Ethical concerns surrounding unconventional oil and gas development and vulnerable populations

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Oil and gas production from unconventional resources has sparked intense policy debates in the US and abroad. Since the development of shale and other tight formations became commercially viable, questions have arisen concerning potential economic gains, employment increases, and energy independence as well as about potential harms to the environment and public health. A spate of scientific literature has accompanied the boom in oil and gas production, addressing many of the aforementioned concerns. (A near exhaustive collection of the peer-reviewed scientific literature on shale gas development is available at: http://psehealthyenergy.org/site/view/1180.)

The majority of the scientific literature on unconventional oil and gas development has been published in the past couple years, suggesting that research is only now beginning to catch up to the rapid growth of this industry. Yet, despite numerous research efforts, significant data gaps remain, some of which pertain to the impact of unconventional oil and gas development on the health of vulnerable populations (1). Due to the fact that the science is nascent, proponents and opponents have been limited in pressing their claims, with each side producing studies and interpreting evidence to support their own positions (2).

When evaluating forms of energy production or other technologies, ethical concerns have often been limited to the assessment of the risks and the potential benefits of development and implementation. In addition, debates that purport to attend to the ethical consequences of energy development often only focus on answering empirical questions like the extent to which air or water quality is compromised or risks to public health are elevated.

However, evaluation of risks and benefits involve more than simply attending to empirical evidence. Science alone cannot determine what counts as a benefit, what are appropriate levels of safety or how much risk we as a society are willing to accept in order to derive certain benefits; nor can it tell us who should bear the burden of these risks, or where the burden of proof should lie in determining particular harms. However, science can inform policy makers as to what these risks look like and how they may disproportionately impact vulnerable populations, including young children, pregnant women, the elderly, or the socioeconomically disenfranchised.

We know, for instance, that children are more vulnerable and sensitive to chemicals in the environment than adults (3). Children are at a greater risk because their behaviors often put them in closer contact with environmental contaminants. They do not have the same ability to metabolize and excrete chemicals as adults, and they receive proportionately larger doses of chemicals (4). Furthermore, toxic exposures in childhood are more likely to result in disease in adulthood (compared with exposure in adulthood) because children have a longer shelf life for diseases with longer latency periods (5).

There have been research efforts that attempted to determine the impact of unconventional oil and gas development on some vulnerable populations. A study in Colorado examined associations between maternal residential proximity to natural gas development, and found a positive association in the prevalence of congenital heart defects and possibly neural tube defects in newborns (6). A working paper exploring birth records in Pennsylvania, USA suggested an increased prevalence of low birth weight, small for gestational age, and lower APGAR scores, on average, among children of mothers residing closer to shale gas wells (7). Clearly, more scientific investigations of this kind are needed.

Despite the scientific uncertainty, national and international legislative bodies must make decisions on how to proceed. As policy makers move forward with decisions surrounding unconventional oil and gas development, they must also attend to the existent scientific evidence. Yet, although empirical evidence is essential in building a strong foundation for guiding policy, many decisions are and must be influenced by judgments other than scientific ones (8). Very often, these determinations are based on ethical value judgments about what particular externalities communities will tolerate and which particular communities will tolerate them. However, in making decisions about what public policies to implement regarding unconventional oil and

gas development, policy makers must also attend to other ethical considerations. They must, for example, ask what is required for genuinely equal protection for vulnerable populations like children. Given that children and adults are affected differently by the same levels of exposure, policy makers must consider whether equal protection requiring more stringent exposure levels be implemented for children. They must also ask whether increased protection for children is ethically required because of this population's utter vulnerability and because they have not given either implicit or explicit consent.

Similar ethical considerations must be made for other vulnerable populations, including the socioeconomically disenfranchised, who may have a decreased financial ability to mitigate exposures and treat health concerns. Although good policies require strong science and attention to the evidence, they also require attention to many accompanying ethical considerations.

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