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## **Physicians for Social Responsibility, Health and Science Experts Call on Obama, Surgeon General & Governors of Maryland, Pennsylvania to Stop Fracking, Citing National Health Impacts**

*Nobel Peace Prize-Winning Org Partner with Concerned Health Professionals of New York to Release New Comprehensive Report and Analysis of Hundreds of Peer-Reviewed Studies Showing Fracking Cannot Be Done Safely*

### Groups send letters about health impacts and calling for moratorium

**WASHINGTON, DC (Wednesday, October 14)** – A partnership of prominent health organizations encompassing nationwide medical and public health experts and scientists released the third edition of their [Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking on Wednesday](#). The Compendium compiles and summarizes hundreds of peer-reviewed studies and other important findings on fracking, showing the significance and extent of the evidence demonstrating risks to public health, air and water quality, birth and infant health, the environment, and climate change.

Physicians for Social Responsibility, a Nobel Peace Prize-winning organization of physicians, nurses, and other public health professionals, joined with Concerned Health Professionals of New York to send letters with the report to [President Obama and the Surgeon General](#), and the governors of [Pennsylvania](#) and [Maryland](#), highlighting the significant health risks and calling for a moratorium on fracking.

**Barbara Gottlieb, Director, Environment & Health, Physicians for Social Responsibility, said,** "Our new report compiles and summarizes hundreds of peer-reviewed studies and other important findings on fracking, showing overwhelming evidence that drilling and fracking pose serious threats to public health, our environment, and the climate. Physicians for Social Responsibility is joining with our colleagues in sending the scientific evidence to President Obama and state leaders, calling for moratoria or bans on fracking to protect public health."

In compiling the evidence pertaining to the impacts of drilling, fracking, and associated infrastructure, the Compendium offers a unique birds-eye view of the

growing body of evidence, which includes more than 500 peer-reviewed scientific papers, as well as numerous government reports and findings from investigative journalism. This broader view of the science is crucial in understanding the scope of the risks and harms to public health and the environment. The Compendium is organized into 17 categories, and is designed to be accessible to policymakers, researchers, journalists, and the public.

Major areas of risks and harms identified in the compilation of the science include: public health impacts, air pollution, water contamination, occupational health and safety hazards, radioactive releases, inherent engineering problems, impacts from associated infrastructure, and climate change impacts.

The two organizations released letters to President Obama and the Surgeon General asking them to acknowledge the health risks of fracking and requesting a meeting to discuss the scientific evidence and how the groups can work together with them to protect the public health and safety of Americans. The groups also sent letters with the Compendium to the governors and state health and environment agency leaders in [Pennsylvania](#) and [Maryland](#) calling for moratoria or bans on fracking given the public health risks and other impacts.

**Dr. Kathleen Nolan, MD, MLS, of Concerned Health Professionals of New York, said,** “The scientific evidence is irrefutable – fracking is dangerous and cannot be conducted safely anywhere in the U.S. Based on the findings of hundreds of peer-reviewed studies, New York State's ban not only makes sense: it is necessary to protect our residents’ health and safety. More states should follow New York Governor Andrew Cuomo’s lead and keep fracking out of their communities.”

“Today we have more research than ever, showing the irreparable harm fracking can have on our air and water quality, the soil where we grow our food, and our overall wellbeing,” said **Sandra Steingraber, PhD, distinguished scholar in residence at Ithaca College and member of Concerned Health Professionals of New York.** “As healthcare workers and scientists, it is our responsibility to call for our elected officials to do what’s best for our communities and halt this dangerous process.”

**In Pennsylvania, which has had hundreds of cases of water contamination from drilling and fracking and a range of health problems, Walter Tsou, MD, former president of Philadelphia Physicians for Social Responsibility, past president of the American Public Health Association and former health commissioner of Philadelphia, said,** “Drilling and fracking in Pennsylvania have caused widespread water contamination, dangerous air pollution, and serious public health impacts. Given the considerable weight of the scientific evidence showing harm, Governor Wolf should enact a moratorium on fracking to protect public health.”

