

OCT 2018

## POLICY BRIEF



### Summary

- The fracking revolution has transformed the American economy and saved consumers billions of dollars.
- The well-documented successes of fracking have largely been unappreciated by the public and attacked by some lawmakers because of numerous false health claims invented by fracking opponents.
- Well-researched studies clearly and consistently show fracking does not pose serious health or safety concerns to the public, and the best-available data do not justify the imposition of unnecessary fracking regulations, moratoria, or bans on fracking.

## Debunking Four Persistent Myths About Hydraulic Fracturing

By Timothy Benson & Linnea Lueken

### Executive Summary

Hydraulic fracturing, commonly referred to as “fracking,” is a process of extracting natural gas and oil from several miles deep beneath the Earth’s surface. Over the past decade, fracking has increased the output of these two vital energy sources by 40 percent and 85 percent, respectively, and the fracking industry now supports nearly three million U.S. jobs. Thanks to fracking, energy prices have dropped significantly, saving billions of dollars for consumers and spurring massive economic growth.

The well-documented fracking successes have largely been unnoticed and unappreciated by the public and maligned and attacked by some lawmakers. Fracking opponents, many of whom receive substantial funding from anti-energy activists, feed anti-fracking sentiment by asserting several false claims about fracking. Because of these efforts, policymakers in several states have chosen to impose burdensome and unnecessary restrictions on fracking. Some states have even approved fracking bans, severely limiting economic opportunities for their citizens.

This *Policy Brief* outlines the basic elements of the fracking process and then refutes the four most widespread fracking myths. It provides lawmakers and the public with the research and data they need to make informed decisions about hydraulic fracturing and energy development.

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The following is a concise outline of the four most common fracking myths discussed later in this *Policy Brief*:

### **Myth One: Fracking Pollutes Drinking Water**

- While fracking wells are generally thousands of feet deep, water wells and drinking water sources are no more than hundreds of feet deep. Despite fear-mongering to the contrary, there is no evidence that seepage of fracking fluids, oil, or natural gas from fracking wells contaminate water sources.
- Scientific examination has ruled out fracking as the cause of numerous alleged examples of the dangers of fracking, including flammable water flowing from home faucets.
- Multiple studies have found no link between water pollution and fracking.

### **Myth Two: Fracking Pollutes the Air**

- Studies show air pollution found near fracking operations is typically too low to pose a danger to human health.
- The Environmental Protection Agency reports the decades-long decline in national air pollution has continued unabated since fracking became frequent and widespread during the middle of the past decade.

### **Myth Three: Fracking Causes Health Problems**

- As fracking has increased over the past 10 years, the prevalence of asthma, birth defects, and cancer have decreased.
- The prevalence of these health problems in major fracking states, such as Pennsylvania and Texas, is lower than in many states that do not have significant fracking operations.
- Studies have found there is no evidence the miniscule amounts of chemicals in fracking fluids cause cancer.

### **Myth Four: Fracking Causes Dangerous Earthquakes**

- A global database that tracks earthquakes triggered by human activity reveals 44 earthquakes in the database's history, which dates back to the nineteenth century, have been caused by fracking. Only nine of these fracking-induced earthquakes occurred in the United States. Additionally, just three of the earthquakes in the United States were strong enough to be felt and were comparable to the vibrations produced by a passing truck.
- Some studies suggest these small vibrations are associated with water injection and disposal operations in wells of all sorts, not only fracking wells.
- Some scientists believe that after fracking operations conclude, some regions are even less susceptible to seismic activity.

## The Basics and Benefits of Fracking

Hydraulic fracturing, commonly referred to as “fracking,” is the process of extracting natural gas and oil trapped in layers of shale, which are typically more than a mile deep beneath Earth’s surface. To release oil and natural gas, companies drill into the ground and, using explosive charges, puncture tiny holes in the shale. They then inject liquid mixtures, composed primarily of water and sand, into the shale. This cracks and holds open the shale so oil and natural gas are able to flow up to the well at the Earth’s surface, where they are collected by drillers.

