Who we are?

**Stationary Sources Program**
- Oil and Gas Team
- Technical Services Program
- Mobile air quality monitoring unit

**Oil and Gas Health Information and Response Program**
- Response line and scientific review

**Disease Control & Environmental Epidemiology Division**
- Department of Public Health & Environment

**Air Pollution Control Division**
- Department of Public Health & Environment
How do exposures occur?

- Venting tanks
- Leaking tanks/pipes
- Drilling/fracking equipment
- Traffic
- Flares

All of these are regulated by CDPHE or COGCC.
Are hazardous substances emitted?

- 62 substances identified
- Each can be a health concern at some level of exposure
- All have other sources
Effects depend on level of exposure

- Health-based guidelines established by U.S. EPA and state agencies
- Guidelines rely on using conservative methods to ensure protection of sensitive individuals
Do substances emitted into the air from oil and gas activities result in exposures to Coloradoan’s living near oil and gas operations at levels that may be harmful to their health?
Health Risk Assessment

- Measurements from 33 sites
- Over 10,000 air measurements
- 2008-2016
- 62 individual substances evaluated

- Short-term exposure
  - Maximum single sample from 10,000 measurements

- Long-term exposure
  - Maximum average value from 33 sites

What substances are released?

How much are people exposed to?

Are these exposures above or below “safe” levels?
Health Risk from Long-Term Exposure

- Elevated Risk
- Acceptable Risk
- Negligible Risk
Cancer Risk

Elevated Risk
Acceptable Risk
Negligible Risk
Systematic Scientific Literature Review

STEP 1: Identify Relevant Studies
STEP 2: Rate Quality of Individual Findings
STEP 3: Group Related Findings
STEP 4: Weigh the Overall Evidence

- **Strong Findings**: Few Limitations
- **Limited Findings**: Many Limitations

<table>
<thead>
<tr>
<th>Substantial</th>
<th>Moderate</th>
<th>Limited</th>
<th>Mixed</th>
<th>Insufficient</th>
</tr>
</thead>
</table>

- 12 studies
- 27 health effects
<table>
<thead>
<tr>
<th>Health Effects Categories</th>
<th>Number of Studies Evaluated</th>
<th>Number of Health Effects Studied</th>
<th>Highest Level of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth outcomes</td>
<td>4</td>
<td>4</td>
<td>MIXED</td>
</tr>
<tr>
<td>Birth Defects</td>
<td>1</td>
<td>3</td>
<td>INSUFFICIENT</td>
</tr>
<tr>
<td>Eye Nose Throat</td>
<td>5</td>
<td>2</td>
<td>MIXED</td>
</tr>
<tr>
<td>Respiratory</td>
<td>4</td>
<td>3</td>
<td>LIMITED</td>
</tr>
<tr>
<td>Neurological</td>
<td>5</td>
<td>3</td>
<td>MIXED</td>
</tr>
<tr>
<td>Cancer</td>
<td>4</td>
<td>4</td>
<td>MIXED</td>
</tr>
<tr>
<td>Skin</td>
<td>2</td>
<td>1</td>
<td>LIMITED</td>
</tr>
<tr>
<td>Psychological</td>
<td>2</td>
<td>2</td>
<td>MIXED</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>2</td>
<td>2</td>
<td>INSUFFICIENT</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>3</td>
<td>2</td>
<td>INSUFFICIENT</td>
</tr>
<tr>
<td>Musculoskeletal</td>
<td>2</td>
<td>2</td>
<td>MIXED</td>
</tr>
<tr>
<td>Blood/Immune</td>
<td>2</td>
<td>1</td>
<td>MIXED</td>
</tr>
</tbody>
</table>
Major Conclusions

• Based on currently available air monitoring data, the risk of harmful health effects is low for residents living at distances 500 feet or greater from oil and gas operations.

• Studies of populations living near oil and gas operations provide limited evidence of the possibility for harmful health effects. This needs to be confirmed or contradicted with higher quality studies.

• At this time, results from exposure and health effect studies do not indicate the need for immediate public health action, but rather indicate the need for more detailed exposure monitoring and systematic analyses of health effects of residents living near oil and gas operations.
What are we doing?

- Health concern hotline
- Integrated response
- Analyzing trends
- Site investigations
- Air monitoring
- Information clearinghouse
- Community outreach
- Science evaluation

www.colorado.gov/oghealth
Mobile Air Quality Laboratory

- 55+ substances
- Particulate Matter
- Meteorology & GPS
- Can be deployed for several days
2017-2018 Risk Assessment

- Emission data from CSU studies (North Front Range and Garfield County)
- Dispersion model-based exposures
- Calculate potential health risk
  - By distance
  - By operation
    - Directly attributable to oil and gas activities
- Expected completion 7/2018
Questions?

Mike.VanDyke@state.co.us
Health Risk from Short-Term Exposure

- Elevated Risk
- Acceptable Risk
- Negligible Risk
Mapping Concerns
Reported health concerns summary

- 205 health concerns (10/2015-1/2017)
- 70% have reported symptoms