Notably, the Compendium corroborates and extends another, separate expert organization's [analysis of the peer-reviewed science](#), with similar findings. PSE Healthy Energy has established a database of all peer-reviewed studies, and has analyzed the growth in scientific research related to fracking, documenting the portion of studies showing risks and adverse impacts. They found that more than half of all available studies have been published since January, 2014, and the vast majority reveal serious risks. Among original research on human health risks, 84 percent of studies found signs of harm or potential harm, 88 percent of studies on air quality found elevated air pollutant emissions, and 69 percent of original research studies on water quality found evidence of or potential for water contamination.

Since the release of the first edition of the Compendium in July 2014, concerns about and opposition to fracking have grown. In December 2014, the New York State Department of Health released its own years-long [review of the health impacts of fracking](#), which served as the foundation for a statewide ban, along with an [environmental review](#) finding significant impacts. Following New York's ban, Maryland overwhelmingly passed a [two-and-a-half year moratorium on fracking](#). Internationally, both Scotland and Wales imposed moratoria on fracking in January and February 2015, respectively, and in July 2015 the Dutch government banned all shale gas fracking, joining a range of countries and provinces in prohibiting the practice including Bulgaria, France, Germany, Ireland, Netherlands and parts of Canada, Spain and Switzerland.

In June 2015, the U.S. Environmental Protection Agency released a [draft version](#) of its study of the impacts of fracking on drinking water. The agency found that fracking had polluted drinking water in several communities nationwide and identified several “potential mechanisms by which hydraulic fracturing could affect drinking water resources.”

Given the continuous growth in research, the Compendium is designed as a living document that is publicly available on the websites for [Physicians for Social Responsibility](#) and [Concerned Health Professionals of New York](#).

Based on a review of the evidence, the Compendium identifies 10 emerging trends:

**1) Growing evidence shows that regulations are simply not capable of preventing harm.** Studies reveal inherent problems in the natural gas extraction process, such as well integrity failures caused by aging or the pressures of fracking itself. These issues can lead to contamination, air pollution with carcinogens and other toxic chemicals, and a range of environmental and other stressors wrought on communities. Some of fracking's many component parts—which include the subterranean geological landscape itself—are simply not controllable. Compounding the problem, the number of wells and their attendant infrastructure continue to proliferate, creating burgeoning cumulative impacts.

As reported in studies published last March, the injection of extreme volumes of fluids—now typically three to five million gallons or more per well—create significant deformations in the shale that are translated upwards, a mile or more, to the surface. Along the way, these “pressure bulbs” can impact in unpredictable ways faults and fissures in the overlying rock strata, including strata that intersect fresh water aquifers. Such pressure waves may mobilize contaminants left over from previous drilling and mining activities. (See footnotes 93 and 94.) No set of regulations can obviate these potential impacts to groundwater. Furthermore, in July, the state of California determined that fracking can have “significant and unavoidable” impacts on air quality, including by driving pollutants above levels that violate air quality standards. (See footnote 2.) According to the New York State Findings Statement, “Even with the implementation of an extensive suite of mitigation measures...the significant adverse public health and environmental impacts from allowing high-volume hydraulic fracturing to proceed under any scenario cannot be adequately avoided or minimized to the maximum extent practicable....” (See footnote 199.)

**2) Fracking threatens drinking water.** Cases of drinking water sources contaminated by drilling and fracking activities, as well as associated waste disposal, are now proven. The U.S. Environmental Protection Agency’s (EPA) assessment of fracking’s impacts on drinking water resources confirmed specific instances of water contamination caused by drilling and fracking-related activities and identified the various pathways by which this contamination has occurred. According to the EPA, documented cases of drinking water contamination have resulted from spills of fracking fluid and fracking wastewater; discharge of fracking waste into rivers and streams; and underground migration of fracking chemicals, including gas, into drinking water wells. Independently, researchers working in Texas found 19 different fracking-related contaminants—including cancer-causing benzene—in hundreds of drinking water samples collected from the aquifer above the heavily drilled Barnett Shale, thereby documenting widespread water contamination. In Pennsylvania, a solvent used in fracking fluid was found in drinking water wells near drilling and fracking operations known to have well casing problems. In California, state regulators admitted that they had mistakenly allowed oil companies to inject drilling wastewater into aquifers containing clean, potable water. (See footnotes 2, 79, 81, and 83.)