Technological advances and the development of new directional drilling techniques have made it feasible for drillers to tap into these trapped deposits of oil and natural gas. Today, there are about 1.2 million fracking wells in the United States.<sup>1</sup> As the U.S. Energy Information Administration notes, “Hydraulically fractured horizontal wells have accounted for most of the new wells drilled and completed since late 2014. As of 2016, about 670,000 of the 977,000 producing wells were hydraulically fractured and horizontally drilled.”<sup>2</sup>

The fracking technological revolution that has occurred in recent years has dramatically increased the availability of affordable and reliable energy, making it more plentiful today than at any other time in U.S. history. From 2007 to 2017, production of natural gas in the United States increased by 39 percent, from

19.26 trillion cubic feet per year to 26.84 trillion cubic feet per year.<sup>3</sup> During the same period, oil production increased by a whopping 84 percent, from 5.07 million barrels of oil per day to 9.35 million barrels per day.<sup>4</sup> In July 2018, U.S. crude oil output exceeded 11 million barrels per day for the first time.<sup>5</sup>

As a result of this energy renaissance, the price of natural gas fell from \$9.66 per million British thermal units (MMBtu) in January 2007 to \$2.98 per MMBtu in August 2018, a price decrease of 70 percent.<sup>6</sup>

THE FRACKING TECHNOLOGICAL REVOLUTION THAT HAS OCCURRED OVER THE PAST DECADE HAS DRAMATICALLY INCREASED THE AVAILABILITY OF AFFORDABLE AND RELIABLE ENERGY.

A 2015 Harvard Business School/Boston Consulting Group study estimates fracking supported 2.7 million jobs in 2014, with the potential to grow to 3.8 million jobs by 2030.<sup>7</sup> Similarly, Pricewaterhouse-

Coopers prepared a report for the American Petroleum Institute that estimates the oil and natural gas industries supported 10.3 million jobs in 2015, an increase of about 500,00 compared to 2011.<sup>8</sup> The RAND Corporation projects the industries will support an additional 1.9 million jobs by 2035.<sup>9</sup> By the same year, a 2012 IHS study estimates fracking will have created 3.5 million jobs.<sup>10</sup>

A 2016 U.S. Chamber of Commerce study projects that if the fracking revolution of the previous decade had not occurred, 4.3 million jobs would not have been created, the U.S. economy would be \$500 billion smaller, and residential natural gas prices would be 28 percent higher.<sup>11</sup>

Despite the apparent economic benefits provided by fracking, many environmentalists are ardently opposed to hydraulic fracturing. Much of this opposition is based on misinformation and ideological animus, not sound science and well-documented research. To ensure the continuation of the fracking revolution, along with all of its numerous economic benefits, it is crucial those who support reasonable environmental measures and economic growth refute the myths now fueling much of the opposition to fracking.

The following are some of the most pervasive and important falsehoods about fracking, as well as the evidence disproving these fracking myths.

### **Myth One: Fracking Pollutes Drinking Water**

Thanks in large part to the inaccuracies featured in the 2010 “documentary” film *Gasland*, perhaps the most enduring myth about fracking is that it pollutes drinking water. Many have seen the film’s clip of a Colorado man lighting water from his home faucet on fire due to the presence of methane in his water. The film’s director was quick to point to fracking as the culprit, but after scientific investigation, it turns out that biogenic (naturally occurring) methane was the real source.

The Colorado Oil and Gas Conservation Commission (COGCC) tested the man’s water featured in *Gasland*.<sup>12</sup> By analyzing the isotopic composition of the gas, scientists at COGCC determined the source of the methane. The

water well did not test positive for chemicals used in the fracking process. Rather, the flames shown in *Gasland* were the result of natural causes, not fracking.

The misconception that fracking is polluting water has also been debunked by numerous other researchers. Since 2010, there have been more than two dozen peer-reviewed studies and assessments from experts determining the fracking process is not a systemic threat to groundwater sources. Some of these studies have come from researchers at prestigious

PERHAPS THE MOST ENDURING MYTH ABOUT FRACKING IS THAT IT POLLUTES DRINKING WATER.

institutions, such as Duke University,<sup>13</sup> Massachusetts Institute of Technology,<sup>14</sup> Stanford University,<sup>15</sup> University of Michigan,<sup>16</sup> University of Texas at Austin,<sup>17</sup> and Yale University.<sup>18</sup> Others have come from state and federal agencies, including the U.S. Geological Survey,<sup>19</sup> U.S. Department of Energy,<sup>20</sup> and the Wyoming Department of Environmental Quality.<sup>21</sup> Nonprofit agencies such as the California Council on Science and Technology,<sup>22</sup> National Groundwater Association,<sup>23</sup> and the Academy of Medicine, Engineering, and Science of Texas<sup>24</sup> have also produced their share of studies showing that fracking does not pose a significant threat to drinking water, as has the German Federal Institute for Geosciences and Natural Resources, which examined whether fracking affects groundwater in the North German Basin.<sup>25</sup>

