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A Systematic Scientific Approach

Oil and Gas Setbacks and Public Health

Presented by: Tami McMullin, PhD





About Me

Senior Toxicologist

Director, CTEH Applied Public Health Practice



1999 - 2005
PhD, Toxicology
Department of
Environmental and
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2015 - 2018
Public Health
Toxicologist for
Colorado Department
of Public Health and
Environment

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2019 - Present
Senior Toxicologist &
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There is no “One-Size-Fits-All” Answer to Addressing Public Health Concerns Related To Oil And Gas Development And Production

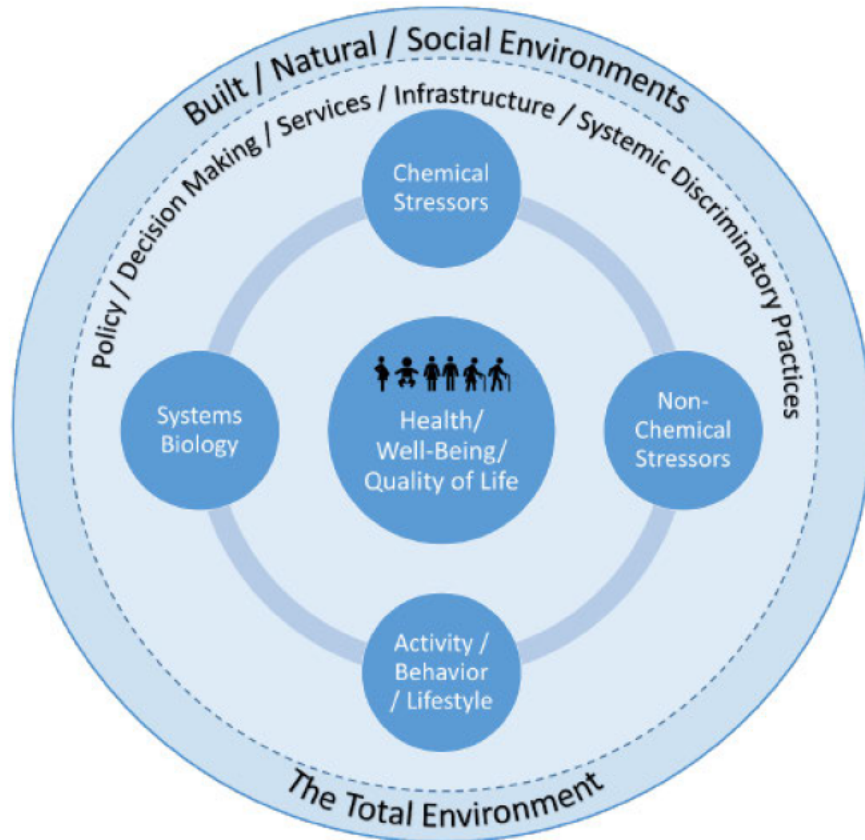


Figure 1. Combined influences on the total (built, natural, social) environment for individuals, geographically defined communities, or definable population groups.

You need to make sure
you are identifying the true

underlying problem
causing the public health
issue, and this is not
always obvious.

Presentation Overview

Story of Public Health and Oil and Gas in Colorado

- How did the setback conversation start?
- Where did the public health science fit?



Overview of Scientific Public Health Evidence

- What frameworks exist to assess public health impacts?
- What do the data show using these frameworks?



Considerations for New Mexico

- How can NM apply these frameworks to develop fit-for-purpose evidence-based, effective policy?

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Oil and Gas Development and Production in Colorado

The Landscape: Pre - 2014

Exponential increase in oil and gas development paralleling exponential land development to accommodate massive population growth.

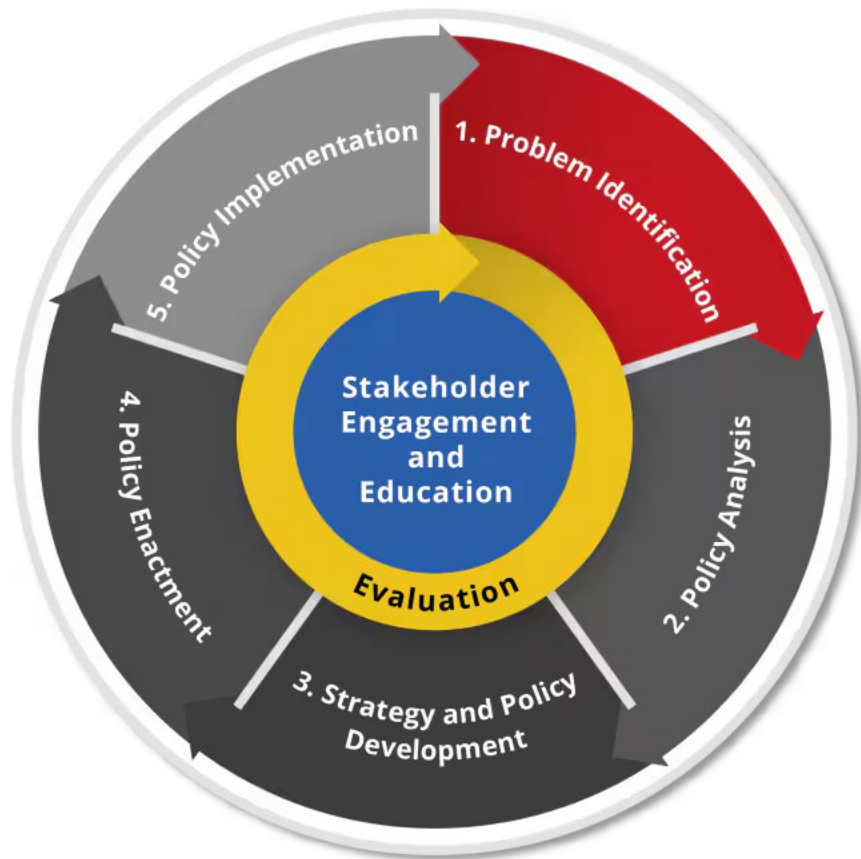
Increased local community concerns - environmental, ecological, and human health impacts in proximity to oil and gas operations.

