

## Public Participation in Air Sampling and Water Quality Test Kit Development to Enable Citizen Science

Erin N. Haynes, DrPH MS,<sup>1</sup> Timothy J. Hilbert, MS,<sup>2</sup> Rusty Roberts,<sup>3</sup> John Quirolgico, MS,<sup>2</sup> Rachael Shepler,<sup>4</sup> Gerry Beckner,<sup>5</sup> Jennifer Veevers, PhD,<sup>2</sup> Jeff Burkle,<sup>4</sup> and Roman Jandarov, PhD<sup>2</sup>

(1) Department of Epidemiology, College of Public Health, University of Kentucky; (2) Department of Environmental Health, College of Medicine, University of Cincinnati; (3) Cincinnati Children's Hospital Medical Center; (4) Guernsey County resident; (5) Guernsey County Department of Emergency Management

Correspondence to: Erin N. Haynes, DrPH MS, Department of Epidemiology, College of Public Health, University of Kentucky, 111 Washington Ave., CPH 212G, Lexington, KY 40536-0003. Phone: (859) 562-2119. Fax: (859) 257-8811. E-mail: Erin.Haynes@uky.edu

### What Is the Purpose of This Study/Review?

- To establish an academic–community partnership to address Guernsey County residents' concern regarding environmental quality near proposed and operating natural gas extraction waste sites.
- To develop a citizen science tool for water quality assessment by engagement of the local middle and high schools.

### What Is the Problem?

- Natural gas extraction creates liquid, solid, and gaseous waste and the management of these wastes is a public health concern.
- Natural gas extraction waste facilities are often located in underserved areas, an environmental justice issue for these communities.
- The dramatic increase in natural gas extraction activity has caused concern among community members of Guernsey County and neighboring counties.

### What Are the Findings?

- Together we selected 10 air sampling locations in proximity to current or proposed natural gas extraction sites, obtained cooperation from landowners, and conducted air quality monitoring over a 6-week period.
- Volatile organic compounds were detected at all 10 air sampling locations.
- Nineteen unique volatile organic compounds were detected; one was above the recommended exposure level.
- Water quality test kits were developed and piloted in middle school and high school classrooms.

### Who Should Care Most?

- Residents, public health officials, and emergency responders in rural communities with nearby natural gas extraction activity.
- Educators and residents with an interest in participating in environmental health research via citizen science.

## Recommendations for Action

- Baseline measurements should be taken at any potential natural gas extraction sites and routine monitoring be conducted thereafter to characterize long-term exposures.
- Water and soil sampling should be performed.
- Data such as truck traffic and gallons of waste injected should be documented.
- Engaging residents in research is a useful tool for increasing awareness and connecting communities to research.