Perhaps most notably, the Obama-era U.S. Environmental Protection Agency (EPA) confirmed these findings in 2016 with its own \$29 million, six-year study of the impacts on groundwater by 110,000 fracked oil and nat-

ural gas wells in use across the country since 2011.<sup>26</sup> That report concluded, “Hydraulic fracturing operations are unlikely to generate sufficient pressure to drive fluids into shallow drinking water zones.”

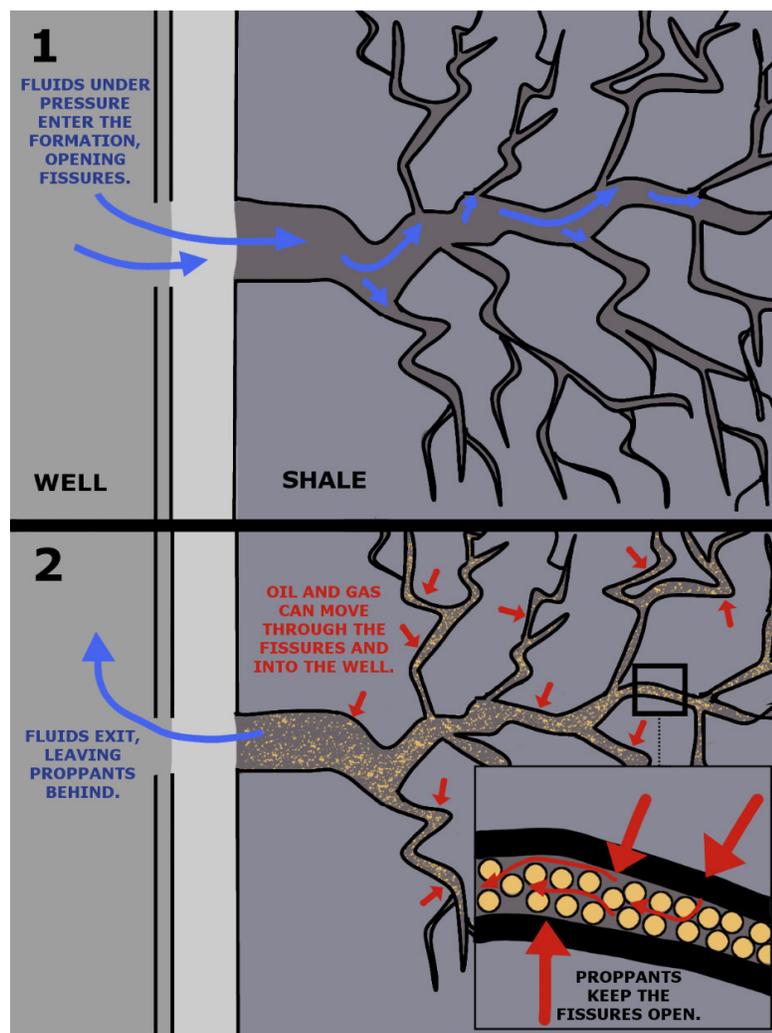
Why is fracking contamination of groundwater so unlikely to occur? Hydraulic fracturing is a “stimulation treatment” in which fissures are opened in rock, such as shale. Shale is a rock with good porosity—meaning it has lots

of tiny pores that can hold oil, gas, and water—but it has very low permeability, meaning there are few pathways between the pores that would allow the oil, gas, or water to be extracted.<sup>27</sup>

During the fracking process, fissures are opened by pumping fluid solutions into the chosen shale zone, which is usually thousands of feet deep, at high pressures and rates, forming small fractures in the rock. (See Figure One.) Often, a device called a

“perforating gun” is used to assist this process. Small particles (mostly sand, commonly referred to as “proppants”) are then pumped into the fissures to prevent them from closing, creating “engineered permeability.” While the hydraulic pressure is enough to crack the rock, it is not enough to send fluid up through multiple rock formations, where drinking water zones are located.

