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Non-Elite Eight: Worst Inputs Used in New Colorado Health Study

Modeling exercise on alleged health impacts from shale development uses outlandish inputs to achieve outrageous outputs.

A [new paper](#) from the Colorado School of Public Health (CSPH) released this week suggests the development of oil and natural gas in general – and the use of hydraulic fracturing in particular – can cause “[serious health impacts](#)” for those who live closest to well sites. But if you look past the [ominous headlines](#) that the study launch generated and examine the range of strange assumptions that form the basis for the report, the conclusions are not only rendered fairly predictable, but also unquestionably flawed.

Of course, we’ve all seen first-hand how choices made by a researcher with respect to the inputs he or she uses as part of a study plan can, and indeed will, significantly impact the nature of the results. The infamous [Howarth paper](#) from Cornell University, for example, used a global warming potential for methane 45 percent greater than what even the U.N. Intergovernmental Panel on Climate Change says is appropriate. That flawed input, along with the casual use of “[inflated leakage](#)” rates, served as the central basis for its deeply flawed (and [widely debunked](#)) conclusions.

In some ways, the inputs used by the CSPH researchers are even more egregious than those found in the Cornell report. Below, we identify eight specific assumptions made that, upon closer examination and considered in combination, cast serious doubt on the results produced by the modeling exercise.

Bad Input #1: Out of Date Emissions Data

CSPH: “*We used air toxics **data collected in Garfield County from January 2008 to November 2010** as part of a special study of short-term exposure as well as on-going ambient air monitoring program data to estimate subchronic and chronic exposures and health risks.*” (p. 8)

- **FACT:** Colorado updated its regulatory requirements for oil and gas systems in February 2009, which means at least a portion of the data collected by CSPH is from an operating environment that, by law, no longer exists. Among the rules were requirements for volatile organic compounds (VOCs) to be reduced [by as much as 95 percent](#) through the use of low- or no-bleed pneumatic devices.

Bad Input #2: Inflated Time to Drill and Complete a Well by as Much as 900%

CSPH: “*We assumed a 30-year project duration **based on an estimated 5-year well development period** for all well pads, followed by 20 to 30 years of production.*” (p. 11)

CSPH: “*To evaluate subchronic non-cancer HIs from well completion emissions, we estimated that a resident lives \leq 1/2 mile from two well pads resulting a 20- month exposure duration based on **2 weeks per well for completion and 20 wells per pad**, assuming some overlap between activities.*” (p. 12)

- **FACT:** The well development process takes a matter of months, *not years*. In fact, well development, as defined by CSPH in the same study, “involves pad preparation, well drilling, and well completion” (p. 5). According to the Marcellus Center at [Penn State University](#): “The total time to drill each well is about a **three to six weeks** depending on the depth and length of the horizontal well, so if there are four wells on a well pad, **you could expect the big rig to be there for about three to six months.**” The Marcellus Center adds that hydraulic fracturing (i.e. completion) “typically occurs within a few weeks or months of the well drilling, dependent on the project schedule, and **may take up to several days for each well** to be hydraulically fractured.” API also [notes](#) that the process takes “two to five days for the entire multi-stage fracturing operation.”

Bad Input #3: Inflated Small Cancer Risks Due to Lack of Context

CSPH: “*The cumulative cancer risks based on the 95% UCL of the mean concentration were **6 in a million** for residents > ½ mile from wells and **10 in a million** for residents < ½ mile from wells.*” (p. 15-16)

- **FACT:** While these numbers are small, the lack of context suggests they could be significant. But according to EPA’s National-Scale Air Toxics Assessment (NATA), these risks are *in line with or even well below the risk* for the entire U.S. population. According to a recent EPA [report](#): “NATA estimates that **all 285 million people in the U.S. have an increased cancer risk of greater than 10 in one million.** 13.8 million people (less than 5 percent of the total U.S. population based on the 2000 census) have an increased cancer risk of greater than 100 in a million. **The average, national, cancer risk for 2005 is 50 in a million.** This means that, on average, **approximately 1 in every 20,000 people have an increased likelihood of contracting cancer as a result of breathing air toxics from outdoor sources** if they were exposed to 2005 emission levels over the course of their lifetime.”

