

Oil and Natural Gas Production (ONGP) Health Concerns

ONGP in Pennsylvania

ONGP is a significant industry in Pennsylvania. The latest wave of ONGP activity in the state began in 2005 with the start of unconventional oil and natural gas development (UONGD). Unconventional wells are distinct from conventional wells by the geologic formation being tapped. They use horizontal and vertical drilling and hydraulic fracturing (“fracking”) to access traditionally unavailable reservoirs of oil and natural gas.

As of March 31, 2019, the Pennsylvania Department of Environmental Protection (DEP) reported there were 10,451 active unconventional wells in the state. Thirty-four of Pennsylvania’s 67 counties had active unconventional wells, with Washington (1,707), Susquehanna (1,544) and Greene (1,309) counties having the greatest numbers of active unconventional wells.*

ONGP Health Registry

In response to growing concerns about UONGD, the Pennsylvania Department of Health (DOH) developed a confidential health registry to better track and respond to public health complaints related to ONGP.

As of March 31, 2019, DOH received 156 ONGP-related health complaints, with Washington (41), Susquehanna (29) and Bradford (21) counties having the most health complaints.

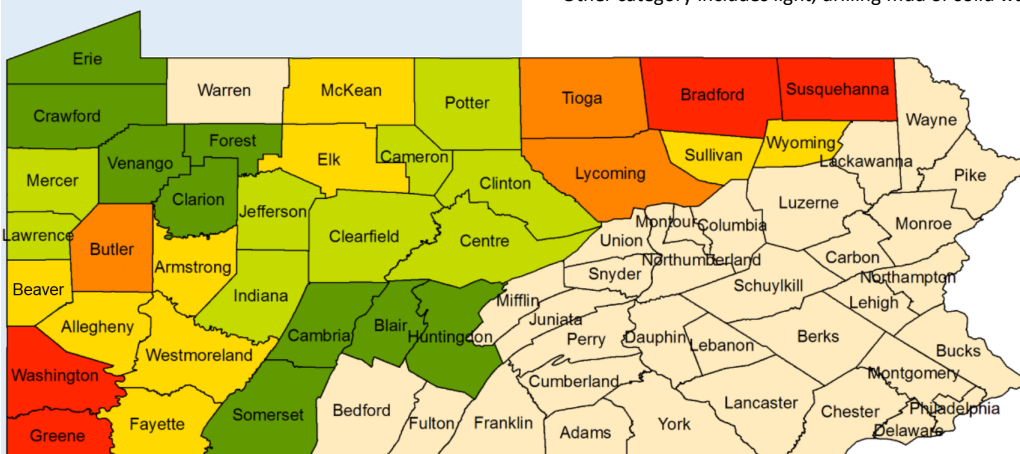


Figure 2. Active Unconventional Oil and Natural Gas Wells in Pennsylvania, as of March 31, 2019*

*Based on the number of active wells from DEP Spud Data Report, Wells Drilled by County

Figure 1. Total Health Complaints Logged by DOH Division of Environmental Health Epidemiology Since 2011 (N=156)

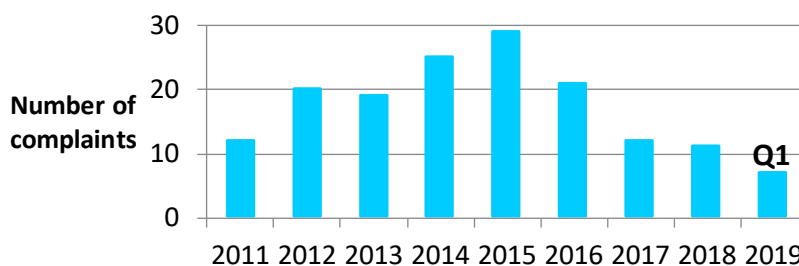


Table 1. Reason for Contact (N=156)

Reason	Q1 2019	2019 YTD	Total since 2011	% of Total since 2011
General inquiry	0	0	24	15.4%
News update/alert	0	0	3	1.9%
Information sharing	0	0	12	7.7%
Formal health complaint ^a	7	7	117	75.0%

^aGeneral inquiries, news updates/alerts and information sharing cases were no longer logged in the health complaints registry effective March 2017.