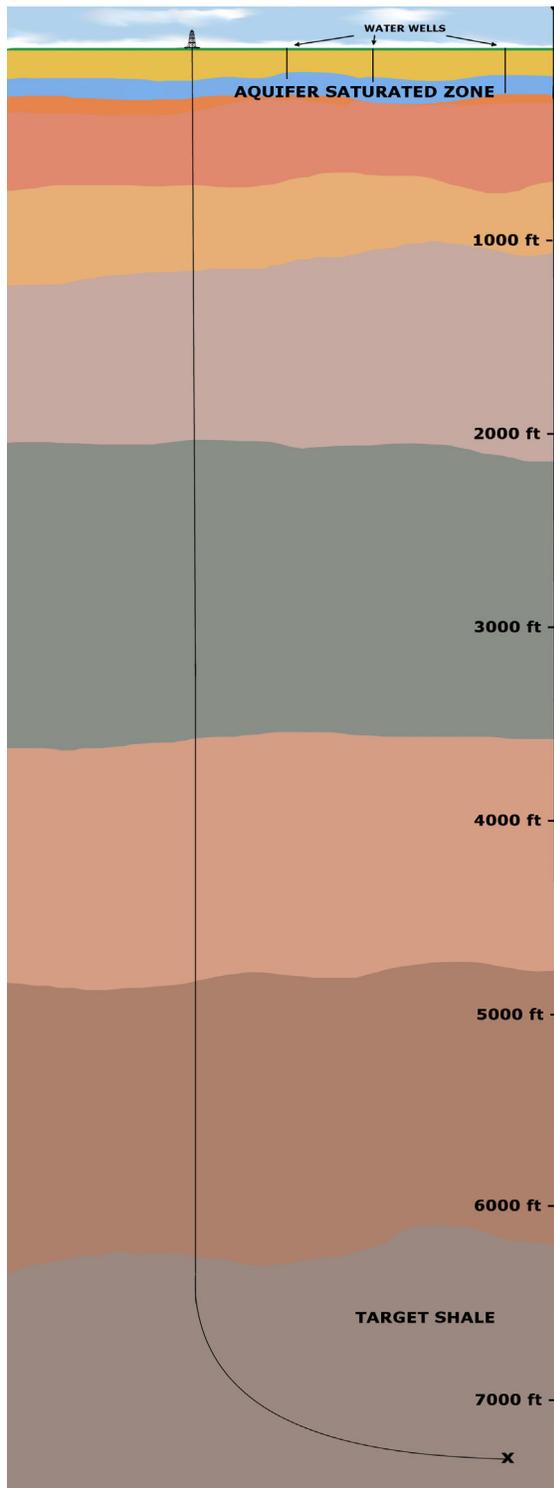
**Figure One: Simplified diagram of the hydraulic-fracturing process**



Source: Linnea Lueken, The Heartland Institute, 2018.

Figure Two shows, to scale, the level of the typical oil well compared to drinking well water aquifers. In Figure Two, tiny marks near the Earth’s surface represent drinking water wells. There are thousands of feet of rock between the aquifer and the fracked section of shale. In places such as Wyoming, there are often more than six different rock units, or “layers,” to the horizontal portion of a well. Wells for drinking water are usually drilled to a depth of about 100–500 feet. Fracking wells are generally 6,000–10,000 feet beneath the Earth’s surface.

**Figure Two: Scale image of a fracked well**



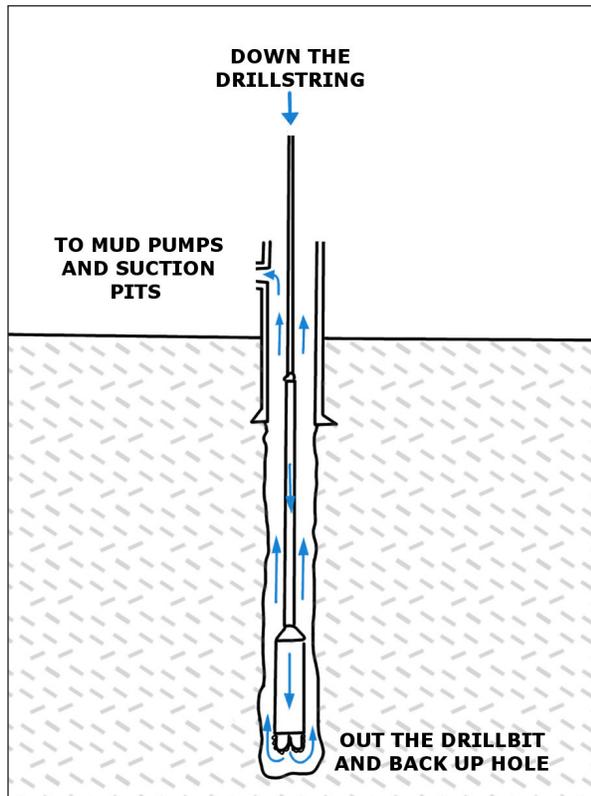
Source: Linnea Lueken, The Heartland Institute, 2018.

