

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 due to the geologic formation being tapped. They use horizontal and vertical drilling as well as hydraulic fracturing (“fracking”) to access once unavailable reservoirs of oil and natural gas.

As of Dec. 31, 2021, the Pennsylvania Department of Environmental Protection (DEP) reported there were 11,779 active unconventional wells in the state. Thirty-five of Pennsylvania’s 67 counties had active unconventional wells, with Washington (1,898), Susquehanna (1,817), and Greene (1,493) 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 Dec. 31, 2021, DOH received 186 ONGP-related health complaints, with Washington (45), Susquehanna (39), and Bradford (23) counties having the most health complaints. Three complaints were received in Quarter 4 2021.

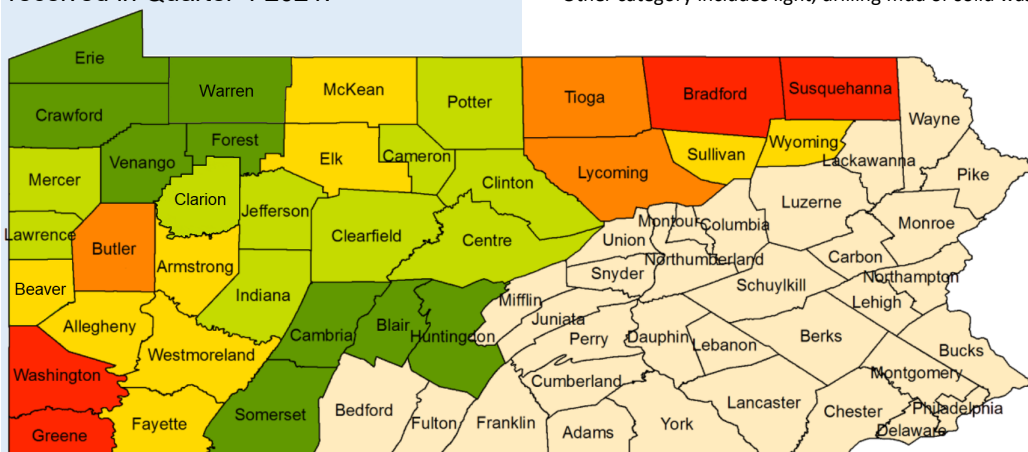


Figure 2. Active Unconventional Oil and Natural Gas Wells in Pennsylvania, as of Dec. 31, 2021*

*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=186)

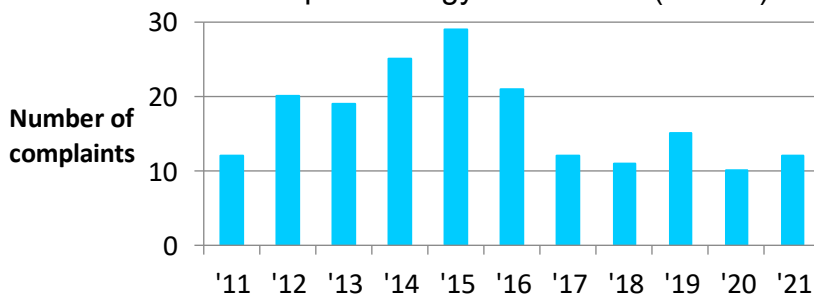


Table 1. Reason for Contact (N=186)

Reason	Q4 2021	2021 YTD	Total since 2011	% of total since 2011
General inquiry	0	0	24	12.9%
News update/alert	0	0	3	1.6%
Information sharing	0	0	12	6.5%
Formal health complaint ^a	3	12	147	79.0%

^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=186)

Source	Q4 2021	2021 YTD	Total since 2011	% of total since 2011
Water	3	10	133	71.5%
Air	2	6	106	57.0%
Soil	0	2	34	18.3%
Noise	0	2	59	31.7%
Truck traffic	0	0	52	28.0%
Other ^b	0	1	52	28.0%
Missing	0	0	9	4.8%

^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

One hundred percent of Q4 2021 health complaints were referred by DEP.

Number of wells

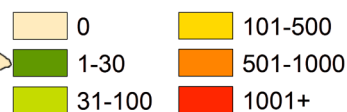


Table 3. Demographic Information of Individuals in ONGP Registry With a Formal Health Complaint (N=147 formal health complaints, 301 individuals*)

Characteristic	Q4 2021	2021 YTD	Total since 2011	% of total since 2011
Female	3	14	158	52.5%
Male	1	9	139	46.2%
Missing	0	0	4	1.3%
Non-Hispanic white	4	23	144	47.8%
Non-Hispanic black	0	0	0	0.0%
Hispanic	0	0	0	0.0%
Other	0	0	5	1.7%
Missing	0	0	152	50.5%
0-17 years old	0	2	47	15.6%
18-64 years old	2	10	149	49.5%
65+ years old	2	11	56	18.6%
Missing	0	0	49	16.3%
Any private insurance	3	13	104	34.6%
Public only insurance	1	5	35	11.6%
Uninsured	0	2	8	2.7%
Missing	0	3	154	51.2%