Local jurisdictions respond - revisit adequacy of regulations they have control over (land use development – here enters the setback conversation).

Increase in disparate and conflicting local regulations, like “setbacks”, with unclear evidence of their effectiveness to solve the problem and legal authority to enact.

Public Policy and Oil and Gas Development (OGD) in Colorado

Step 1: Problem Identification



The regulatory environment was quickly going to result in regulations and prescriptive state laws that would lead to an... *“adversarial, cumbersome, time consuming, and expensive process”* in court.

- Gov. Hickenlooper Executive Order, 9/8/2014

Adapted from CDC: CDC Policy Development

Public Policy and Oil and Gas Development (OGD) in Colorado

Step 1: Problem Identification



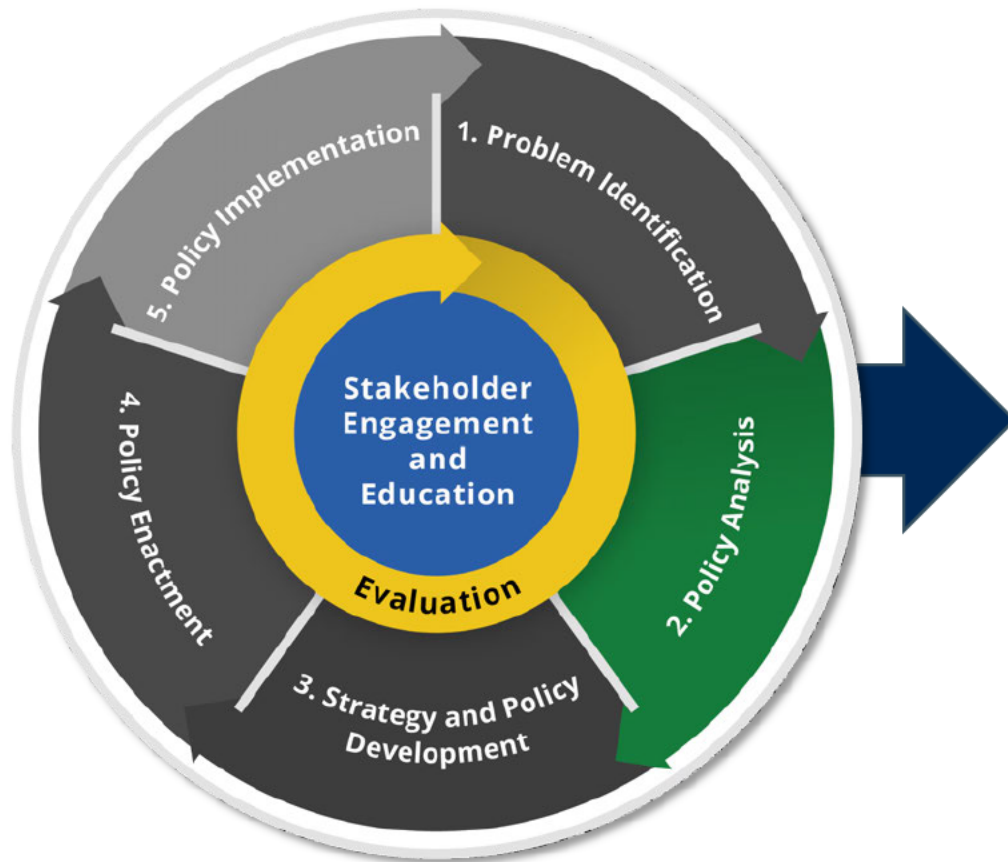
- Complexity of jurisdictional statutory authority to regulate OGD at various levels (federal, state, local)
- Consideration of mineral rights laws
- Importance of oil and gas to Colorado's economy
- Avoidance of duplication and conflict at state and local levels

Need for a collaborative, coordinated problem-solving approach with stakeholder engagement

Adapted from CDC: CDC Policy Development

Public Policy and Oil and Gas Development (OGD) in Colorado

Step 2: Policy Analysis



Executive Order Establishes 19 Member Task Force

Appendix A1: Executive Order B 2014-005 "Creating the Task Force on State and Local Regulation of Oil and Gas Operations"

STATE OF COLORADO

OFFICE OF THE GOVERNOR

136 State Capitol Building
Denver, Colorado 80203
Phone (303) 866-2471
Fax (303) 866-2003



B 2014 005

EXECUTIVE ORDER

Creating the Task Force on
State and Local Regulation of Oil and Gas Operations

Adapted from CDC: CDC Policy Development

Governor's Charge to Colorado's Oil and Gas Task Force

Appendix A1: Executive Order B 2014-005 "Creating the Task Force on State and Local Regulation of Oil and Gas Operations"

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B 2014 005

EXECUTIVE ORDER

Creating the Task Force on
State and Local Regulation of Oil and Gas Operations

"The Task Force shall identify and strive to reach agreement on recommendation for policy or legislation to harmonize state and local regulation structures as to activities associated with oil and gas operations"

<https://www.keystone.org/wp-content/uploads/2015/08/022715-ColoradoOilandGasTaskForceFinalReport.pdf>