No one wants their well water contaminated by the fluids used in fracking, and it's also important to note drillers do not want well water seeping into their operations, either. Water invasion of an oil or natural gas well could change the drilling "mud weight," which is an essential factor in maintaining safe pressures at the depths drilling operations take place. (See Figure Three.)

Mud weight refers to the density of the drilling mud, which is often a barite clay solution that is similar to the composition of mud masks that one can find in beauty stores. It is pumped down and then back up the well during the drilling process. (See the arrows in Figure Three.) Mud helps to maintain stable pressures underground, lubricates the drill bit, and carries the rock bits that are drilled to the surface so that the drill bit doesn't become clogged.

To understand why this process is extremely important for fracking operators, picture the wood shavings that appear when one drills a hole in a plank of wood. With fracking, similar "shavings" develop, but they are much more difficult to clear away because they are thousands of feet underground, made of rock, and significantly larger. Removing these shavings is necessary to ensure the drilling process can operate properly. The rock shavings, known in the fracking industry as "cuttings," do not pop to the surface from the drilling action, rather they are carried to the surface by the drilling mud. If the mud weight is changed because of the presence of unwanted water, the pressure at the bottom of the well will also change, which can lead to a wide range of problems. Insufficient mud weight is the predominant cause of "kicks," which occur when fluid from the rock formation from which drillers are ex-

**Figure Three: A simplified diagram of how mud flows in a drilling operation**



Source: Linnea Lueken, The Heartland Institute, 2018.

fracturing oil and gas rushes up the drilled hole to the surface. If the well is not brought under control, kicks can cause a dangerous blowout. It is in the best interest of every oil and gas worker to ensure well water does not seep into fracking operations.

## **Myth Two: Fracking Pollutes the Air**

Opponents of fracking often argue poisonous air emissions from fracking create significant and widespread health problems. However, the

evidence from shale plays all over the United States reveals this claim is erroneous.

A 2017 Colorado Department of Public Health and Environment study found the levels of air pollution created at active oil and gas drilling operations in or near residential areas are too low to pose serious health problems, even when the data are adjusted to account for people who are more sensitive to air pollution, such as those with asthma.<sup>28</sup> “All measured air concentrations were below short- and long-term ‘safe’ levels of exposure for non-cancer health effects, even for sensitive populations,” the report concluded.

A 2016 study conducted by the University of Texas at Arlington found air quality surrounding unconventional drilling operations in the Eagle Ford Shale, such as fracking well sites, was well within the acceptable limit.<sup>29</sup> In 2015, a Modern Geosciences study of the Barnett Shale in the Lone Star State found “none of the observed [volatile organic compounds (VOCs)] were noted above [state-mandated public health thresholds.]”<sup>30</sup> These results are supported by a previous study of the Barnett Shale that found “shale gas activities have not resulted in VOC levels that pose a health concern.”<sup>31</sup>

A 2015 study of the Marcellus region in Pennsylvania by researchers at Drexel University “did not observe elevated levels of any ... light aromatic compounds (benzene, toluene, etc.)” at well sites, and it noted there were “few emissions of non-alkane VOCs ... from Marcellus Shale development.”<sup>32</sup> In Utah, a multi-year collaborative report from the Utah Division of Air Quality, Region 8 of the Environmental Protection Agency, and the Ute Indian Tribe,

released in 2016, found VOC emissions levels in the Uinta Basin were far lower than had previously been estimated.<sup>33</sup>

“The emissions inventory shows basin-wide emissions of VOCs, thought by scientists to be the main drivers of ozone formation in the basin, are 49% lower than previous inventory estimates,” a contemporaneous press release notes. “Like in other oil and natural gas basins, the new inventory revealed primary VOCs have lower potency for driving ozone. That’s especially important because the oil and natural gas industry is the largest contributor of VOC emissions in the Uinta Basin. However, this downward revision of VOC emissions is yet another example of how industry has been able to reduce emissions while maintaining strong growth in oil and natural gas production.”<sup>34</sup>

