Student's Guide to the Microbial World, or "What do I need to know, and when?"

It is not possible to provide a comprehensive list of all microorganisms that one should "know" to practice medicine and dentistry. However, this list is provided as a study reference to help guide you through the world of microorganisms as you go through the medical/dental undergraduate curriculum. Neither is it possible to provide an exhaustive list of each species in the genera on the list. You will be expected to be knowledgeable about the species named on these lists. It is not expected that you be equally knowledgeable about details of species not listed, beyond knowing general characteristics about each genus listed. And finally, as you go through your careers, remember that you will learn about microorganisms not included on these lists either because they had not yet been discovered, or because they had not yet been common causes of human infection.

The division of the microorganisms on these lists across the two years is based on the common causes of infections in the body systems you will study in each year. It is admittedly somewhat arbitrary since many organisms commonly cause infections in most body systems. This division however allows some pacing of the material so you realize that you are not expected to know all the organisms at once (although it may seem that way at first!). You will have heard about many of the microorganisms on these lists in HDI, but other blocks in years 1 and 2 will have cases or content which will give you the opportunity for at least self-directed learning, if not more formal presentations, to review the microorganisms noted. Some of the microorganisms have been assigned to a block even though there may not seem to be a natural fit, to balance out the learning. Additionally, most body systems have normal flora, and you should be familiar with the organisms that make up the normal flora of that system as you finish each block.

In learning about these microorganism you should familiarise yourself with their characteristics in terms of

1) their main habitat,
2) how humans encounter them and their mode of spread,
3) the diseases they cause in humans,
4) the pathogenic mechanisms by which they cause disease in humans,
5) the specimens taken, tests ordered, and laboratory features which are used to identify the organism

By the end of Phase VI, i.e. by graduation, in addition to the above characteristics of microorganisms, you should be able to describe the clinical presentation, treatment, and prevention of, infections caused by the listed organisms (and any additional you may have encountered).

The list of microorganisms that you should be familiar with by the end of the first academic year, with indications of the blocks where we would expect you to encounter them:

	HDI	Pulmonary	Cardiovascular	Fergu
Know common normal flora of the organ system, if any		✓	✓	✓
BACTERIA:				
Staphylococci				
-*S. aureus*	✓	✓	✓	
Many other species, collectively known as coagulase negative staph				
-*S. epidermidis*	✓			
-*S. saprophyticus*	✓			✓
Streptococci				
-*S. pyogenes* (Group A)	✓	✓	✓	✓
-alpha hemolytic streps (many species, viridans streptococci)	✓	✓	✓	
	✓	✓		
-*S. mutans (of particular importance to dentistry)*	✓			
-*S. pneumoniae*	✓	✓		
Enterococci				
-*E. faecalis*	✓		✓	✓
-*E. faecium*	✓		✓	✓
Bacillus				
-*B. anthracis*	✓	✓		
-*B. cereus*	✓			
-Bacillus species	✓			

	HDI	Pulmonary	Cardiovascular	Fergu
Corynebacteria				
-*C. diphtheriae*	✓	✓	✓	
-Corynebacterium species	✓			
Mycobacteria				
-*M. tuberculosis*	✓	✓		
-*M. avium-intracellulare*	✓	✓		
Enterobacteriaceae				
-*E. coli*	✓			✓
Salmonella				
-*S. enteritidis*	✓			
-*S. typhi*	✓			
Shigella species	✓			
Proteus mirabilis	✓			✓
Klebsiella pneumoniae	✓	✓		✓
Citrobacter species	✓			✓
Yersinia pestis	✓	✓		
Campylobacter jejuni	✓			
Pseudomonas aeruginosa	✓			
Burkholderia cepacia	✓	✓		
Stenotrophomonas maltophilia	✓	✓		
Haemophilus				
-*Haemophilus influenzae*	✓	✓		
-Haemophilus species	✓	✓		
-*H. aphrophilus*			✓	
Legionella pneumoniae	✓	✓		
Moraxella catarrhalis	✓	✓		
Cardiobacterium hominis			✓	
Coxiella burnettii	✓	✓		
Kingella kingii			✓	
Chlamydia				
-*C. trachomatis*	✓			✓
-*C. pneumoniae*	✓	✓		
-*C. psittaci*	✓	✓		
Mycoplasma pneumoniae	✓	✓		
Ureaplasma urealyticum	✓	✓		✓
Neisseria				
-Neisseria species	✓	✓		
-*N. gonorrhoeae*	✓			✓