**3) Drilling and fracking emissions contribute to toxic air pollution and smog (ground-level ozone) at levels known to have health impacts.** The New York State Department of Environmental Conservation determined that fracking could increase ozone levels in downwind areas of the state, potentially impacting the ability to maintain air quality that meets ozone standards. (See footnote 199.) Air near gas wells in rural Ohio had levels of polycyclic aromatic hydrocarbons that surpassed those in downtown Chicago. They were also ten times higher than the levels found in rural areas without fracking operations, raising the lifetime risk of cancer for residents living near the well pads by 45 percent. (See footnote 8.) Two independent reports from California determined that fracking occurs disproportionately in areas already suffering from serious air quality problems and

can drive ozone and other federally regulated air pollutants to levels that violate air quality standards. (See footnotes 1 and 2.) This increased air pollution and smog formation poses a serious risk to all those already suffering from respiratory issues, such as children with asthma. With an average of 203 high-ozone days a year, intensely fracked Kern County, California, is the fifth-most ozone-polluted county in the nation, according to the American Lung Association.

#### **4) Public health problems associated with drilling and fracking, including occupational health and safety problems, are increasingly well documented.**

Among residents living near drilling and fracking operations, documented indicators variously include increased rates of hospitalization, self-reported respiratory problems and rashes, motor vehicle fatalities, trauma, drug abuse, and low birth weight among infants. As we go to press, a new study from Johns Hopkins University finds a 40 percent increase in the risk of preterm birth among infants born to mothers who live nearby active drilling and fracking sites in Pennsylvania.\* Among workers, risks include both toxic exposures and accidents. Benzene has been detected in the urine of wellpad workers in Colorado and Wyoming. The National Institute for Occupational Safety and Health named oil and gas extraction industry workers among those at risk for silicosis, an incurable lung disease caused by exposure to silica dust, from the silica sand that is used extensively in fracking operations. Fatality rates among workers in the oil and gas extraction sector in North Dakota were seven times the national fatality rates in this industry, which itself has more deaths from fires and explosions than any other private industry. An increase in workplace deaths has accompanied the fracking boom in West Virginia. As we go to press, a new census from the Bureau of Labor Statistics finds that the number of fatal work injuries in oil and gas extraction industries rose 27 percent between 2013 and 2014.\*\*

#### **5) Natural gas is a bigger threat to the climate than previously believed.**

Methane is a much more potent greenhouse gas than formerly appreciated. The Intergovernmental Panel on Climate Change now estimates that, over a 20-year time frame, methane can, pound for pound, trap 86 times more heat than carbon dioxide.\*\*\* Further, real-world leakage rates greatly exceed earlier estimates. In the heavily drilled Barnett Shale of northeastern Texas, methane emissions were shown to be 50 percent higher than the EPA had estimated. Fracking operations and

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\* Casey, J. A., Savitz, D. A., Rasmussen, S. G., Ogburn, E. L., Pollak, J., Mercer, D. G., & Schwartz, B. S. (2015). Unconventional natural gas development and birth outcomes in Pennsylvania, USA. *Epidemiology*. Advance online publication. doi: 10.1097/EDE.0000000000000387

\*\* U.S. Department of Labor, Bureau of Labor Statistics (2015, September 17). National census of fatal occupational injuries in 2014 (preliminary results). USDL-15-1789. Retrieved from <http://www.bls.gov/news.release/pdf/cfoi.pdf>