In West Virginia, the state’s Department of Environmental Protection found in 2013 that “there are no indications of a public health emergency or threat” from fracking activity there.<sup>35</sup> This led the department to conclude, “based on a review of completed air studies to date, including the results from the well pad development monitoring conducted in West Virginia’s Brooke, Marion, and Wetzel Counties, no additional legislative rules establishing special requirements [for drilling activity] need to be promulgated at this time.”<sup>36</sup>

These U.S.-based studies are not outliers. To take just one example from abroad, in 2013, the United Kingdom’s Department of Health

issued a report concluding “that the potential risks to public health from exposure to the emissions associated with shale gas extraction are low if the operations are properly run and regulated.”<sup>37</sup>

As seen by these highlighted examples, fracking does not pose a significant threat to air quality. EPA reports the decades-long decline in national air pollution has continued unabated since fracking became frequent and widespread, during the middle of the past decade.<sup>38</sup>

AS SEEN BY THESE HIGHLIGHTED EXAMPLES, FRACKING DOES NOT POSE A SIGNIFICANT THREAT TO AIR QUALITY.

### **Myth 3: Fracking Causes Health Problems**

Some environmental activists have claimed the fracking process causes a multitude of health problems, including increased asthma hospitalizations, lower birth weights, higher infant mortality, and increased rates of cancer.<sup>39</sup> However, there is no evidence showing that fracking causes such health problems. The following is a brief summary of the research examining these important concerns, grouped by health problem.

#### **Asthma**

If fracking causes asthma, one would expect asthma to have become more common and severe during the past decade, because fracking has become much more prevalent. However, this has not occurred.

According to the Centers for Disease Control and Prevention (CDC), the number of asthma sufferers reporting an attack has fallen from 52.5 percent in the 2006–10 period to 46.9 percent in 2016.<sup>40,41</sup> CDC also notes asthma mortality rates have over the same period dropped from 1.1 per 100,000 to one person per 100,000. Asthma prevalence rates have also decreased, from 8.4 percent to 8.3 percent.<sup>42</sup>

Texas—a major center of fracking operations and a state that is on pace to become the world’s third-largest oil producer—has among U.S. states the fourth-lowest adult asthma prevalence rate and the lowest asthma mortality rate.<sup>43,44</sup>

Pennsylvania, which ranks second nationally in natural gas and total energy production, has the fourth-lowest asthma mortality rate.<sup>45</sup> Pennsylvania’s asthma mortality rate is even lower than neighboring New York’s, which banned hydraulic fracturing in 2014.<sup>46</sup>

Further, asthma hospitalization rates in Pennsylvania have decreased from 17.6 percent in 2004 to 13.4 percent in 2014, the most recent year for which data are available.<sup>47</sup> This represents a 24 percent decrease in asthma hospitalization rates during the same period the number of hydraulically fracked shale wells in the state increased from zero to more than 7,500.<sup>48</sup> The state’s six largest shale-producing counties—Bradford, Greene, Lycoming, Susquehanna, Tioga, and Washington—have experienced lower asthma hospitalization

rates during the same period, and all six counties have lower rates than the state average.<sup>49</sup>

## Birth Defects, Low Birthweight, and Infant Mortality

If fracking has been causing various birth anomalies, one would also expect the prevalence of these health problems to have increased in the United States over the past decade, but this, too, has not happened.

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The low birthweight rate in the United States was 8.17 percent in 2016, the most recent year for which data are available, down from 8.26 percent in 2006.<sup>50</sup> Infant mortality in the United States has also declined. From 2005 to 2013, the latest year for which data is available,

infant mortality fell by 13.1 percent.<sup>51</sup> In Pennsylvania, the infant mortality rate declined 8.8 percent,<sup>52</sup> and the rate for various other birth defects fell or remained stable over the same period.<sup>53</sup>

Other large oil- and natural gas-producing states—such as Colorado, Louisiana, Oklahoma, Texas, and Wyoming—have experienced similar decreases in their infant mortality rates.<sup>54</sup>

## Cancer

Research overwhelmingly shows fracking

does not cause cancer. Fracking chemicals remain locked deep underground, well below groundwater and water reservoirs. Moreover, fracking fluids are almost entirely made of water and sand. As noted by EPA, less than 1 percent, by mass, of fracking fluids is composed of chemical additives.<sup>55</sup> These chemical additives are used to control numerous aspects of the process, from the gel-quality of the fluid (thicker fluid will suspend sand better than water) to the fluid's density.

