



The Microbiology Effect: A Call for Education Research

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When we are young, we hear a lot about “germs” from the adults in our lives: “Don’t put that in your mouth!” and “Wash your hands!” Enrolling in a microbiology course takes these concepts to a whole new level; by seeing microbes firsthand and learning about how they grow and thrive, we begin to truly understand how ubiquitous microbes are within our environment. Indeed, this causes what I anecdotally call the “Microbiology effect,” where new students within the discipline become hyper-aware of their surroundings and the microbes they contain. As we progress with our studies, this awareness becomes tempered with experience, but the basic tenets of handwashing, disinfection, and safe food preparation hopefully remain.

As microbiology educators, we take this idea for granted; we see it in action every semester. Yet, very little work has been done to correlate the impacts of taking a microbiology course on student behavior after the students leave our classes. Recent discussion among microbiology educators indicates that both nursing programs and nursing accreditation agencies have dropped, or are considering dropping, the microbiology requirement for an Associate’s degree in Nursing. Some have already dropped the microbiology laboratory component. These decisions come from pressure to reduce credit hours necessary for graduation with an Associate’s degree in Applied Science (AAS). The American Society for Microbiology’s (ASM) microedu list-serv was recently in an uproar over this issue, with very few resources to back our claim: microbiology is critical at all levels of nursing education. Members at a Peer-to-Peer Exchange discussion that I convened at ASM’s annual meeting, Microbe 2016, expressed similar consternation.

Here is what we do know: hospital acquired infections (HAIs) are a significant global burden within clinical settings (4, 8, 10). While current infection control measures seem to be effective in reducing incidents (4), HAIs are likely to persist, with the development and spread of multiple antibiotic-resistant bacterial strains (1, 2, 11, 14). As front-line caretakers, nursing staff are often responsible for the spread of HAIs (3, 5, 13), and the medical community recognizes these issues (7, 12).

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My own literature searches found only one article that directly addresses the link between microbiology education and clinical practices. Cox *et al.* skillfully describe the link between nursing education and clinical practice, and provide a roadmap for future studies (6). In this issue of *JMBE*, microbiologist and educator Andrea Rediske describes how taking microbiology impacted her personal experiences within a hospital setting (9). As a community of educators, we need to take the next step and directly show how microbiology impacts our students’ behaviors in terms of infection control, both within our classrooms and in their careers. To do this, we must partner with our clinical colleagues; accreditation agencies will not consider our work seriously without this critical piece. Together, we can make a strong case to maintain microbiology as a mandatory component within nursing education.

We want to hear from our community. *JMBE* welcomes manuscripts on this and other issues in biology education. Feel free to contact us at JMBE@asmusa.org at any stage of the writing process. We are here to help you publish!

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REFERENCES

1. Ammerlan, H. S., et al. 2013. Secular trends in nosocomial bloodstream infections: antibiotic-resistant bacteria increase the total burden of infection. *Clin. Infect. Dis.* **56**(6):798–805.
2. Behnke, M., et al. 2013. Nosocomial infection and antibiotic use: a second national prevalence study in Germany. *Dtsch. Arztebl. Int.* **110**(38):627–633.
3. Blegen, M. A., C. J. Goode, J. Spetz, T. Vaughn, and S. H. Park. 2011. Nurse staffing effects on patient outcomes: safety-net and non-safety-net hospitals. *Med. Care* **49**(4):406–414.
4. Centers for Disease Control and Prevention. 2016. National and state Healthcare Associated Infections (HAI) progress report. National Center for Emerging and Zoonotic Infectious Diseases. [Online.] <http://www.cdc.gov/HAI/pdfs/progress-report/hai-progress-report.pdf>. Accessed 11 October 2016.
5. Cimiotti, J. P., L. H. Aiken, D. M. Sloane, and E. S. Wu. 2012. Nurse staffing, burnout, and health care–associated infection. *Am. J. Infect. Control* **40**(6):486–490.

6. **Cox, J. L., M. D. Simpson, W. Letts, and H. M. A. Cavanagh.** 2015. Re-thinking microbiology/infection control education to enhance the practice-readiness of health professional students: more than just a curriculum issue. *J. Learn. Des.* **8**(1):55–67.
7. **Goldstein, E. J., et al.** 2015. Pathway to prevention of nosocomial *Clostridium difficile* infection. *Clin. Infect. Dis.* **60**(Suppl 2):S148–S158.
8. **Lessa, F. C., L. G. Winston, L. C. McDonald, Emerging Infections Program C. difficile Surveillance Team.** 2015. Burden of *Clostridium difficile* infection in the United States. *N. Engl. J. Med.* **372**:825–834.
9. **Rediske, A.** 2016. The necessity of prerequisite undergraduate microbiology courses for pre-allied health professionals. *J. Microbiol. Biol. Educ.* **17**(3):329–330.
10. **Rosenthal, V. D., et al.** 2014. International Nosocomial Infection Control Consortium (INICC) report, data summary of 43 countries for 2007–2012. Device-associated module. *Am. J. Infect. Control* **42**:942–956.
11. **Sievert, D. M., et al.** 2013. Antimicrobial-resistant pathogens associated with healthcare-associated infections: summary of data reported to the national healthcare safety network at the Centers for Disease Control and Prevention, 2009–2010. *Infect. Control Hosp. Epidemiol.* **34**(1):1–14.
12. **Spruce, L.** 2014. Back to basics: preventing surgical site infections. *AORN* **99**(5):600–611
13. **Stone, P. W., M. Pogorzelska, L. Kunches, and L. Hirschhorn.** 2008. Hospital staffing and health care-associated infections: a systematic review of the literature. *Clin. Infect. Dis.* **47**(7):937–944.
14. **Tacconelli, E., et al.** 2014. ESCMID guidelines for the management of the infection control measures to reduce transmission of multidrug-resistant Gram-negative bacteria in hospitalized patients. *Clinical Microbiology and Infection.* **20**(s1):1–55.