	HDI	Pulmonary	Cardiovascular	Fergu
VIRUSES				
Herpes viruses -CMV	✓	✓		✓

-VZV -HSV -HHV 6 -HHV 8				
Influenza viruses	✓	✓		
Parainfluenzae viruses	✓	✓		
Respiratory Syncytial Virus	✓	✓		
Adenovirus	✓	✓		
Hanta virus		✓		
Enteroviruses -Coxsackie -Echo virus	✓		✓	
Rotavirus	✓			
Norwalk virus	✓			
HIV	✓			
PARASITES:				
Protozoa:				
Plasmodium	✓			
Babesia	✓			
Giardia	✓			
Cryptosporidium	✓			
Cyclospora	✓			
Entamoeba histolytica	✓			
Dientamoeba fragilis	✓			
Trichomonas vaginalis	✓			✓
Toxoplasma gondii	✓			
Round worms: *-Ascaris lumbricoides* *-Ancylostoma duodenale* *-Necatur americanus* *-Trichuris trichiura* *-Strongyloides stercoralis* *-Trichinella spiralis* *-Enterobius vermicularis*	 ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓			
Tape worms: **Taenia** *-T. solium* *-T. saginata* *Diphyllobothrium latum* Echinococcus	 ✓ ✓ ✓ ✓			

FUNGI:				
Candida -*C. albicans* -Candida species	 ✓ ✓	 ✓ ✓	 ✓ ✓	 ✓ ✓
Cryptococcus	✓	✓		
Pneumocystis	✓	✓		
Aspergillus	✓			
Coccidioides	✓	✓		
Histoplasma	✓	✓		
Blastomyces	✓	✓		
Mucor	✓	✓		
Rhizopus	✓	✓		

The list of microorganisms that you should be familiar with by the end of the second academic year, with indications of the blocks where we would expect you to encounter them:

During P2P2 you will meet many of the same microorganisms again (time for review), but by the end of P2P2 (i.e., year 2 of your program) you should be able to add to the above list of microorganisms by having the same information on the following additional microorganisms. There will be additional questions on the exam at the end of year 2 to reflect this expectation.

	Inte-gument	**Blood/ Lymph/ MSK**	**GI**	**Brain and Behaviour**	**Repro-duction**	**Growth/ Develop-ment**
Know common normal flora of organ system, if any	✓	✓	✓	✓	✓	✓
BACTERIA						
Streptococcus -*S. agalactiae* (Group B) -beta hemolytic Streps Groups A, C & G					✓	✓ ✓
Lactobacilli					✓	
Actinomyces israelli			✓			
Nocardia asteroides				✓		
Clostridia -*C. perfringens* -*C. botulinum* -*C. tetanus* -*C. difficile* -Clostridial species			✓ ✓ ✓	 ✓ ✓		
Miscellaneous anaerobes -*Bacteroides fragilis* -Porphyromonas -Prevotella -Fusobacteria -Propionibacterium			✓			
Listeria monocytogenes						✓
Helicobacter pylori			✓			
Haemophilus ducreyi					✓	
More Enterobacteriaceae -*Enterobacter cloacae* -*Enterobacter aerogenes* -*Serratia marcescens* -*Yersinia enterocolitica* -*Yersinia pseudotuberculosis*		 ✓	✓ ✓ ✓ ✓ ✓ ✓			

Vibrio -*V. cholerae* -*V. parahemolyticus*			✓ ✓			
Aeromonas			✓			
Pleisiomonas			✓			
Brucella		✓				
Francisella tularensis		✓				
Pasteurella multocida		✓				
Bartonella (Rochalimea)	✓	✓				
Gardnerella vaginalis					✓	
Neisseria meningitidis						✓
Mycobacterium leprae	✓					
Spirochaetes -*Treponema pallidum* -*Borrelia burgdorferi* -*Borrellia hermsii* -Borrellia species -Leptospira	✓	✓ ✓ ✓ ✓		✓	✓	✓
Rickettsia -*R. rickettsiae* -R. species	✓ ✓					
Ehrlichia		✓				

	Inte-gument	**Blood/ Lymph/ MSK**	**GI**	**Brain and Behaviour**	**Repro-duction**	**Growth/ Develop-ment**
VIRUSES						
Hepatitis viruses: -A through E			✓			
Epstein Barr Virus (EBV)		✓				✓
Rubella	✓				✓	✓
Rubeola	✓					✓
Parvovirus B19	✓	✓			✓	✓
Mumps					✓	✓
Pox viruses	✓					
Rabies virus				✓		✓
Enterovirus -Polio -Enteroviruses 68 to 71		✓		✓		✓
Papilloma viruses	✓				✓	
Molluscum contagiosum	✓					
HTLV 1 & 2		✓				
Adenoviruses						✓

Parainfluenza viruses						✓
Yellow Fever Virus			✓			
Ebola virus		✓				
West Nile Virus				✓		
Arboviruses -SLE -WEE -JE				✓		
PARASITES						
Flukes Schistosomes -*S. mansoni* -*S. haematobium* -*S. japonicum* *Clonorchis sinensis* *Paragonimus westermanii*			✓			
Protozoa -Acanthamoeba -Naeglaria				✓ ✓		
Ectoparasites **Mites:** -*Sarcoptes scabiei* **Lice:** -*Pediculus hominis* -*Phthirus pubis*	 ✓ ✓ ✓					
FUNGI						
Dermatophytes: -Epidermophyton -Microsporum -Trichophyton	✓					
Sporothrix schenckii	✓					
Malasseszia furfur	✓					
Paracoccidioides brasiliensis	✓					
PRIONS						
-CJD agent				✓		
-nvCJD agent				✓		