Health Impact Assessment for Shale Gas Extraction

IOM Roundtable on Environmental Health Workshop on HIA of Shale Gas Extraction

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Health Impact Project
www.healthimpactproject.org
Health Impact Assessment: National Research Council definition

A systematic process that uses an array of data sources and analytic methods and considers input from stakeholders to determine the potential effects of a proposed policy, plan, program or project on the health of a population and the distribution of those effects within the population. Health impact assessment provides recommendations on monitoring and managing those effects.

National Research Council, 2011
Health Impact Assessment

• Informs decision making on a specific proposed action—legislation, new regulation, permit, growth plan, etc.

• Identifies potential risks and benefits of the proposal
  - Sometimes quantitative, more commonly simple qualitative/descriptive approach.
  - Broad perspective: considers how multiple factors (economy, employment, environment, etc) affect health

• Emphasis on inter-agency collaboration

• Includes input from stakeholders: regulators, industry, community.

• Offers recommendations to address data gaps, establish monitoring framework, maximize benefits, and minimize any risks.
Natural Resource Development HIA
Industry and development banks use routinely

World Bank and IFC: part of evaluation standards for large development loans

Multinational Corporations: eg large oil and mining companies:

Business case for HIA
- Lower business costs
- Corporate social responsibility
- Healthy workforce
- Risk management
Energy and natural resource development HIAs
U.S. HIAs that have addressed energy and natural resource development decisions

- Biomass (poultry litter, wood) (MA, OR, CA, VA)
- Oil and gas leasing, development (AK)
- Shale gas development (CO)
- Mining (AK)
- Wind energy (OR)
What’s unique about this sector?

- Politics and scrutiny:
  - Polarization and politicization common: jobs, national security, environmental concerns.
  - Threat of litigation may make context more challenging.

- Mix of environmental health and socioeconomic risks and benefits.

- Concerns about pollutants can distract attention from other important risks and benefits.
Natural resource development
Common factors that may influence health

Air quality
Water quality
Noise
Subsistence/Agricultural Uses
Demographic change/influx of workers
Traffic patterns
Revenues
Employment and Income

Note: many of these factors are commonly considered in baseline studies, permit applications, and EIA
## Natural resource development

### What does HIA add to other studies & NEPA analysis?

<table>
<thead>
<tr>
<th>HEALTH INFUENCE (OFTEN PART OF EIS)</th>
<th>INFORMATION ADDED BY HIA</th>
</tr>
</thead>
</table>
| Air—criteria pollutants, HAP        | • Baseline prevalence of relevant diseases  
|                                     | • Local concerns/TEK      
|                                     | • Impact pathways, susceptibility analysis, cumulative impact factors |

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Table 5.8 Air Quality Health Impacts for San Marcos and Railroad Avenue Scenarios Adjusted for Population

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Estimated persons living in these conditions</th>
<th>Premature mortality (long-term exposure in ages 30+)*</th>
<th>Asthma hospitalization (ages ≤ 64)</th>
<th>Lower respiratory symptoms (ages 7-14)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Marcos</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential (non-arterial)</td>
<td>7,482</td>
<td>4</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Residential (arterial)</td>
<td>831</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Railroad Avenue, distant from SR 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential (non-arterial)</td>
<td>4,078</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Residential (arterial)</td>
<td>453</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>1</td>
</tr>
<tr>
<td>Residential and Commercial (non-arterial)</td>
<td>4,078</td>
<td>4</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Residential and Commercial (arterial)</td>
<td>453</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Railroad Avenue, near to SR 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential (non-arterial)</td>
<td>215</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Residential (arterial)</td>
<td>24</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
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<td>Residential and Commercial (non-arterial)</td>
<td>215</td>
<td>1</td>
<td>1</td>
<td>3</td>
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<td>24</td>
<td>&lt;1</td>
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## Typical Health Determinants Addressed

### Water Quality, Noise

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<th>HEALTH INFUENCE (OFTEN PART OF EIS)</th>
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<tr>
<td>Water—metals, organics, NORM</td>
<td>• Baseline prevalence of relevant diseases</td>
</tr>
<tr>
<td></td>
<td>• Local concerns/TEK</td>
</tr>
<tr>
<td></td>
<td>• Often very simple discussion of potential impacts: what discharges are expected, what health effects do they cause, what are the pathways through which they might contact people?</td>
</tr>
<tr>
<td></td>
<td>• Impact pathways, diet/subsistence practices, cumulative factors.</td>
</tr>
<tr>
<td></td>
<td>• Sometimes: incorporating HRA approach</td>
</tr>
</tbody>
</table>
HIAs that have applied a health risk assessment approach for air and water quality