Demographic Summary

This table summarizes the demographic and health insurance information of individuals included in the formal health complaints received for Q4 2021, YTD 2021, 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=147 formal health complaints, 301 individuals*)

Symptom group	Q4 2021	2021 YTD	Total since 2011	% of total since 2011
Cardiovascular	1	1	43 (11) [†]	14.3%
Dermatological	2	7	116	38.5%
Ear	0	1	36	12.0%
Eye	1	6	60	19.9%
Gastrointestinal	1	8	109	36.2%
General systemic ^a	0	3	102	33.9%
Neurological	2	9 (2) [†]	128 (8) [†]	42.5%
Psychological	0	2	65 (8) [†]	21.6%
Respiratory	1	5	149 (22) [†]	49.5%
Urogenital	1	5	34 (6) [†]	11.3%
Missing	0	0	36	12.0%

Symptom Summary

This table summarizes the symptoms reported by individuals for Q4 2021, YTD 2021, and total since 2011.

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

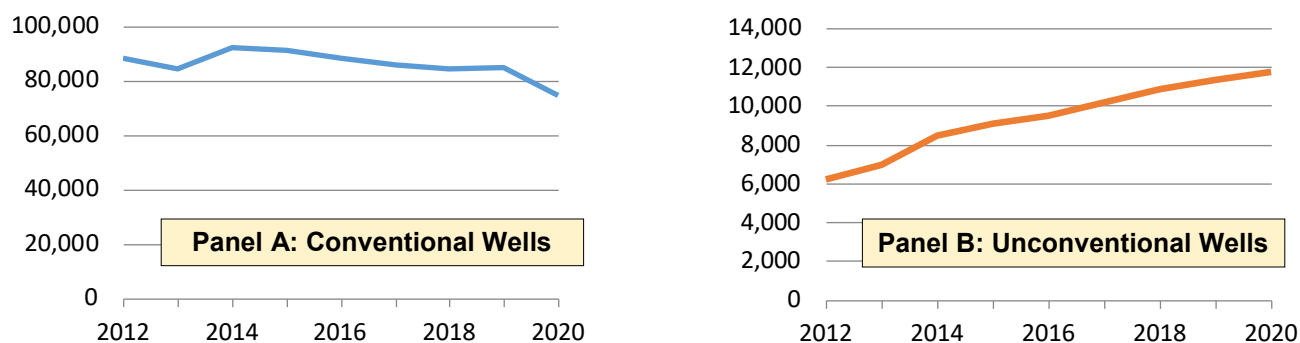
^aIncludes sleep disturbance, fatigue, fever, chills, night sweats, shaking, weight loss/gain, decreased appetite, muscle aches/cramps, joint pain, fainting, and swelling

[†]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 2021 Year-to-Date Based on Formal Health Complaints (N=12 complaints, 23 individuals)

- Individuals who reported being in poor or fair health: 26% (additionally, one individual is deceased)
- Individuals who reported being disabled: 4%
- Individuals who reported being diagnosed with cancer since the beginning of 2021: 9%
- Individuals who visited the doctor for their health concerns: 57%
- Four (33%) of 2021 YTD complaint cases had concerns about animal health (livestock or pets).

Figure 3. Total Number of Active Oil and Natural Gas Wells in Pennsylvania, 2012 to 2020



The tables below show data for counties with more than 500 active unconventional oil and natural gas wells as of December 31, 2021.

Washington (1,898) Susquehanna (1,817) Greene (1,493)
Bradford (1,459) Lycoming (971) Tioga (846) Butler (609)

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

Source	Washington	Susquehanna	Greene	Bradford	Lycoming	Tioga	Butler
Water	25	34	8	21	2	6	3
Air	36	20	4	6	4	2	2
Soil	10	5	3	4	0	2	0
Noise	24	10	4	4	0	1	1
Truck traffic	22	10	3	4	1	2	1
Other ^a	22	11	2	5	0	1	1
Missing	3	0	0	0	1	0	0

County-specific numbers of complaint cases are as follows: 45 (Washington), 39 (Susquehanna), 9 (Greene), 23 (Bradford), 6 (Lycoming), 6 (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	36	12	12	6	2	0
Ear	8	7	0	3	2	1	0
Eye	15	12	2	5	3	5	0
Gastrointestinal	23	32	6	15	0	3	2
General systemic ^a	26	19	10	11	0	4	2
Neurological	32	21	7	15	1	8	3
Psychological	23	14	3	5	3	1	2
Respiratory	41	30	12	16	4	6	2
Urogenital	6	12	3	4	3	0	1
Missing	16	2	3	8	0	0	1

County-specific numbers of individuals are as follows: 73 (Washington), 72 (Susquehanna), 22 (Greene), 35 (Bradford), 8 (Lycoming), 14 (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 five complaints related to conventional oil and natural gas development since 2011. Symptoms are self-reported and are not clinically verified. Symptoms reported are general in nature and cannot specifically be attributed to ONGP.

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.