Public Policy and Oil and Gas Development (OGD) in Colorado

Step 3: Strategy and Policy Development



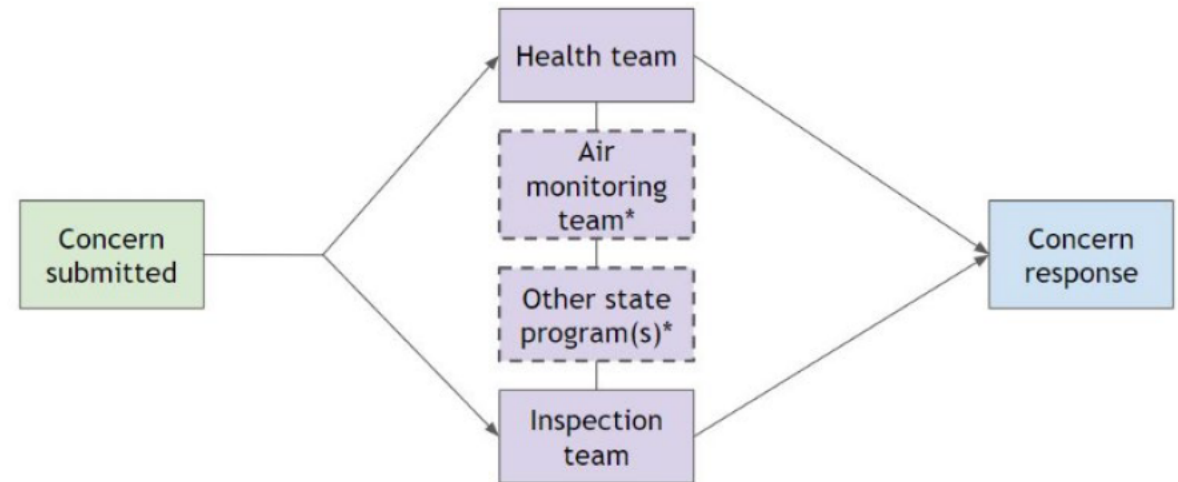
Overview of Recommendations

- Facilitate collaboration across state, local governments, and operators
 - Land use and urban planning
 - Local government liaison program to address community specific issues and education
- Increase funding to staff for compliance and enforcement
- Establish a program to evaluate the science and address public health concerns at department of public health and environment (CDPHE)

Colorado's Oil and Gas Task Force Made Four Public Health Recommendations

1. Increase capacity to effectively regulate emissions
2. Establish health complaint and information line
3. Develop a complaint and response program
4. Evaluate and summarize the scientific evidence on O&G development and health effects
 - Risk assessment
 - Health outcomes

Oil and gas concern response flowchart



*Involved on a case-by-case basis

CDPHE Oil and Gas Health Information and Response Program

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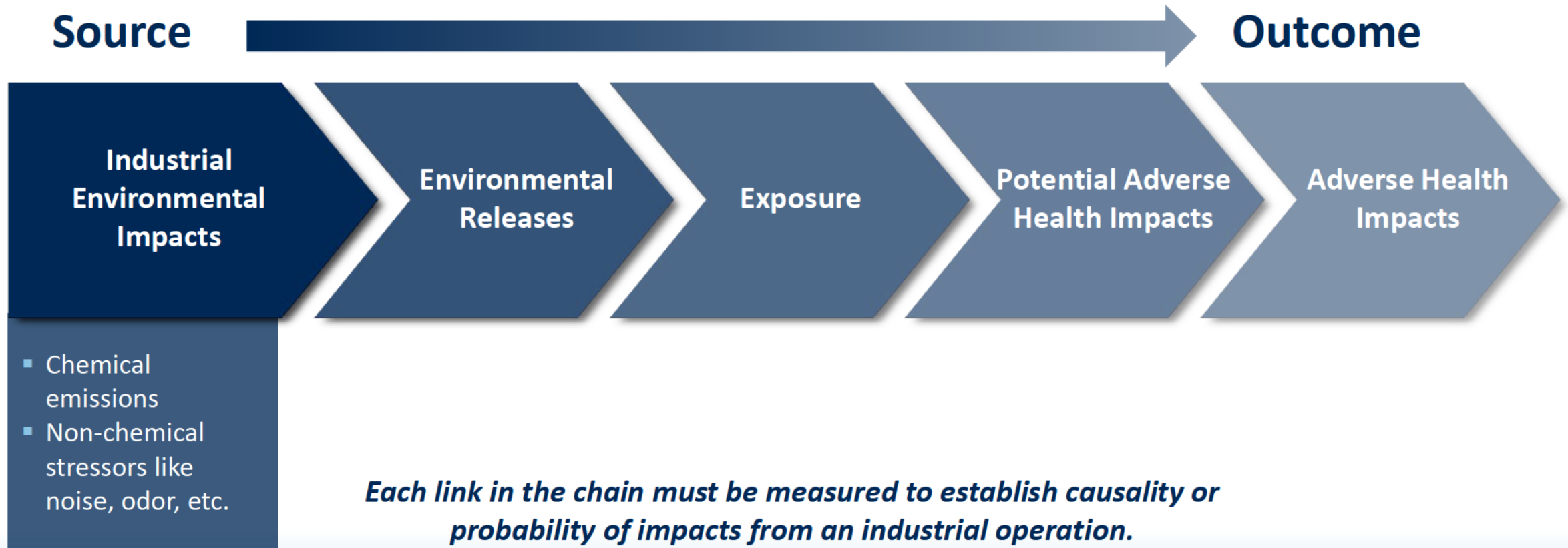
Overview of Scientific Public Health Evidence

- What frameworks did we take to evaluate OGD and health effects?
- What did we find?

Considerations for New Mexico

- How can NM apply these frameworks to develop fit-for-purpose evidence-based, effective policy?