Wishbone Hill Coal Project
http://www.epi.alaska.gov/hia/WishboneHillDraftHIA.pdf

## Typical Health Determinants Addressed

### Noise

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| Noise                             | • Baseline prevalence of relevant diseases  
• Local concerns/TEK  
• Identify vulnerable populations (eg. schools), locations relevant to sources (truck traffic, operations equipment)  
• Mitigations: sound walls and housing modifications, truck routes, hours of operation. |
## Typical Health Determinants Addressed

### Traffic

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| Traffic—changes in flow; transportation routes; road conditions | • Injury rates  
• Locations with high injury rates (dangerous roads, intersections)  
• Location of high-risk groups (eg. school xing) |

Figure 3.4.3-3 Vehicle-related accidents in Sublette County, 1995–2005 (Wyoming Department of Transportation 2007)

Figure 3.4.5-2 Number of EMS responses (Sublette County Rural Health Care District 2007)
**Typical Health Determinants Addressed**

**Demographic change: “influx”**

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<td>Demographic change— influx of non-resident workers;</td>
<td>• Potential impact pathways:</td>
</tr>
<tr>
<td></td>
<td>- Strain on services</td>
</tr>
<tr>
<td></td>
<td>- Social change: violence, crime</td>
</tr>
<tr>
<td></td>
<td>- Infectious disease</td>
</tr>
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**Science News**

*Mining in Africa Is Spreading TB, Study Suggests*

*ScienceDaily (June 3, 2010) —* Mining for gold, diamonds, and precious minerals is dangerous work, but in sub-Saharan Africa the activity could be driving an entire continent's tuberculosis epidemic, a new Oxford-led study has found.

Researchers at Oxford and Brown universities, the University of California, San Francisco and the London School of Hygiene and Tropical Medicine estimate that the mining industry in Africa may be implicated in as many as 760,000 new cases of tuberculosis each year.

**See Also:**
- Health & Medicine
  - Tuberculosis
  - Workplace Health
  - Infectious Diseases

*Data analysis shows a correlation between greater mining production and a rise in tuberculosis in sub-Saharan Africa.*
“Rate of syphilis jumps in McMurray”

Posted 2009
By LAUREN CUTLER
Today staff Fortmcmurraytoday.com

Figure 1: Number of infectious syphilis cases and rates per 100,000 by year in Alberta, 2009.
Typical Health Determinants Addressed
Economic revenues and costs

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<tr>
<td>Economy--Revenues</td>
<td>• Service needs—education, water/sanitation, public safety, clinics/hospitals, EMS</td>
</tr>
<tr>
<td>Economy--Costs</td>
<td>• Change in demands/LOS for hospital, emergency services, police, fire</td>
</tr>
</tbody>
</table>
Typical Health Determinants Addressed
Economic revenues and costs

Santa Barbara County Assn. of Governments
“Socioeconomic Monitoring & Mitigation Program”

“...small towns were turned literally overnight into boomtowns. Housing became scarce and community infrastructure was strained to the breaking point. All these problems overwhelmed the financial and technical capabilities of local governments.”

A few more examples of health-based mitigation

<table>
<thead>
<tr>
<th>Influence on Health</th>
<th>Sample Recommendations</th>
</tr>
</thead>
</table>
| **Air**             | • Monitoring & adaptive management: developing site-specific, tailored monitoring programs based on local meteorological conditions and population vulnerability  
                      • Best control practices near particularly vulnerable communities |
| **Water**           | • Identification and monitoring for sensitive receptors  
                      • Address unique pathways (e.g. subsistence consumption) |
| **Economy—Revenues and Costs** | • Monitoring system to identify costs important to health (road wear, EMS calls, school population, policy staffing ratio, etc), and guide use of tax revenues  
                      • Impact-benefit agreements with industry  
                      • Financial management courses and support for workers |
Issues & Challenges for HIA of Unconventional Shale Gas Operations

1. **Engaging polarized stakeholders**: building common ground between industry, community groups, local, state and federal government, and other interests

2. **Data gaps**: amount and type of emissions and discharges; baseline disease prevalence in small towns.

3. **No clear decision point**: Often no federal EIS; many states have not undertaken a comprehensive review prior to permitting.
Resources

Health Impact Project interactive map:
www.healthimpactproject.org/hia/us
-search by sector: “natural resources and energy”

Alaska Health Impact Assessment Program
http://www.epi.alaska.gov/hia/
• Technical guidance for HIA in Alaska:
  http://www.epi.alaska.gov/hia/AlaskaHIAToolkit_Intro.pdf

International Council on Mining and Metals:
HIA Guidance: http://www.icmm.com/library/hia
Thank you

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