\*\*\* IPCC. (2013). *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T. F., D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex & P. M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Retrieved from <http://www.ipcc.ch/report/ar5/wg1/>

associated infrastructure contribute 71 to 85 percent of the methane emissions in the region. Researchers discovered that much of these emissions originated not from accidental leaks but from losses that are inherent to the design of the machinery or to normal operating use and are therefore not possible to mitigate. Methane leakage at the levels now being documented (by multiple approaches in measurement and modeling) negates and outweighs previously hypothesized benefits from burning methane instead of coal in most existing power plants. As we go to press, a new study confirms that a commonly used instrument to quantify methane leakage has unreliable sensors and malfunctions in ways that vastly underreport emissions by factors of three to five. More than 40 percent of the compiled national methane inventory may be affected by this measurement failure, according to the author of this study.\*At this writing, the implications of this discovery for our understanding of system-wide methane leakage rates from drilling and fracking operations are not known, but they do call into question the results of at least one major study of methane emissions that relied on this device for collecting data.

**6) Earthquakes are a consequence of drilling and fracking-related activities in many locations.** In the past few months, several major studies have confirmed a causal link between the injection of fracking wastewater in disposal wells and earthquake swarms. The evidence is strong enough that the Oklahoma Supreme Court ruled unanimously in June that homeowners can sue the oil and gas industry for injuries or property damage resulting from earthquakes. The number of earthquakes of magnitude 3.0 or higher has skyrocketed in Oklahoma since the advent of the fracking boom, with fewer than two per year before 2009 and more than 1,100 predicted to occur in 2015. (See footnote 321.) Evidence now also shows that the process of fracking itself can trigger small earthquakes, as several confirmed cases in Ohio, Oklahoma, Texas, the United Kingdom, and Canada demonstrate. (See footnote 199.)

**7) Fracking infrastructure poses serious potential exposure risks to those living near it.** Drilling and fracking activities are temporary operations, but compressor stations are semi-permanent facilities that pollute the air 24 hours a day as long as gas is flowing through the pipeline. As documented by a Pennsylvania study published in February 2015, day-to-day emissions from compressor stations are highly episodic and can create periods of potentially extreme exposures. (See footnote 515.) In the Upper Midwest, Wisconsin residents living near silica sand mining operations that service the fracking industry reported dust exposure and respiratory problems. Silica dust is a known cause of silicosis and lung cancer.

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\* Howard, T. (2015). University of Texas study underestimates national methane emissions at natural gas production sites due to instrument sensor failure. *Energy Science & Engineering*. Advance online publication. doi: 10.1002/ese3.81. This is the second of two recent studies that finds that the primary tool approved by the U.S. EPA for measuring and reporting emissions of methane fails to function properly when used as directed by the manufacturer. See also footnote 453.

In May 2015, the Medical Society of the State of New York passed a resolution recognizing the potential health impacts of natural gas infrastructure and pledging support for a governmental assessment of the health and environmental risks associated with natural gas pipelines. In June 2015, the American Medical Association (AMA) adopted a similar resolution that supports legislation requiring all levels of government to seek a comprehensive Health Impact Assessment regarding the health and environmental risks associated with natural gas pipelines. As part of a related resolution, the AMA also called for full disclosure of all chemicals used during fracking operations.

**8) Drilling and fracking activities can bring naturally occurring radioactive materials to the surface.** Exposure to increased radiation levels from these materials is a risk both for workers and for residents. In Pennsylvania, radon levels in homes have been rising since the advent of the fracking boom, and buildings in heavily drilled areas have significantly higher radon readings than areas without well pads—a difference that did not exist before 2004. University of Iowa researchers documented a variety of radioactive substances including radium, thorium, and uranium in fracking wastewater and determined that their radioactivity increased over time; they warned that radioactive decay products can potentially contaminate recreational, agricultural, and residential areas. The New York State DEC's Findings Statement noted that naturally occurring radioactive materials (NORM) are brought to the surface “in the cuttings, flowback water and production brine....[T]he build-up of NORM in pipes and equipment has the potential to cause a significant adverse impact because it could expose workers handling pipes, for cleaning or maintenance, to increased radiation levels.” (See footnote 199.)

