

Engineering and public health: An interdisciplinary approach to addressing water quality in Compone, Peru

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Background: University of Maryland undergraduate students, graduate students, and faculty from the Schools of Engineering and Public Health conducted field water tests and a health needs assessment in a traditional farming community in the Andean mountain region of Southern Peru. This innovative project focuses on health as a cross-cutting issue best addressed as an interdisciplinary team. The project provides an opportunity to develop relationships among different fields and expands leadership capacity through multi-level teams of undergraduate students, graduate students, and faculty.

Structure/Method/Design: The first phase was a multi-method needs assessment to examine health issues and priorities among residents and to assess water quality. The public health team used principles of cultural competency and health literacy to develop a qualitative questionnaire. Fourteen interviews were conducted with health clinic staff, school personnel, community leaders, and community members. The teams worked together to conduct seven field tests of the local water supply at various points in the distribution system.

Results (Scientific Abstract)/Collaborative Partners (Programmatic Abstract): Residents and leaders identified animal contamination, flooding, and standing water as health priorities. Some residents objected to neighbors' overuse of water, particularly at the end of the distribution branch. Without a consistent water supply, the community risked financial sustainability.

Common health problems identified by residents and leaders were diarrhea, acute respiratory infections, cold/flu, alcoholism, and skin problems. Other issues were nutrition, general hygiene, and disorganization within the community. Social mapping analysis revealed that communication between residents and leaders is not prioritized.

Total coliform results revealed that after incubation, contamination ranged from ~10-108 CFU (EPA MCL = 0), indicating high fecal coliform and *E. coli* contamination. Community leaders expressed interest in chlorination of the existing water supply system. While community members prioritize water quantity and reliability, they were aware of contamination. One resident boils water "because it is bad for us." Another resident noted that boiling water was practical, for "if we don't, there are little bugs and sand." However, researchers observed use of tap water to wash vegetables.

Summary/Conclusion: Qualitative data from a representative sample of community members, school personnel, and health providers along with field water tests substantiated speculation by Engineers without Borders that health problems may be related to contaminated water. These data provided information to guide design of a water disinfection system and curriculum addressing the health issues identified by community members. This case study illustrates the opportunities of cross-discipline collaborations to simultaneously address technical, infrastructural, and behavioral challenges in sustainable global health projects.

Guidelines for global health experiences in postgraduate medical education: Development, content, and implementation

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Background: Global health experiences (GHE) are both potentially valuable educational opportunities and potentially dangerous undertakings for medical trainees, patients, and communities. Some of the practical, ethical, and educational aspects of these experiences at the undergraduate level have been discussed and debated in the literature, and many universities have developed policies, structures, and predeparture training programs. However, the literature regarding postgraduate GHE's is limited. Postgraduate medical trainees are graduated physicians in 2- to 6-year specialty training programs. While these individuals may be able to more meaningfully contribute to global health than their undergraduate counterparts, their participation in global health activities raises even more weighty ethical, legal, and educational dilemmas. Furthermore, the significant diversity of skills and knowledge between specialties and years of training makes development of predeparture training programs challenging.

Structure/Method/Design: A global health education subcommittee was struck to develop a set of guidelines for global health experiences for postgraduate trainees. The committee consisted of global health leads of clinical departments and was chaired by the postgraduate global health lead. The committee's work was informed by a literature review, extensive consultation, and by the Guidelines for Global Health Electives produced by the Canadian Association for Interns and Residents. The guidelines were iteratively reviewed and modified, including solicitation of comments from global health partner organizations and individuals.

Results (Scientific Abstract)/Collaborative Partners (Programmatic Abstract): The "Guidelines for Educationally and Ethically Sound Global Health Experiences in Post-Graduate Medical Education" apply formally to global health electives abroad and informally to global health experiences locally with marginalized/vulnerable populations. Detailed sections include registration and logistics, educational integrity and supervision, ethics, health and safety, and predeparture training and post-travel debriefing. Several provisions of the guidelines, such as those requiring due diligence regarding local needs assessment, detailed educational objectives, and both home and field site supervision might be considered burdensome by some, but committee members felt these were educationally and ethically non-negotiable.

A predeparture training framework was developed which involves five elements: basic health and safety abroad, comprehensive principles of global health, discipline-specific knowledge and skills, stage-of-training specific training, and project/location-specific briefing. The guidelines were approved by the Post-Graduate Medicine Education Advisory Committee, and will be implemented using the Post-Graduate Online Web Evaluation and Registration (PO-WER) System, and a dedicated global health lead faculty and manager.

Summary/Conclusion: The guidelines fill a critical gap in policy and practice within our institution and can be adapted for use at other universities and health sciences centres.

Interdisciplinary approaches to global health: A cross-sectional cluster sample survey examining health risks at the human-animal interface in Madagascar

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