Established Public Health Frameworks to Evaluate Adverse Public Health Impacts from Industrial Operations

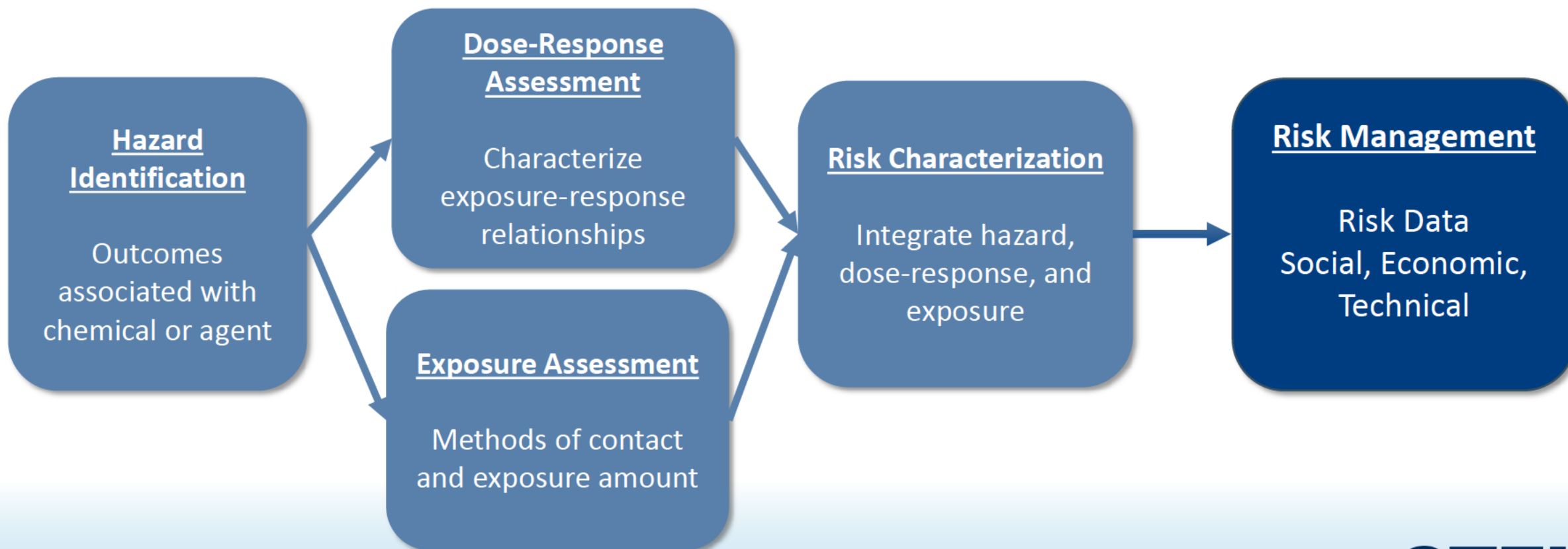


Human Health Risk Assessment

A Well-established Framework to Inform Risk Management and Policy

Human Health Risk Assessment

Risk Management



Risk-Based Questions Exposure Scientists Ask To Determine if Health Risk from Source Releases Needs to be Managed

What are the sources of emissions released to the environment?

How do the released chemicals move and change in the environment?

Who may be exposed to the chemicals and at what levels?

How does exposure occur? How often, frequent, and for how long?

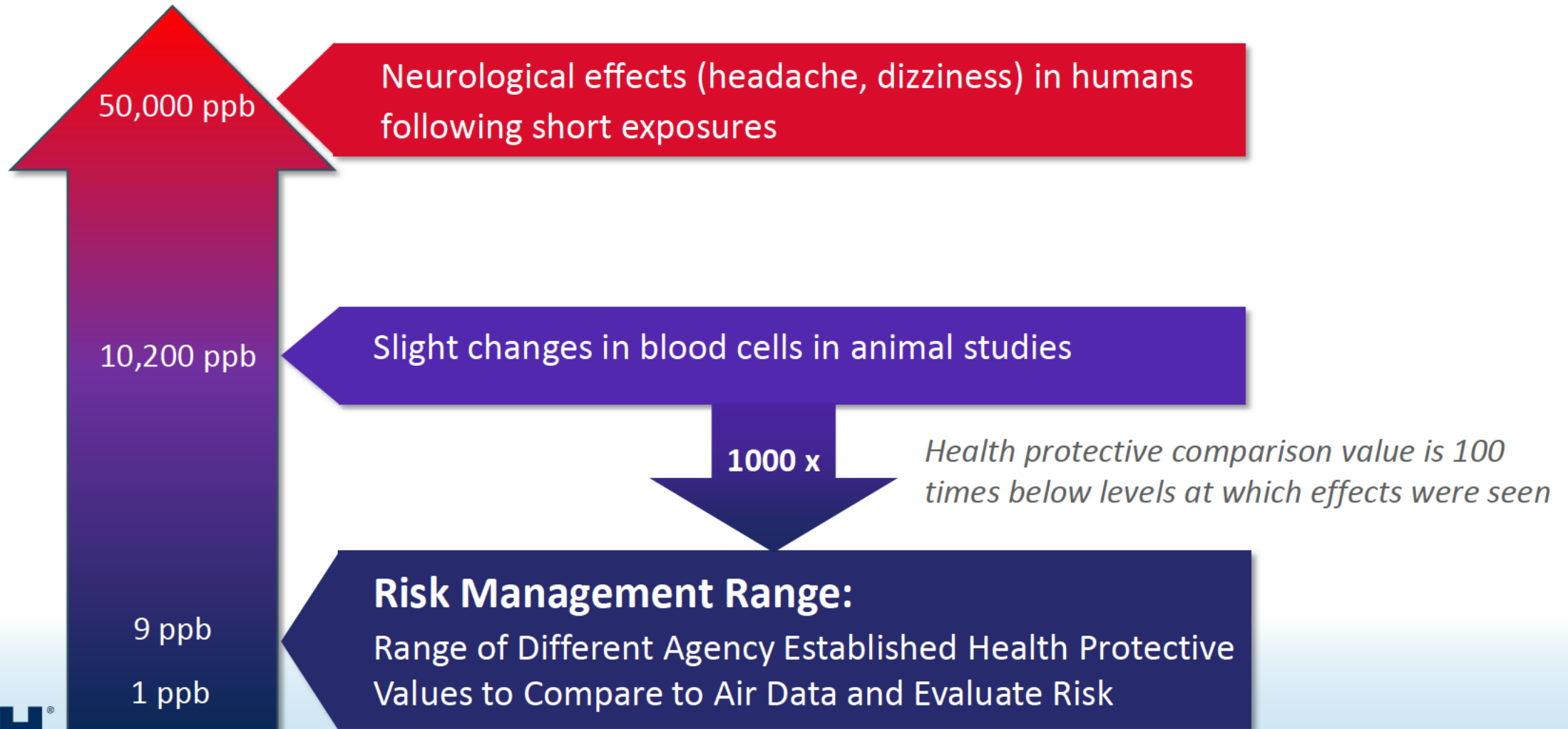
What are the effects of the chemicals and how potent are they?

