

This manuscript is the Author's Accepted Manuscript (accepted version, post-peer review, prior to typesetting by the journal. This manuscript is shared through the Green Open Access Self-Archiving Policy of SAGE Publishing, allowing the Accepted Manuscript to be posted as a downloadable copy on any non-commercial website.

Please do not cite this document without the authors' permission. Instead, please access and cite the following:

James, T. G., & Lippi, C. A. (2020). Interdisciplinary collaborations required: Teaching health educators infectious disease dynamics. *Pedagogy in Health Promotion*. DOI: [10.1177/2373379920941531](https://doi.org/10.1177/2373379920941531)

Interdisciplinary Collaborations Required:

Teaching Health Educators Infectious Disease Dynamics

Tyler G. James, M.S, CHES®*^{1,2}, & Catherine A. Lippi, MFAS¹

*Correspondence regarding this article should be sent to Tyler G. James, tjames95@ufl.edu.

Twitter for Tyler G. James: @tylergjames_

Twitter for Catherine Lippi: @AedesLady

Affiliations:

1. Quantitative Disease Ecology and Conservation (QDEC) Lab Group, Department of Geography and Emerging Pathogens Institute, University of Florida, Gainesville, FL, USA.
2. Department of Health Education and Behavior, University of Florida, Gainesville, FL, USA.

Acknowledgements: Thank you to Devon K. Mims, Doctor of Veterinary Medicine and Master of Public Health candidate, Meagan K. Sullivan, M.P.H., CPH, and Julia R. Varnes, Ph.D., M.P.H., MCHES® for their feedback on early versions of this manuscript.

Abstract

Infectious diseases, including zoonotic infectious diseases, are some of the leading causes of the global burden of diseases. Public health education/promotion specialists are specifically trained in methods and theory to deliver risk communication that can help decrease the transmissibility, morbidity, and mortality of infectious diseases. However, the limited training of health educators in infectious disease dynamics represents a critical barrier for health educators wishing to engage in this work. In this commentary, we describe the importance of health education/promotion specialists being trained on infectious disease dynamics to engage in effective science and health communication locally and globally.

Keywords: interdisciplinary education; career development/professional preparation; health education; collaboration

Word count: 1,176

Interdisciplinary Collaborations Required: Teaching Health Educators Infectious Disease Dynamics

Infectious diseases play an important part in health and wellness of the communities in which we serve. The SARS-CoV-2 pandemic and associated COVID-19 infection has caused unprecedented social disruption that will surely have intermediate- and long-term effects on health education/promotion practice, and pre-professional teaching and learning. After the fluctuations demanded by the pandemic calm, the field of health education/promotion pedagogy can learn from this experience and develop paths to move forward and improve the training of future health education specialists. One of these paths is ensuring public health educator readiness for communicating about, and working to prevent, pandemics.

Since 2009, the World Health Organization has declared six Public Health Emergencies of International Concern: (1) the novel influenza A H1N1 epidemic of 2009; (2) the polio and (3) Ebola outbreak declarations in 2014; (4) the Zika virus epidemic of 2015 and 2016; (5) the 2018 to 2020 Kivu Ebola epidemic; and, most recently, (6) the 2019 novel coronavirus SARS-CoV-2 pandemic. These emerging or reemerging infectious diseases are responsible for the largest global burdens of disease and, with climate change, will continue to worsen (Lippi et al., 2019; Ryan et al., 2015, 2020).

The ongoing SARS-CoV-2 pandemic has demonstrated the importance of effective science communication when working on sensitive and emerging health issues. Government scientists and public health administrators, including Drs. Anthony Fauci and Anne Schuchat, were trusted, household names early in the pandemic – their credibility stemming from their experience in public health and their ability to explain infectious disease epidemiology to the populace. Drs. Fauci and Schuchat are medical doctors and heavily trained in epidemiology, but

during a pandemic the role of science communication is not restricted to epidemiologists. Health education specialists are trained to conduct needs assessments, develop, implement, and evaluate programs, and conduct advocacy regarding health issues (National Commission for Health Education Credentialing, Inc. & Society for Public Health Education, Inc., 2020). Therefore, the role of a health education specialist undoubtedly includes serving as a resource person and communications expert in assisting with infectious disease response and mitigation. This role is further emphasized by the fact that emerging infectious disease prevention behaviors are of central interest to infectious disease experts (Adongo et al., 2016; Carter et al., 2017; Committee on Emerging Microbial Threats to Health, 1992; Kenneson et al., 2017; Ryan et al., 2019; Schmid et al., 2017) who could benefit from partnerships with social-behavioral experts including health educators. However, the health education/promotion specialist's utility as a collaborative resource is partly contingent on their ability to effectively communicate within these teams. This leads to a fundamental question of *if* pre-professional and professional public health education/promotion specialists are adequately trained for this role.

