/21	02/05/21	Lab quiz 1	02/24/21	02/25/21
started/course tour	deadline	deadline			
quiz					
Take home	02/17/21	02/18/21	Lab quiz 2	03/15/21	03/16/21
molecular					
genetics review					
exam					
Unit 1 exam	03/01/21	03/02/21	Lab quiz 3	04/12/21	04/08/21
Unit 2 exam	03/17/21	03/18/21	Lab quiz 4	04/21/21	04/20/21
Unit 3 exam	04/19/21	04/15/21	Lab quiz 5	05/05/21	05/04/21
Unit 4 exam	04/28/21	04/27/21	Creative	05/05/21	05/04/21
			project		
Unit 5 & 6 (final)	05/21/21	05/21/21			
exam	deadline	deadline			

To see the due dates for your 3 lab reports (Lab 12, Lab 15, and Final Lab Project, see your Blackboard Class Calendar.

For a more detailed look at of lecture topics and laboratory topics go to your Blackboard Course site and click on the "Detailed Course Information" link or the "Course Calendar" link in the menu.

This syllabus may be changed with notification to the class.

¹ Note that the content in these sections is dictated by the Common Course Outline for this course, as approved at the college-wide level: [CCBC Common Course Outlines]

² Students should first attempt to take concerns to the faculty member. If students are unable to resolve course-related concerns with the instructor, they should contact Mrs. Christine DeStefano, Assistant Dean of Science, at cdestefano@ccbcmd.edu or 443-840-2673.

The Big Picture of Infectious Diseases

One of the most important things you will learn in this course is what I call "The Big Picture of Infectious Diseases," or as was mentioned earlier, the biological basis of host parasite interaction. There are three interlocking parts to this big picture:

A. The microbe's side of the story - why some microbes have more potential to be harmful than others.

The overwhelming majority of microbes in nature are harmless to humans and, in fact, many are beneficial, being key players in the recycling of nutrients in nature. We will look at the major groups of microbes, learn what they are composed of chemically and structurally, and see how they carry out their metabolism and reproduce. We will learn of a variety of factors some microbes may possess that play a role in increasing their ability to cause disease. Also, we will learn how, through mutation, genetic recombination, and natural selection, microbes may adapt to resist our control attempts.

B. The body's side of the story - ways in which the body defends itself naturally against infectious disease agents.

Here will learn about the phenomenal defenses the body has available to defend itself against infectious disease agents, as well as altered body cells such as cancer cells and infected cells. The body does this through the innate immune system and the adaptive immune system. Innate immune defenses are those you are born with and include anatomical barriers, mechanical removal, cytokines, pattern-recognition receptors, phagocytosis, inflammation, the complement pathways, and fever. The adaptive immune defenses are those you develop throughout your life and include antibody production and cell-mediated immunity.

C. Ways in which we can artificially help the body defend itself by removing the microbes or enhancing body defenses.

We will learn how we can artificially help ourselves to avoid or reduce the risk of infection. Also, we will learn ways in which we are able to artificially remove microbes from the body and its environment using agents such as antiseptics, disinfectants, physical agents such as heat and cold, antimicrobial chemotherapeutic chemicals, and antibiotics. Finally, we will learn ways we are currently able to improve or restore the body's immune responses, or potentially in the future will be able to do so, through such techniques as immunization, adoptive immunotherapy, or immune modulation.

D. Relationship between the Human Microbiome and Human Health

The complex mutually beneficial symbiotic relationship between humans and their natural microbes is critical to good health. It is now recognized that the millions of genes associated with the normal flora or microbiota of the human body - especially in the intestinal tract - aid in the digestion of many foods, the regulation of multiple host metabolic pathways, and the regulation the body's immune defenses.

By the end of the course, these factors should fit together nicely to give you a good understanding of "The Big Picture of Infectious Diseases."