How likely is it that potentially exposed populations will experience harm because of the exposures?

Reference: EPA Volume 1: Technical Resource Manual – Air Toxics Risk Assessment Reference Library

Hazard ID and Dose-Response

Where do health effects occur and what level do we manage risk to prevent health effects from occurring?

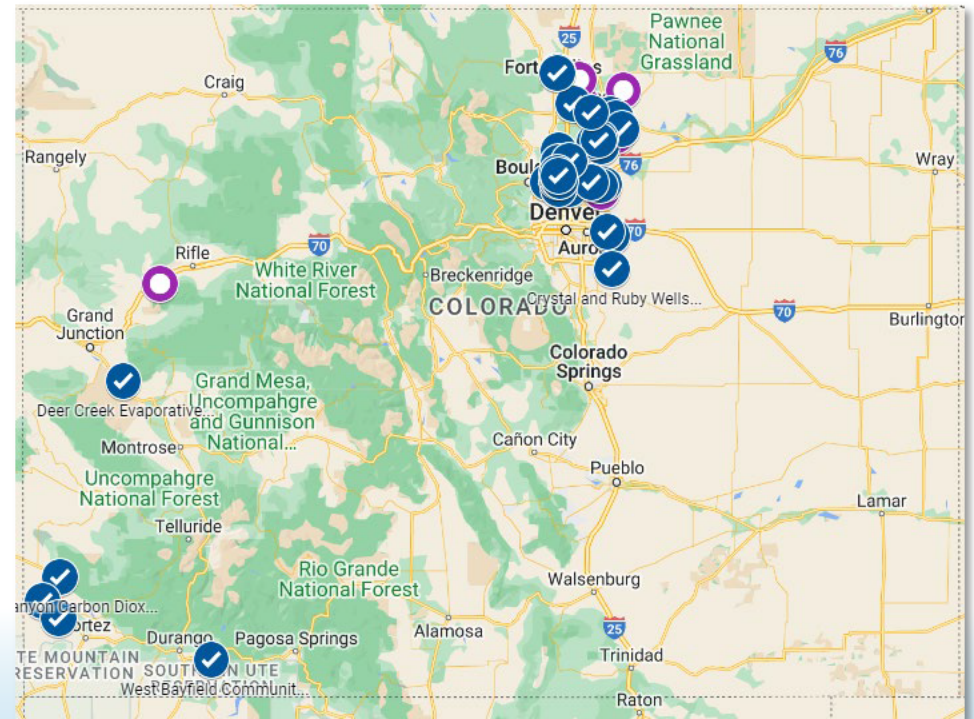


EXPOSURE:


What are exposures and associated health risks in communities in close proximity to O&G Operations in Colorado?

- Since 2017, CDPHE has collected thousands of air samples as close as 350 ft from specific oil and gas operations
- Under some circumstances, CDPHE has detected increases in O&G related compounds within a few hundred feet from O&G operations.
- These increases; however, have not resulted in exposures that CDPHE deemed “harmful” to people living near O&G development and production in Colorado.

Locations of Air Sampling Investigations Conducted by Colorado Public Health and Environmental Department (CDPHE)



Distance from wellpad(s) is not a reliable measure of exposure.

International Journal of Environmental Research and Public Health 

Article

Exposures and Health Risks from Volatile Organic Compounds in Communities Located near Oil and Gas Exploration and Production Activities in Colorado (U.S.A.)

Tami S. McMullin ^{1,*}, Alison M. Bamber, Daniel Bon, Daniel I. Vigil and Michael Van Dyke

International Journal of Environmental Research and Public Health 

Review

A Systematic Review of the Epidemiologic Literature Assessing Health Outcomes in Populations Living near Oil and Natural Gas Operations: Study Quality and Future Recommendations

Alison M. Bamber ^{1,*}, Stephanie H. Hasanali ², Anil S. Nair ², Sharon M. Watkins ², Daniel I. Vigil ¹, Michael Van Dyke ¹, Tami S. McMullin ¹ and Kristy Richardson ¹

Distance from wellpad(s) \neq Exposure

Distance from wellpad(s) \neq Causality

	SPECIAL REPORT 1
A Health Effects Institute Affiliate	POTENTIAL HUMAN HEALTH EFFECTS ASSOCIATED WITH UNCONVENTIONAL OIL AND GAS DEVELOPMENT: A SYSTEMATIC REVIEW OF THE EPIDEMIOLOGY LITERATURE
September 2019	HEI-Energy Research Committee

- Airborne VOC levels are below those anticipated to cause long-term non-cancer health effects to those living at distances 500 feet or greater from oil and gas activities
- Analysis suggests low risk of harm from acute exposures to VOCs from oil and gas operations at these distances
- Regional air quality monitoring with more site-specific, community level air sampling is needed...generating these exposure data is critical to developing scientifically sound risk management and public health policy decisions

McMullin/CDPHE 2019

Public Health Policy Development in Colorado

Steps 4-5: Policy Enactment and Implementation



What happened next?

- State of the science report released
- Change in state leadership occurred
- SB 19-181 was passed in next legislative session

SB19-181

Protect Public Welfare Oil And Gas Operations

Concerning additional public welfare protections regarding the conduct of oil and gas operations, and, in connection therewith, making an appropriation.