**9) The risks posed by fracking in California are unique.** One in every eight Americans lives in California, and hydraulic fracturing in California is practiced differently than in other states, making its risks different, as well. California is the only state that allows fracking waste to be held in unlined, open pits, which creates risks for both air and groundwater contamination. Wells are more likely to be vertical rather than horizontal, and the oil-containing shale is shallower. Hence, much less water is used per well for fracking as compared to other states. However, the fracking fluid used is much more chemically concentrated, the fracking zones are located closer to overlying aquifers, and the risk of a fracture reaching groundwater is higher. Most new fracking operations in California take place in areas with a long history of oil extraction, most notably San Joaquin Valley within Kern County. A high density of old and abandoned wells in that area provides potential leakage pathways, should fractures intersect with them. And although fracking requires considerably less water per well in California, it takes place disproportionately in areas of severe water shortages and can compete with municipal and agricultural needs for freshwater. (See footnote 74.)

Fracking in California is concentrated in two areas, both of which face unique potential risks to human health. One, Kern County, serves as a top producer of the

nation's food crops, yet it hosts the highest density of drilling and fracking operations in the state. These factors project fracking's impacts onto geographically distant populations. The other area where fracking is concentrated, the Los Angeles oil basin, is located directly under one of the most populous cities in the world. About 1.7 million people in Los Angeles live or work within one mile of an active oil or gas well. California does not currently limit how close drilling and fracking operations can be from residences or schools.

The recent admission by state regulators that companies had been wrongly allowed to inject fracking waste directly into freshwater aquifers for years has led to the closing of many disposal wells. The combination of ongoing drought and lack of disposal options has resulted in the diversion of fracking wastewater to farmers for irrigation of crops, raising concerns about contaminated water potentially affecting food crops and draining into groundwater. Chevron Corporation piped eight million gallons of treated fracking waste to farmers for crop irrigation last year. Tests showed the presence of several volatile organic compounds, including acetone. (See footnote 426.) Food is a very troubling possible exposure route to fracking chemicals about which little is known. (See footnotes 425-427, 433, 436-438, 444-447.)

**10) The economic instabilities of fracking further exacerbate public health risks.** Real-life challenges to the industry's arguments that fracking is good business are becoming more apparent. Independent economic analyses show that the promise of job creation has been greatly hyped, with many jobs going to out-of-area workers. With the arrival of drilling and fracking operations, communities have experienced steep increases in rates of crime, including sex trafficking, sexual assault, drunk driving, drug abuse, and violent victimization—all of which carry public health consequences, especially for women. Social costs include strain on law enforcement, municipal services, and road damage. Economic analyses have found that drilling and fracking threaten property values and can diminish tax revenues for local governments. Additionally, drilling and fracking pose an inherent conflict with mortgages and property insurance due to the hazardous materials used and the associated risks.

The shaky economic fundamentals of the industry as a whole also have consequences for public health and safety. The low price of oil and gas coupled with unexpectedly short-lived well production has led companies drilling shale to reduce the value of their assets by billions of dollars, creating shortfalls that are largely filled through asset sales and increasing debt load. Falling prices means that interest payments are consuming revenue of many smaller companies, raising questions about safety-cutting measures. Inflated and unreliable estimates of shale reserves and potential profitability continue to fuel the rush to drill new wells, cut regulatory corners, and press into densely populated communities. Thus, the fundamental economic uncertainties of shale gas and oil production further exacerbate the risks of fracking to public health and society.



### **About Physicians for Social Responsibility**

Physicians for Social Responsibility (PSR) has been working for more than 50 years to create a healthy, just and peaceful world for both the present and future generations. PSR advocates on the issues people care about by addressing the dangers that threaten communities, using their medical and public health expertise to:

- Prevent nuclear war and proliferation;
- Reverse our trajectory towards climate change;
- Protect the public and our environment from toxic chemicals;
- Eliminate the use of nuclear power.

### **About Concerned Health Professionals of New York**

Concerned Health Professionals of New York is initiative to amplify the voices of hundreds of health professionals in New York concerned about the health and public safety risks of fracking. Concerned Health Professionals of New York is also an online resource center for the public, press, elected officials and other health professionals to learn of our ongoing work and access the documentation of the serious health risks posed by hydraulic fracturing.

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