In such small proportions, it is an absurd exaggeration to say exposure to fracking fluids causes cancer. The very small amounts of chemical additives in fracking fluid are too miniscule to impact human health. If that were the case, oil and gas workers who mix fracking fluids and drilling mud would have higher rates of cancer, but according to a Norwegian study, they do not. The Norwegian researchers found the only fracking-worker-related elevated cancer rates are associated with asbestos exposure, both on-site and off-site, particularly before 1980 (when asbestos was commonly used on fracking sites).<sup>56</sup>

A 2015 study purporting to show elevated cancer risks near fracked natural gas wells had to be retracted after the authors admitted they included "honest calculation errors"<sup>57</sup> in their assessment. When those errors were corrected, the observed hydrocarbon emissions were reduced by 7,250 percent, leaving them well below any cancer risk threshold.<sup>58</sup>

There have also been numerous other studies showing fracking does not pose a significant public health risk.<sup>59</sup> For instance, a 2017 analysis by Resources for the Future, titled "Health Impacts of Unconventional Oil and Gas Development,"<sup>60</sup> concluded many of the studies linking severe health issues to unconvention-

al oil and gas operations had "weaknesses and many had significant shortcomings." Furthermore, the study's authors concluded, "Overall, we find that the literature does not provide strong evidence regarding specific health impacts and is largely unable to establish mechanisms for any potential health effects."<sup>61</sup>

#### **Myth 4: Fracking Causes Dangerous Earthquakes**

Numerous studies show fracking does not cause dangerous, widespread earthquakes. As the U.S. Geological Survey notes on its "Myths and Misconceptions" webpage, fracking is not the primary cause of induced (human-caused) earthquakes. The page directly states, "Fracking is NOT causing most of the induced earthquakes."<sup>62</sup>

A database administered by researchers at the United Kingdom's University of Durham and University of Newcastle upon Tyne is the largest and most up-to-date database of earthquake sequences purported to have been induced or triggered by human activity worldwide since the 1800s. According to this important database, as of July 2018, fracking has been

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conclusively linked to only 6 percent of all human-caused earthquakes, 44 earthquakes overall. Considering there are at least 1.1 million active fracking wells in the United States, this number is miniscule.<sup>63</sup>

Furthermore, in the United States, only nine earthquakes have been conclusively linked to fracking, and of those nine, just three have reached M3 on the moment magnitude scale,<sup>64</sup> which is roughly the threshold needed for an earthquake to be felt on the surface. M3 earthquakes produce “vibrations similar to the passing of a truck.”<sup>65</sup>

Researchers have noted that there is a correlation to the presence of a fracking site and a higher likelihood of earthquakes. In light of the information presented above, what is causing earthquakes near these sites? Analysts say the culprit is wastewater disposal processes.<sup>66</sup>

Wastewater injection and disposal wells are wells in which brine (salt water) and other fluids are re-injected so drillers can dispose of them. While wastewater is produced by fracking operations, it is also produced in almost all other more traditional oil and gas drilling and production processes. It is not the drilling itself that is potentially causing tremors, nor is this a problem that is exclusive to fracking. Wastewater disposal involves much higher injection pressures and volumes of fluid than fracking, because the aim of drillers is to keep those fluids in well reservoirs. The practice, by law, is overseen by local or regional EPA offic-

es.<sup>67</sup> Extrapolating that fracking is the cause of these earthquakes because frack wastewater is occasionally injected is comparable to saying turning on the ignition of a car causes traffic accidents.