Bad Input #4: Assumed No One Ever Leaves Garfield County

CSPH: “*We assumed a resident lives, works, and otherwise **remains within the town 24 hours/day, 350 days/year and that lifetime of a resident is 70 years**, based on standard EPA reasonable maximum exposure (RME) defaults (US EPA 1989)*” (p. 11)

- **FACT:** The study assumes that, aside from a few quick out-of-town weekend trips per year, residents never, ever – ever! – leave the city limits over the course of 70 years. Unless the “town” is actually a prison, this is a fundamentally flawed assumption about the length and extent of exposure.

Bad Input #5: Failed to Account/Control for Other Variables

CSPH: “*The GCPH collected **ambient air samples** every six days between January 2008 and November 2010 (163 samples) from a fixed monitoring station located in the midst of rural home sites and ranches and NGD, during both the well development and production. The site is located on top of a small hill and **4 miles upwind of other potential emission sources, such as a major highway (Interstate-70) and the town of Silt, CO...***” (p. 9)

CSPH: “*The GCPH collected 16 ambient air samples at each cardinal direction along 4well pad perimeters (130 to 500 feet from the well pad center) in rural Garfield County during well completion activities... All five well pads are located in areas with active gas production, **approximately one mile from Interstate-70.***” (p. 9-10)

- **FACT:** When studying concentrations and identifying sources of benzene, it’s probably not a great idea to take samples from areas *closer to a major highway* than the ambient, control samples. The EPA classifies benzene as one of many Mobile Source Air Toxics (MSATs), and in its [Final Rule to Reduce Mobile Source Air Toxics](#), the EPA notes that “**most of the nation’s benzene emissions come from mobile sources. People who live or work near major roads,**

or spend a large amount of time in vehicles, are likely to have higher exposures and higher risks. People living in homes with attached garages are also likely to be exposed to benzene levels that are higher than average.”

Bad Input #6: Poor Distance Assumptions Increased Uncertainty

CSPH: *“The actual distance at which residents may experience greater exposures from air emissions may be less than or greater than a 1/2 mile, depending on dispersion and local topography and meteorology. This lack of spatially and temporally appropriate data **increases the uncertainty associated with the results.**”* (p. 21)

- **FACT:** Here, CSPH admits that its main basis of comparison – those living within and outside of a half mile zone surrounding a well – may not actually be representative after all. And in a study whose main conclusion, according to its [press release](#), is “air emissions near fracking sites may have serious health impacts,” uncertainty about distance – and thus what defines “near” – means there is also considerable uncertainty about the conclusions.

Bad Input #7: Failed to Communicate with Local Environmental Officials

CSPH study author Lisa Mackenzie: *Garfield County “did not financially support the scientific paper. We did this on our own. We feel the findings are significant, and we are scientists, and **this is the way scientists communicate with each other**”* (Glenwood Springs Post Independent, [3/20/2012](#)).

- **FACT:** If that’s how scientists communicate, it’s news to at least one notable health official, namely Jim Rada, Garfield County’s chief environmental health official. Rada said of Mackenzie’s work: **“I had no knowledge of what she was studying, or her methods, or the implications of her work.”** Rada also [noted](#): **“We are not in violation on ambient air quality standards.”**

Bad Input #8: Who’s in Charge Here?

CSPH press release: *“**Garfield County asked the Colorado School of Public Health to assess the potential health impacts of these wells** on the community of Battlement Mesa with a population of about 5,000.”* (Press Release, [3/19/2012](#))

- **FACT:** This is also news to Rada, who [said](#): **“We didn’t ask them to do this paper.** They were not sanctioned by the county, or paid by the county to do this paper.” As the Glenwood Springs Post Independent reported shortly after the release of the study, the CSPH paper “became embroiled in controversy” about a year ago after criticism by the Colorado Department of Public Health and Environment (among others), and the study “was decommissioned by the Garfield County commissioners in May 2011.”

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