Table 2. Environmental Source of Concern^a (N=156)

Source	Q1 2019	2019 YTD	Total since 2011	% of Total since 2011
Water	6	6	107	68.2%
Air	2	2	93	60.8%
Soil	3	3	27	16.2%
Noise	2	2	53	33.8%
Truck traffic	1	1	48	31.1%
Other ^b	1	1	45	29.1%
Missing	0	0	9	6.1%

^aMore than one environmental source of concern may be selected per complaint.

^bOther category includes light, drilling mud or solid waste, vibrations or seismic testing, etc.

Referrals

Eighty-six % of Q1 2019 health complaints were referred by DEP.

Fourteen % of Q1 2019 health complaints were referred by a local health department.

Number of wells

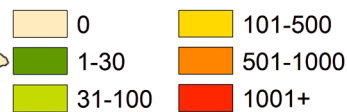


Table 3. Demographic Information of Individuals in ONGP Registry with a Formal Health Complaint (N=117 formal health complaints, 248 individuals*)

Characteristic	Q1 2019	2019 YTD	Total since 2011	% of Total since 2011
Female	5	5	130	52.4%
Male	6	6	114	46.0%
Missing	0	0	4	1.6%
Non-Hispanic white	8	8	93	37.5%
Non-Hispanic black	0	0	0	0.0%
Hispanic	0	0	0	0.0%
Other	1	1	2	0.0%
Missing	2	2	153	61.7%
0-17 years old	0	0	39	15.7%
18-64 years old	6	6	119	48.0%
65+ years old	3	3	38	15.3%
Missing	2	2	52	21.0%
Any private insurance	8	8	64	25.8%
Public only insurance	1	1	26	10.5%
Uninsured	0	0	5	2.0%
Missing	2	2	153	61.7%

Demographic Summary

This table summarizes the demographic and health insurance information of individuals included in the formal health complaints received for Q1 2019, YTD 2019 and total since 2011. This does not necessarily reflect the demographic characteristics of the entire community.

*Table excludes general inquiries, news updates and information sharing complaints. Each health complaint may pertain to more than one individual.

Race/ethnicity, age and health insurance were not systematically collected until March 2017. Percentages within each group may not sum to 100% due to rounding.

Table 4. Health Information of Individuals in ONGP Registry with a Formal Health Complaint (N=117 formal health complaints, 248 individuals*)

Symptom Group	Q1 2019	2019 YTD	Total since 2011	% of Total since 2011
Cardiovascular	1	1	41 (10) [†]	16.5%
Dermatological	2	2	92	37.1%
Ear	0	0	30	12.1%
Eye	1	1	50	20.2%
Gastrointestinal	6	6	90	36.3%
General systemic ^a	6	6	91	36.7%
Neurological	4	4	109 (5) [†]	44.0%
Psychological	4	4	60 (8) [†]	24.2%
Respiratory	4	4	134 (20) [†]	54.0%
Urogenital	1	1	26 (6) [†]	10.5%
Missing	0	0	36	14.5%

Symptom Summary

This table summarizes the symptoms reported by individuals for Q1 2019, YTD 2019 and total since 2011.

*Table excludes general inquiries, news updates and information sharing complaints. Each health complaint may pertain to more than one individual.

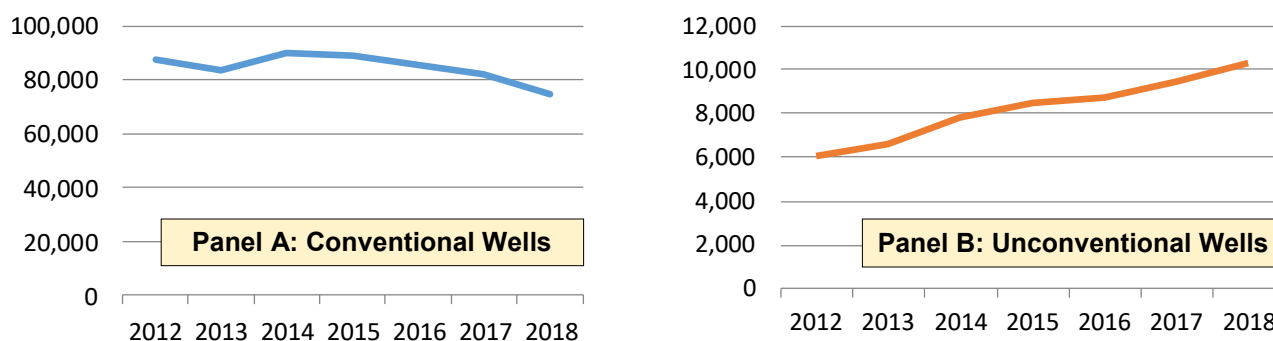
^aIncludes sleep disturbance, fatigue, fever, chills, night sweats, shaking, weight loss/gain, decreased appetite, muscle aches/cramps, joint pain, fainting and swelling