Answering this question is beyond the scope of this commentary and warrants scientific study. However, during the SARS-CoV-2 pandemic, students and some Certified and Master Certified Health Education Specialists indicated concerns regarding public health messaging, understanding the scientific validity of sources, and feeling underprepared for answering questions about the pandemic (S. Cook, personal communication, April 19, 2020). This may be due to training deficiencies at the institution level. For example, several programs require only one introductory epidemiology course for graduate-level students enrolled in the pre-professional degree tracks most suited for future health education/promotion practitioners. Students at a large institution in the southeast United States reported that during the spring 2020 semester there was

no discussion of the COVID-19 pandemic during the course. Post-graduates from other universities indicate that they were discouraged from focusing on infectious diseases during their pre-professional training (Lee, 2020; C, 2020). This presents a missed opportunity and a serious concern regarding the training of future health educators and public health specialists. The extent of this training gap nationwide is unknown, but it would be atypical for students in the behavioral sciences to learn about infectious disease dynamics. However, in our view, it is without question that training in infectious disease dynamics should be required for pre-professional health educators.

Training in infectious diseases need not be overly focused on the biology of disease but *must* be interdisciplinary. To this end, we recommend interdisciplinary collaboration between health education/promotion programs and medical geography programs. The field of medical geography exemplifies the degree of interdisciplinary collaboration needed to tackle multifaceted global health issues, incorporating theory and methods from epidemiology and public health, social geography, spatial sciences, and biology (Blackburn, 2010; May, 1978). As an example, the Geography Department at the University of Florida offers ‘Peoples and Plagues’, a core course in the Medical Geography in Global Health focus area. This is a survey course of historical and modern infectious diseases impacting the global burden of diseases, focused primarily on zoonotic infectious diseases which occur at the animal-human-environment interface. The course begins with an overview of infectious disease models – such as the SIR (susceptible, infected, recovered) compartmental model (Kermack & McKendrick, 1927) discussed during the SARS-CoV-2 pandemic –, surveys diseases, and discusses issues relevant to public health education including the mathematics behind disease transmission, and vaccination campaigns and herd immunity. Diseases featured in the class include the bubonic plague,

malaria, tuberculosis, poxviruses including smallpox, influenza, tickborne diseases, and viral hemorrhagic fevers such as Ebola virus. The course content includes the history of the disease, the disease's spatial and temporal distribution, and social determinants impacting prevention and transmission, diagnosis, and treatment. The content covered in 'Peoples and Plagues' is directly applicable to health education practice and provides a foundation for future work in infectious and chronic disease prevention in local and global health settings.

We recognize that the position of including infectious disease dynamics in health education/promotion curricula and professional development may seem unconventional. Our opinion is formed by our experience and knowledge of the unique contribution of this training on community, patient, college, and worksite health education practice. – Author1 is a doctoral candidate in health education, a Certified Health Education Specialist and health education researcher focused on health equity and healthcare utilization among underserved populations and has prior training in medical geography and infectious disease dynamics (including taking 'Peoples and Plagues') which serves as a strong foundation to his current practice. Author2 is a former public health practitioner with a state department of health, a current doctoral candidate in medical geography, and a researcher in infectious disease dynamics and prevention in global health contexts. – For example, one contribution is an increased skillset and schema of prevention activities. Pre-professional health promotion programs typically focus on primary prevention; infectious disease prevention requires a robust understanding of primary, secondary, and tertiary prevention and emphasizes the importance of quick response to emerging health issues through cross-sector collaborations. Therefore, training in infectious disease dynamics will also help ensure health educators are ready to fulfill the responsibility of working across disciplines to better health in all settings (First International Conference on Health Promotion,

1986). In recognizing the invaluable, bidirectional contributions of health education practice and medical geography, the potential future impacts of emerging infectious diseases, and the importance of a readied public health workforce, it is clear that health education/promotion specialists must have a more nuanced understanding of infectious disease dynamics.