The scientific evidence was used, in part, for promulgating rules according to SB 19-181

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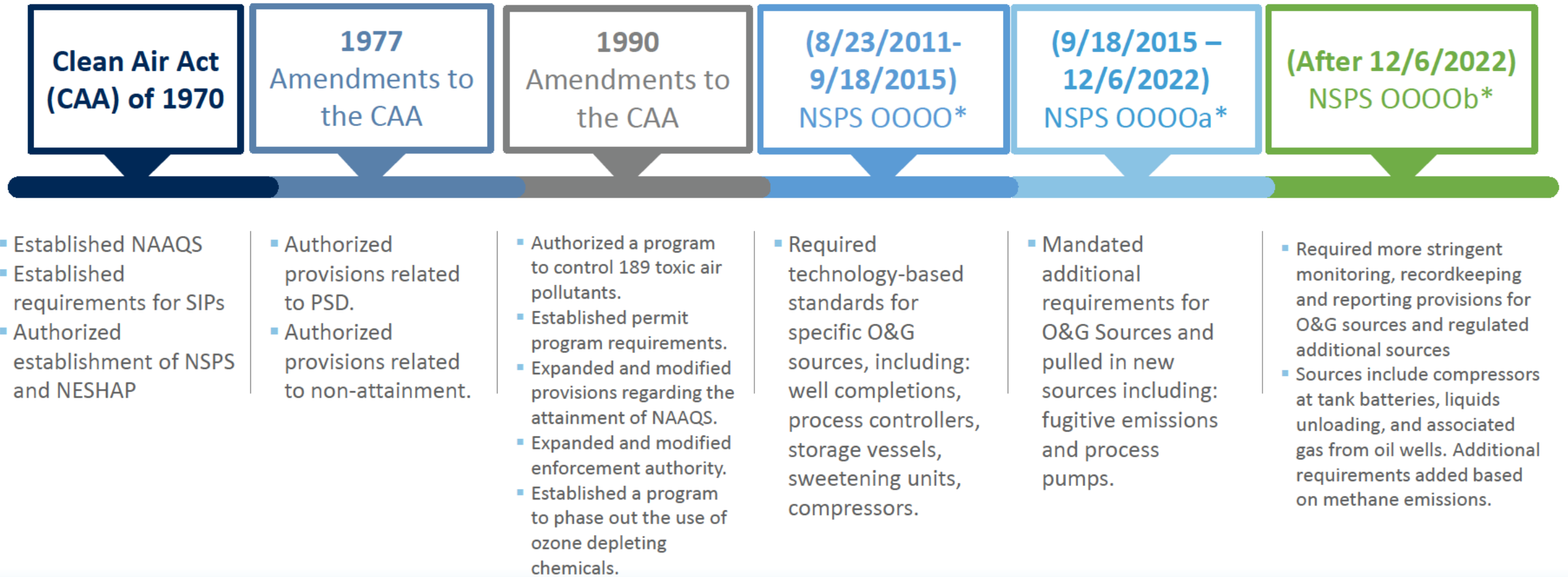
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Considerations for New Mexico

- Example of how can NM apply these frameworks to develop fit-for-purpose evidence-based, effective policy?

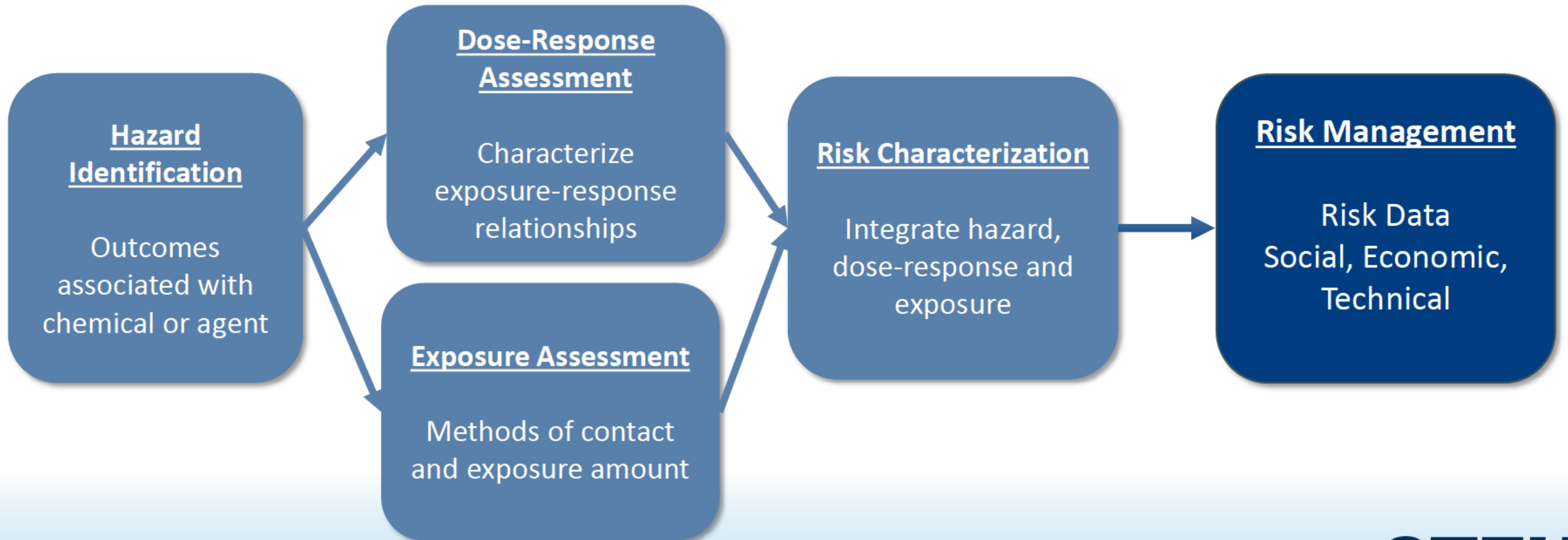
What are the existing O&G regulations intended to mitigate emissions of compounds of greatest health concern?