Interestingly, some researchers say that once fracking operations conclude, earthquakes may be *less likely* to occur than in similar areas where no fracking processes have been conducted. At The Heartland Institute’s 2017 America First Energy Conference, Joe Leim-

kuhler, vice president for drilling at LLOG Exploration, observed, “Long-term, once a well produces enough volume of fluid that exceeds the volume of water and sand that you’ve put in the fractal well, once you’ve taken more material out than you’ve in, you’ve lowered the overall stress state of the system, and you can make an argument that on a regional basis you’ve actually decreased the tendency for earthquakes and not increased it long term.”<sup>68</sup>

Researchers at the University of Alberta recently conducted a two-year study to determine just how much of the seismic activity experienced from 1965 to 2014 could be correlated with increased oil and gas production. The examined regions were in the U.S. states of North Dakota, Ohio, Oklahoma, Pennsylvania, Texas, and West Virginia and the Canadian provinces of Alberta, British Columbia, and Saskatchewan.<sup>69</sup>

The researchers concluded that in all but one studied region there was no correlation

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between increased seismic activity and the presence of increased oil and gas production: “analysis of oil and gas production versus seismicity rates in six other States in the USA and three provinces in Canada finds no State/Province-wide correlation between increased seismicity and hydrocarbon production.”<sup>70</sup> One of the researchers even went so far as to say: “It’s not as simple as saying ‘we do a hydraulic fracturing treatment, and therefore we are going to cause felt seismicity.’ It’s actually the opposite. Most of it is perfectly safe.”<sup>71</sup>

Even the relationship between wastewater injection wells and seismicity stands on shaky ground. The Institute for Geophysics at the University of Texas at Austin conducted a study attempting to determine if the earthquakes in the Barnett Shale region of Texas are a danger to the public and whether they could be connected to Texas’ many wastewater injection wells.<sup>72</sup> According to the study, the presence of injection wells increases the likelihood of small earthquakes, but the study also shows there are a significant number of wells with similar injection rates as those linked to small earthquakes that did not experience earthquakes in the area.

EPA found similar results in its study of 30,000 wastewater disposal wells<sup>73</sup>: “EPA is unaware of any ... [underground drinking water] contamination resulting from seismic events related to injection-induced seismicity,” the report concludes. “Very few of these disposal well sites have produced seismic events with magnitudes greater than M 4.0. For example, at the

time of this report, there were approximately 2,700 active disposal wells in Louisiana, with no recent significant seismic events occurring as a result of the disposal activities.”<sup>74</sup>

## Conclusion

Well-researched studies clearly and consistently show fracking does not pose serious health or safety concerns to the public, and the best-available data do not justify the imposition of unnecessary fracking regulations, moratoria, or bans. In light of the immense number of studies showing fracking is relatively

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safe and that it provides substantial economic benefits, lawmakers in Maryland, New York, and Vermont, who have responded to environmentalists’ fear-mongering and spurious claims by banning fracking, should reconsider their decision to unnecessarily stunt economic growth.

As this paper has made evident, fracking does not pollute water or air or cause public health problems or dangerous earthquakes. Of course, this does not mean energy companies shouldn’t continue to develop technologies that make the fracking process safer or more efficient.

Nothing in this *Policy Brief* is meant to suggest there are zero risks associated with fracking or other drilling operations. However, those risks are quite small compared to the enormous benefits fracking continues to provide to the United States.

## About the Authors

### Timothy Benson

Timothy Benson is a policy analyst at The Heartland Institute. Prior to joining Heartland, Benson worked for the Foundation for Government Accountability as an editor and writer. He also wrote a regular column for Scripps Treasure Coast Newspapers.

Benson's work has appeared in dozens of national media outlets, including *Investor's Business Daily*, *National Review Online*, *The Hill*, *The Washington Times*, *The Washington Examiner*, *Crain's Chicago Business*, *The American Spectator*, *Real Clear Policy*, *The Federalist*, and many others, as well as in newspapers throughout the country. He is the author of the Heartland *Policy Brief* "Education Savings Accounts: The Future of School Choice Has Arrived," co-author of the Heartland *Policy Brief* "Saving Chicago Students: Strike Vouchers and SOS Accounts," and the author of dozens of Heartland *Research & Commentaries*.

### Linnea Lueken

Linnea Lueken is a student at the University of Wyoming who will graduate in December 2018 with a B.S. in petroleum engineering and a minor in geology. Lueken worked as a paleontology lab assistant and has conducted undergraduate research with the university's Petroleum Engineering Department on a drilling simulator. In 2018, Lueken worked as an intern for The Heartland Institute.

Lueken regularly writes for The Heartland Institute's *Budget & Tax News* and *Environment & Climate News*, and she has authored opinion articles for the influential climate and environment website WattsUpWithThat.com.

## Notes

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