

Human health and CSG development: A future study design framework

Knowledge Transfer session

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Innovation and Science

Multi-disciplinary, multi-institutional project team

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- Leisa-Maree Toms (QUT) Lesa Aylward (Summit Toxicology LLP)
- Will Rifkin (University of Newcastle)





Queensland Alliance for Environmental Health Sciences



QUT









Knowledge Transfer

Health Study Framework



Gas Industry Social and Environmental Research Alliance

Addresses chemical and social stressors









Establish processes for TRUST and QUALITY



Community moderately concerned: Narrabri 2017





Health concerns mid-table of perceived negative impacts from CSG development

Water contamination Depletion of underground water Community division over CSG Disposal of salt and brine Natural environment (Pilliga Forest) Farm property values Home rental prices Health impacts Air contamination Dust, noise, and light pollution Pressure on services and facilities Risk of fire Traffic on the roads



Level of concern



5

9

As confidence in knowledge increases - health concerns decrease





Site specific Demonstrate an exposure pathway



- potential hazards
- exposure pathways
- health concerns of the community, and
- confounding factors

Gather site-specific existing data





Hypothetical study boundary

Identification

Site model Exposure pathways





Prioritisation may be required to work within a given budget. This may result, for example, in breaking a future study up into a suite of smaller studies to be undertaken as budgets permit.



Physical and chemical stressors

Collate

- ✓ chemical levels in air, soil, water and people (e.g. blood)
- measures of physical stressors (light, noise)
- health symptom and outcome data



Key exposure and health factors for the region



Surat Basin ambient air quality study





- An assessment of impacts of CSG on air quality in Surat Basin
- Data from a network of 5 air quality monitoring stations in the Chinchilla

 Miles - Condamine area & 10 VOC monitoring sites for 2016 & 2017
- AQ model explores the degree to which different emission sources in the SB contribute to air pollution



Exposure modelling example Shipping contribution to annual PM2.5 in the Sydney region





Air, water and soil impacts of hydraulic fracturing study





- Measurements from August to November 2017
- High spatial resolution with measurements taken across 6 sites within a ~600 ha site containing 10 wells.
- High time resolution -combination of continuous measurements and short duration integrated sampling (12-hour 48-hour samples)
- 50 individual measurement systems detecting over 50 species including all air pollutants listed in the National Environment Protection Measures for Ambient Air Quality (NEPM 2015) and Air Toxics (NEPM 2011)



Upper Hunter Valley case study

- Community concern over coal dust
- Particle characterisation source apportionment
- Hibberd, Selleck and Keywood (2013)





PM2.5 mass (micrograms/m3)

Social stressors

Collate

 ✓ data on Social risk factors & precursors that may contribute to adverse health outcomes at the individual, family, or population level

Assess

✓ Quality check data sets
 ✓ Identify confounding factors
 ✓ Determine population statistics
 ✓ Identify vulnerable and susceptible populations
 ✓ Gauge social stress and resilience
 ✓ Identify symptom patterns

Social risk factors & precursors that may contribute to adverse health outcomes at the individual, family, or population level



Screening Assessment Data quality Identify data gaps





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Further assessments





Scoping a future study- considerations

- □ Framework allows for flexibility
- Consider most impact from available resources (budgets)
- □ Stakeholder priorities
- Study location in an active CSG area (e.g. Surat Basin) – likely to provide most meaningful results



Scoping future studies: Examples of different options

Suite of smaller studies

- Assess chemical and social stressors separately
 - in different studies
 - at different times
- Conduct Identification and Screening stages in an initial study
- Further designed in a follow up study

Boundaries

- screening and further assessments based on the identification process and local stakeholder priorities
 - e.g include social stress directly related to the industry (landowner stress related to negotiating conduct and compensation agreements or ensuring compliance with the CCA) and omit indirect social stressors (increased rents in town)
 - Assess water or air issues only





Thank you





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