Following a Risk Based Approach to Inform Policy Development

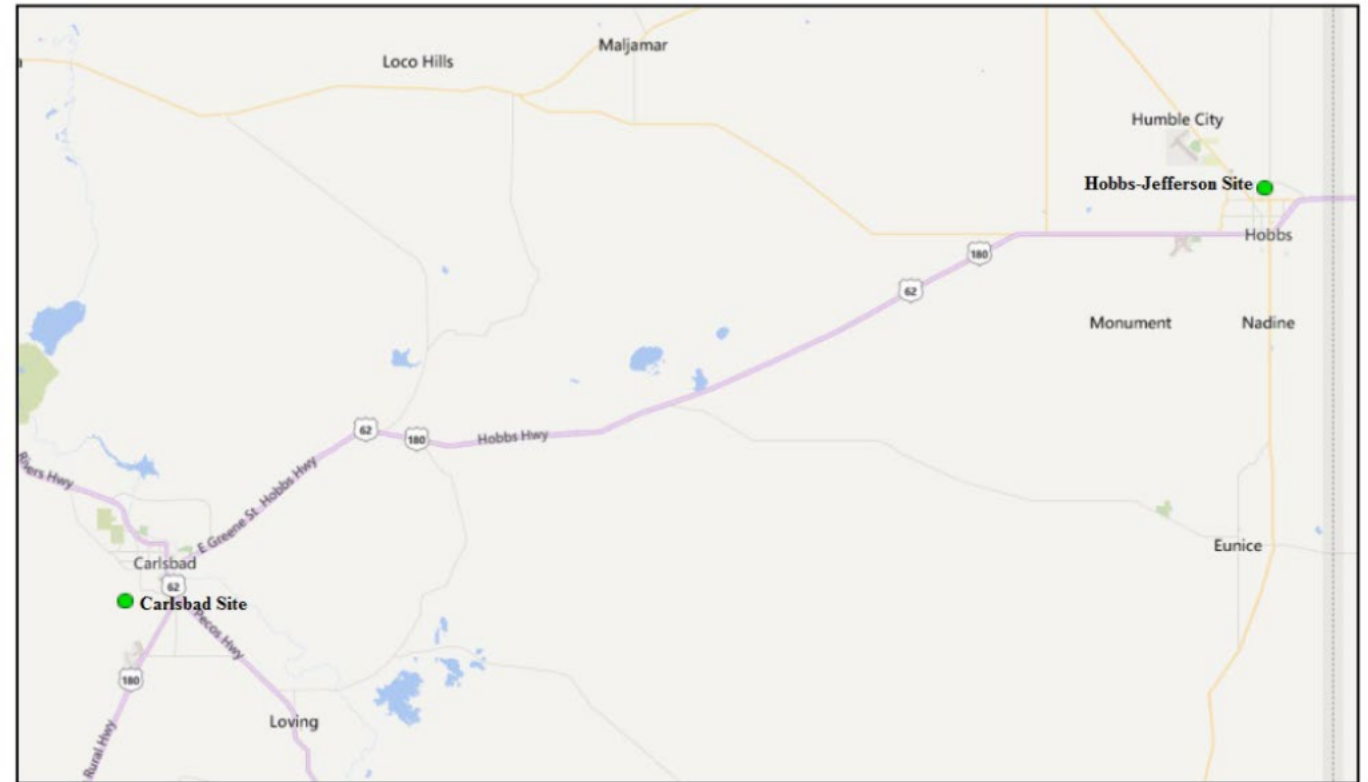
Human Health Risk Assessment

Risk Management

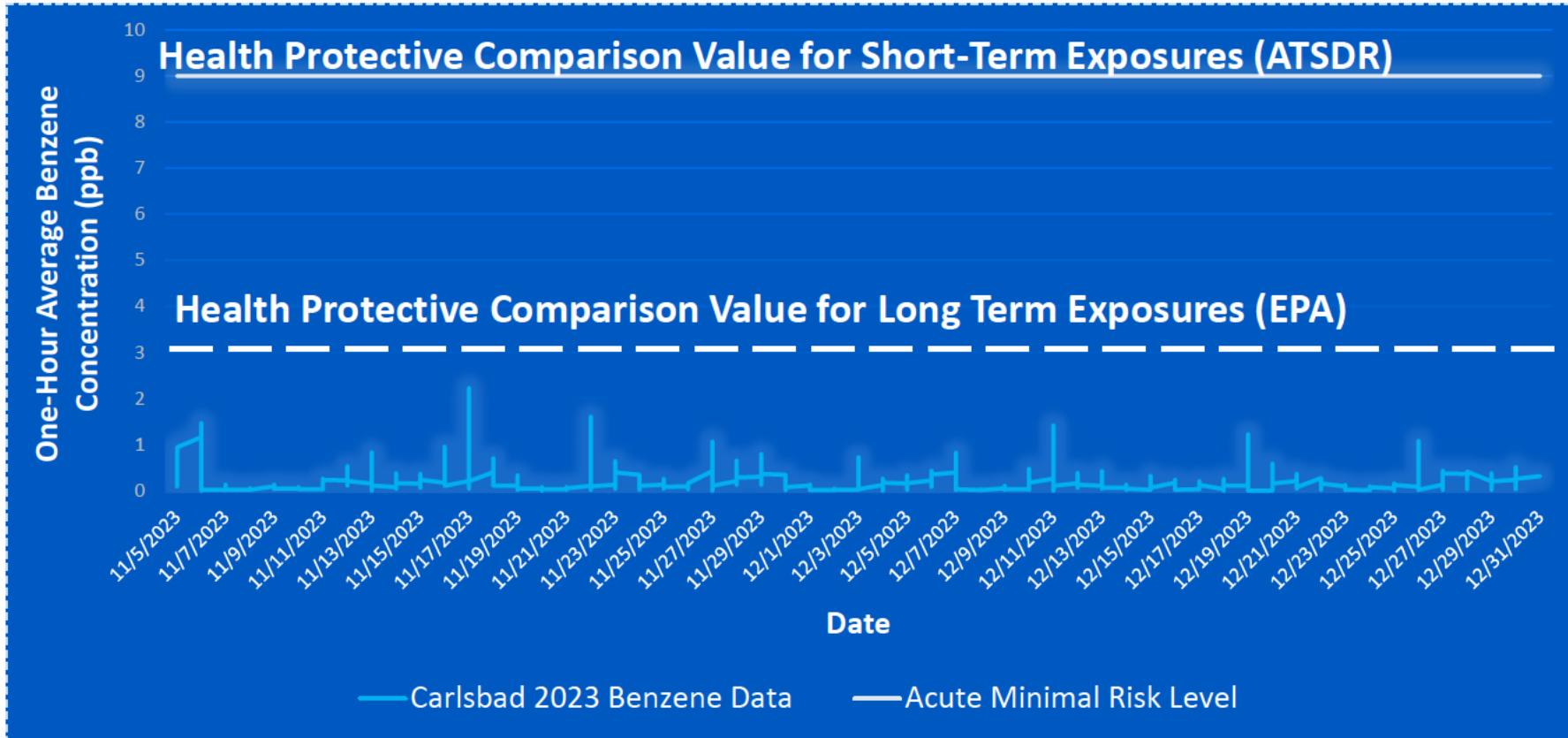


What data does NM already collect that tells us about benzene exposures in communities near O&G in New Mexico?

- New Mexico Environment Department (NMED)
 - Air monitoring station in Carlsbad.
 - BTEX (benzene, toluene, ethylbenzene, xylenes) Special Monitoring Project.
 - *“The NMED-AQB is committed to addressing environmental justice concerns related to the air quality network. Based on EPA’s EJ Screen for ozone and PM_{2.5}, NMED’s air monitoring network is providing representative data and monitoring sites have appropriate number of sampling equipment. Additionally, monitoring sites are located in areas that coincide with the pollution concentration percentages.”* (Air Quality Bureau 2022 Annual Network Review)



When correctly averaged, do benzene concentrations in Carlsbad air indicate potential risk of adverse health effects?



- In 2023, all one-hour benzene measurements are below the short-term health protective comparison value.
- Benzene would not be expected to cause short-term health effects to a person that breathed this air, even continuously over long time periods.

Are there increases in adverse health outcomes that can be caused from exposure to O&G emissions in Carlsbad compared to the state and other counties?

High exposures to benzene over an occupational lifetime can cause cancer of blood cells



NM Environmental Public Health Tracking Portal

	(184.20 - 116.70)	103.40	Desirable value (high vs. low) not applicable
Birth Outcomes - Total Fertility Rate (Expected Number of Births, 2017-2021)	2,062 (2,062 - 2,102)	1,654	Desirable value (high vs. low) not applicable
Cancer Incidence - Brain and Central Nervous System Cancer (Cases per 100,000 Population, Age-adjusted, 2016-2020)	5.3 (2.7 - 7.9)	5.3	Similar
Cancer Incidence - Chronic Lymphocytis Leukemia (Cases per 100,000 Population, Age-adjusted, 2017-2021)	2.0 (0.5 - 3.5)	4.2	Better
Cancer Incidence - Esophagus Cancer (Cases per 100,000 Population, Age-adjusted, 2016-2020)	5.9 (2.2 - 8.6)	3.5	Similar