[†]Numbers in parentheses correspond to newly diagnosed conditions relevant to that symptom group: heart disease and/or hypertension (cardiovascular group), neurological disease (neurological), psychological disease (psychological), asthma or COPD (respiratory), kidney disease or failure (urogenital). They do not represent pre-existing conditions. Therefore, someone could report that UONGD exacerbated their asthma (noted in the respiratory count) but was diagnosed before UONGD activity started in their area (not reflected in number of parentheses).

Health Overview 2019 Year-to-Date based on Formal Health Complaints (N=7 complaints, 11 individuals)

- 45% of individuals reported being in poor or fair health.
- 18% of individuals reported being disabled.
- 0% of individuals reported being diagnosed with cancer since 2011.
- 55% of individuals visited the doctor for their health concerns.
- Three (43%) of 2019 YTD complaint cases had concerns about animal health (livestock or pets).

Figure 3. Total Number of Oil and Natural Gas Wells in Pennsylvania, 2012 to 2018



The tables below show data for counties with more than 500 active unconventional oil and natural gas wells as of March 31, 2019.

Washington (1,707) Susquehanna (1,544) Greene (1,309)
Bradford (1,278) Lycoming (895) Tioga (759) Butler (550)

Table 5. Environmental Source of Concern by County (All Complaints since 2011)

Source	Washington	Susquehanna	Greene	Bradford	Lycoming	Tioga	Butler
Water	24	24	6	19	2	3	3
Air	32	16	4	6	4	1	2
Soil	9	3	2	4	0	0	0
Noise	21	10	4	3	0	1	1
Truck traffic	21	9	3	3	1	1	1
Other ^a	21	9	2	4	0	0	1
Missing	3	0	0	0	1	0	0

County-specific numbers of complaint cases are as follows: 41 (Washington), 29 (Susquehanna), 7 (Greene), 21 (Bradford), 6 (Lycoming), 3 (Tioga) and 3 (Butler). More than one environmental source of concern may be selected per complaint.

^aOther category includes light, drilling mud or solid waste, vibrations or seismic testing, etc.

Table 6. Health Symptoms by County (Individuals with a Formal Health Complaint since 2011)

Symptom Group	Washington	Susquehanna	Greene	Bradford	Lycoming	Tioga	Butler
Cardiovascular	6	8	3	12	0	1	0
Dermatological	23	24	7	10	6	0	0
Ear	7	5	0	3	2	0	0
Eye	15	11	2	5	3	1	0
Gastrointestinal	22	23	6	14	0	1	2
General systemic ^a	24	19	9	10	0	2	2
Neurological	29	19	6	15	1	3	3
Psychological	22	13	2	4	3	0	2
Respiratory	37	29	12	15	4	1	2
Urogenital	6	6	2	4	3	0	1
Missing	16	2	3	8	0	0	1

County-specific numbers of individuals are as follows: 66 (Washington), 57 (Susquehanna), 17 (Greene), 33 (Bradford), 8 (Lycoming), 3 (Tioga) and 5 (Butler).

^aIncludes sleep disturbance, fatigue, fever, chills, night sweats, shaking, weight loss/gain, decreased appetite, muscle aches/cramps, joint pain, fainting and swelling

By far, most oil and natural gas-related complaints received by DOH have been related to UONGD. We have received four complaints related to conventional oil and natural gas development since 2011.

Figures in this report may slightly differ from previous reports due to the potential for ongoing data collection. Please contact the Division of Environmental Health Epidemiology for more details at 717-787-3350 or env.health.concern@pa.gov.