

These recommended curriculum guidelines for undergraduate microbiology in nursing and allied  
2012 Curriculum Guidelines for undergraduate  
microbiology (<https://www.asm.org/index.php/guidelines/curriculum-guidelines>) as well as the  
test plan for the National Council Licensure Examination for Registered Nurses published in  
2016 (NCLEX-RN; [https://www.ncsbn.org/RN\\_Test\\_Plan\\_2016\\_Final.pdf](https://www.ncsbn.org/RN_Test_Plan_2016_Final.pdf)).

- 4. Microbes interact with human hosts in beneficial, neutral, or detrimental ways.**
- Pathogens can be prokaryotic, eukaryotic, or acellular and primarily include bacteria, viruses, fungi, helminths, protozoa, and prions. A general understanding of these diverse groups is essential to guide healthcare practices and promote communication among professionals in such settings.
  - To best protect themselves and care for their patients, nurses should understand the microbiological and epidemiological features of pathogenic agents (e.g. etiological agent, reservoir, transmission patterns, incubation period, risk factors, potential complications, treatments, etc.)
  - Host factors, such as age and overall health and life habits, impact infectious disease development.
  - In humans, normal microbiota includes neutral and beneficial microbes (e.g. gut microbiota produce vitamins that humans cannot make and gut microbes compete with potential pathogens to limit their growth); also, microbes in probiotics are increasingly recognized as beneficial in a number of health applications.

*ASM Recommended Curriculum Guideline: 23*

*NCLEX-RN Alignment: Pharmacological & Parenteral Therapies; Safety & Infection Control; Health Promotion & Maintenance; Basic Care & Comfort; Physiological Adaptation*

**5. Humans use microorganisms and their products to make pharmaceuticals.**

*ASM Recommended Curriculum Guideline: 26*

*NCLEX-RN Alignment: Health Promotion & Maintenance*

**Microbial Pathogenicity**

- 6. Pathogens have diverse virulence factors that influence their pathogenesis and impact treatment options and clinical management.**
- Understanding adhesion factors, enzymatic factors, endospores, pathogen strategies to evade immune responses, endotoxins, exotoxins, and the nature of toxigenic bacterial strains is central to developing effective patient care plans for toxemia and sepsis/septic shock.
  - Understanding pathogenesis mechanisms allows healthcare workers to identify, properly treat, and reduce infectious disease transmission.
  - Bacteriophages can impact bacterial pathogenicity. For example, lysogenic bacteriophages can perform specialized transduction, which can confer new genetic traits to bacteria while lytic bacteriophages serve as vehicles for generalized transduction of new genetic traits.

*ASM Recommended Curriculum Guidelines: 8, 9, 10, 23*

*NCLEX-RN Alignment: Health Promotion & Maintenance; Safety & Infection Control*

- 7. Pathogens are continuously evolving and virulence is not a static property. Understanding mechanisms that impact pathogen evolution (i.e. vertical and horizontal genetic variation, mutations, recombination, etc.) is central to limiting pathogen evolution.**

- a. Gene transfer events such as transduction, transformation, and conjugation help bacteria gain new virulence factors, including the ability to make toxins and acquire antimicrobial resistance.

*ASM Recommended Curriculum Guidelines: 2, 3, 15*

*NCLEX-RN Alignment: Safety & Infection Control*

### **Identifying and Managing Infectious Diseases**

#### **8. diseases.**

*ASM Recommended Curriculum Guideline: 23*

*NCLEX-RN Alignment: Management of Care*

#### **9. A variety of methods are used to identify infectious agents.**

- a. Serology and other diverse molecular methods are used to diagnose infections and identify causative infectious agents.
- b. Staining and biochemical test media are useful for identifying bacterial pathogens.

*ASM Recommended Curriculum Guideline: 34*

*NCLEX-*



- c. An understanding of microbial control (sterilization and disinfection methods) is essential to understand how critical, semi-critical, and non-critical equipment should be managed as well as how to properly prepare patient body sites for medical procedures like injections and surgery.

*ASM Recommended Curriculum Guidelines: 7, 8,14*

*NCLEX-RN Alignment: Pharmacological & Parenteral Therapies; Health Promotion & Maintenance; Physiological Adaptation; Basic Care & Comfort*

**16. Antimicrobial compounds combat bacteria, fungi, helminths, protozoans, and viruses.**

- a.

- b. Nurses should understand the metric system and scientific notation (e.g. milli ( $10^{-3}$ ), micro ( $10^{-6}$ ) and nano ( $10^{-9}$ ) scales) as this terminology is used in patient medical history (e.g. lymphocyte counts) and is used in calculating dosage for medications.
- c. Nurses should appreciate that microbe levels impact disease development and prognosis (i.e. lethal dose-50 and infectious dose-50 as parameters that impact morbidity and mortality).

*ASM Recommended Curriculum Guideline: 29*

*NCLEX-RN Alignment: Pharmacological & Parenteral Therapies; Reduction of Risk Potential*

**20. The ability to communicate and collaborate with other disciplines is important for a cross disciplinary healthcare team.**

- a. Microbiology is central to the top three threats in healthcare: healthcare associated infections, antibiotic resistance, and emerging diseases. Nurses and other allied health care workers should be able to effectively communicate about microbiology related topics in written and oral formats. Furthermore, nurses are often called upon to explain concepts that physicians mention to patients.
- b. Nurses must work effectively as individuals and in groups.

*ASM Recommended Curriculum Guideline: 30*

*NCLEX-RN Alignment: Communication & Documentation; Management of Care*

**21. Understanding the relationship between science and society improves clinical practice and promotes the human aspect of medicine.**

- a. Nurses should be able to identify and discuss ethical issues in microbiology, especially with regard to vaccines and antimicrobial drug stewardship.

*ASM Recommended Curriculum Guideline: 31*

*NCLEX-RN Alignment: Management of Care; Communication & Documentation; Psychosocial Integrity*