Cancer Incidence - Kidney and Renal Pelvis (Cases per 100,000 Population, Age-adjusted, 2016-2020)	19.5 (14.4 - 24.5)	16.2	Similar
Cancer Incidence - Larynx Cancer (Cases per 100,000 Population, Age-adjusted, 2016-2020)	2.6 (0.9 - 4.4)	2.0	Similar
Cancer Incidence - Leukemia (Cases per 100,000 Population, Age-adjusted, 2017-2021)	11.2 (7.5 - 14.9)	12.3	Similar
Cancer Incidence - Liver and Intrahepatic Bile Duct (Cases per 100,000 Population, Age-adjusted, 2017-2021)	14.3 (10.4 - 18.1)	9.7	Worse
Cancer Incidence - Mesothelioma (Cases per 100,000 Population, Age-adjusted, 2017-2021)	0.9 (0.0 - 1.9)	0.6	Similar
Cancer Incidence - Non-Hodgkin's Lymphoma (Cases per 100,000 Population, Age-adjusted, 2017-2021)	14.8 (10.6 - 19.0)	14.0	Similar
Cancer Incidence - Oral Cavity and Pharynx (Cases per 100,000 Population, Age-adjusted, 2017-2021)	14.0 (9.8 - 18.2)	13.3	Similar
Cancer Incidence - Pancreatic Cancer (Cases per 100,000 Population, Age-adjusted, 2017-2021)	14.1 (10.1 - 18.1)	11.6	Similar
Cancer Incidence - Thyroid Cancer (Cases per 100,000 Population, Age-adjusted, 2017-2021)	14.9 (10.3 - 19.6)	14.5	Similar

Incidence rates of blood cell cancers are similar or lower in Eddy County than state averages

Public Health Takeaways for New Mexico



Environmental data collected in communities near oil and gas development have not been at levels of concern for adverse health risks.



Health outcome studies are largely inconsistent, lack cohesiveness of findings, and were not designed to show causal evidence that O&G causes specific health outcomes.



Health studies from other states can be useful, but caution should be taken on applicability to New Mexico.



A policy mandating a prescriptive, “one-size-fits-all” setback is NOT the answer to a multi-faceted public health issue.



A systematic process using established frameworks and convening of stakeholders would be a valuable next step in developing evidence-based policy to protect New Mexico citizens.

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Questions?

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