References

- Adongo, P. B., Tabong, P. T.-N., Asampong, E., Ansong, J., Robalo, M., & Adanu, R. M. (2016). Preparing towards preventing and containing an Ebola Virus Disease outbreak: What socio-cultural practices may affect containment efforts in Ghana? *PLoS Neglected Tropical Diseases*, *10*(7). <https://doi.org/10.1371/journal.pntd.0004852>
- Blackburn, J. K. (2010). Integrating geographic information systems and ecological niche modeling into disease ecology: A case study of *Bacillus anthracis* in the United States and Mexico. In K. P. O'Connell, E. W. Skowronski, L. Bakanidze, & A. Sulakvelidze (Eds.), *Emerging and Endemic Pathogens: Advances in Surveillance, Detection and Identification* (pp. 59–88). Springer Netherlands. <https://doi.org/10.1007/978-90-481-9637-1>
- C. [@Carmied]. (2020, May 8). *Me too. I took ID as an elective, because my concentration was health education. We have never needed broad, consistent public health messaging more, though. I chugged through the Pink Book/Red Book CDC self study courses after graduation and use that info at work often.* [Tweet]. Retrieved from <https://twitter.com/carmied/status/1258741360489717762>
- Carter, S. E., O'Reilly, M., Walden, V., Frith-Powell, J., Kargbo, A. U., & Niederberger, E. (2017). Barriers and enablers to treatment-seeking behavior and causes of high-risk practices in ebola: A case study from Sierra Leone. *Journal of Health Communication*, *22*(sup1), 31–38. <https://doi.org/10.1080/10810730.2016.1222034>
- Committee on Emerging Microbial Threats to Health. (1992). *Emerging infections: Microbial threats to health in the United States*. Institute of Medicine.

- First International Conference on Health Promotion. (1986). *Ottawa Charter for Health Promotion*. World Health Organization.
- Kenneson, A., Beltrán-Ayala, E., Borbor-Cordova, M. J., Polhemus, M. E., Ryan, S. J., Endy, T. P., & Stewart-Ibarra, A. M. (2017). Social-ecological factors and preventive actions decrease the risk of dengue infection at the household-level: Results from a prospective dengue surveillance study in Machala, Ecuador. *PLOS Neglected Tropical Diseases*, *11*(12), e0006150. <https://doi.org/10.1371/journal.pntd.0006150>
- Kermack, W. O., & McKendrick, A. G. (1927). A contribution to the mathematical theory of epidemics. *Proceedings of the Royal Society of London. Series A, Containing Papers of a Mathematical and Physical Character*, *115*(772), 700–721.
<https://doi.org/10.1098/rspa.1927.0118>
- Lee, M. [@MatthewLeeMPH]. (2020, May 7). *Thinking a lot recently about how I and several classmates during undergrad and MPH were discouraged in some courses from being interested in infectious diseases. The messaging was that we should really only focus on chronic diseases because of the 'epidemiological transition.'* [Tweet]. Retrieved from <https://twitter.com/MatthewLeeMPH/status/1258419738268622848>
- Lippi, C. A., Stewart-Ibarra, A. M., Loor, M. E. F. B., Zambrano, J. E. D., Lopez, N. A. E., Blackburn, J. K., & Ryan, S. J. (2019). Geographic shifts in *Aedes aegypti* habitat suitability in Ecuador using larval surveillance data and ecological niche modeling: Implications of climate change for public health vector control. *PLOS Neglected Tropical Diseases*, *13*(4), e0007322. <https://doi.org/10.1371/journal.pntd.0007322>
- May, J. M. (1978). History, definition, and problems of medical geography: A general review: Report to the Commission on Medical Geography of the International Geographical

- Union 1952. *Social Science & Medicine. Part D: Medical Geography*, 12(3), 211–219.
[https://doi.org/10.1016/0160-8002\(78\)90037-0](https://doi.org/10.1016/0160-8002(78)90037-0)
- National Commission for Health Education Credentialing, Inc., & Society for Public Health Education, Inc. (2020). *A competency-based framework for health education specialists—2020*.
- Ryan, S. J., Lippi, C. A., Nightingale, R., Hamerlinck, G., Borbor-Cordova, M. J., Cruz B, M., Ortega, F., Leon, R., Waggoner, E., & Stewart-Ibarra, A. M. (2019). Socio-ecological factors associated with dengue risk and *Aedes aegypti* presence in the Galápagos Islands, Ecuador. *International Journal of Environmental Research and Public Health*, 16(5), 682. <https://doi.org/10.3390/ijerph16050682>
- Ryan, S. J., Lippi, C. A., & Zermoglio, F. (2020). Shifting transmission risk for malaria in Africa with climate change: A framework for planning and intervention. *Malaria Journal*, 19(1), 170. <https://doi.org/10.1186/s12936-020-03224-6>
- Ryan, S. J., McNally, A., Johnson, L. R., Mordecai, E. A., Ben-Horin, T., Paaijmans, K., & Lafferty, K. D. (2015). Mapping physiological suitability limits for malaria in Africa under climate change. *Vector Borne and Zoonotic Diseases*, 15(12), 718–725.
<https://doi.org/10.1089/vbz.2015.1822>
- Schmid, P., Rauber, D., Betsch, C., Lidolt, G., & Denker, M.-L. (2017). Barriers of influenza vaccination intention and behavior—A systematic review of influenza vaccine hesitancy, 2005—2016. *PloS One*, 12(1), e0170550. <https://doi.org/10.1371/journal.pone.0170550>