

Proposed Case Definition

Health Effects Related to Unconventional Natural Gas Development (UNGD) Environmental Exposures

Rationale

A case definition is a set of uniform criteria used to define a disease or other health condition for public health surveillance or epidemiological research. Public health surveillance is the systematic collection, analysis and interpretation of health-related data essential to the planning, implementation, and evaluation of public health activities. Having a case definition assists in assessing the burden of a disease or condition within a population, an understanding which is critical to mounting a public health response. Case definitions may evolve over time as more is learned about the particular condition.

Recognizing that UNGD activities are exposing increasing numbers of residents to harmful air and water contaminants, EHP is proposing a case definition for health effects related to UNGD environmental exposures. The proposed case definition could be used as is, or modified appropriately, by agencies responsible for or interested in assessing the public health burden of UNGD activities.

EHP Case Definition

The Southwest Pennsylvania Environmental Health Project (EHP) case definition for health effects related to environmental exposures from UNGD activities is primarily derived from the knowledge gained from EHP's health assessments of over 100 individuals in southwest Pennsylvania with potential exposure to UNGD related air and water contaminants. The relative frequency of symptoms was determined based

A case definition usually includes both an objective or laboratory criterion and clinical signs or symptoms which must be present to qualify as a case. Cases are classified as “suspected”, “probable”, or “confirmed” based on increasingly stringent criteria for being designated as a case. Although case definitions are useful for estimating the magnitude of the health impacts of an exposure on a population, in a clinical setting, due to the inherent sensitivity and specificity limitations (false negatives and false positives), a case definition should not be used as the only criterion for determining whether an individual is experiencing health effects related to an exposure.

on reported symptoms of 61 individuals who were documented to be living within 1 km of at least one active UNGD site at the time of their evaluation by the EHP nurse practitioner. In order for a reported symptom to have been considered potentially related to UNGD activity and to be included in the case definition, the onset or worsening must have occurred after the beginning of the UNGD activity and must not have been as easily explained by a pre-existing medical

condition, brief unrelated illness, or alternative exposure.

In the EHP analysis, symptoms were grouped into anatomical systems. The six most commonly reported systems were included in the case definition, with individual symptoms included if they had been reported by more than 10 percent of individuals.

Although the case definition is based on symptoms reported to EHP, the reported symptoms are consistent with those reported to other organizations.

Case definitions for environmental exposures typically require an indicator for the environmental exposure in addition to clinical signs and symptoms compatible with the exposure. In the current case definition, an actual measured exposure to a contaminant provides the most stringent exposure indicator, and is required to meet the criteria for a confirmed case. As in other exposure related case definitions, in the absence of a measured exposure, proximity to one or more exposure sources is used as a surrogate. Presence within 1 km of facilities extracting, transporting, processing or storing UNGD gas or waste, is required for a probable case, and within 1-2 kilometers for a suspected case. Examples of “a presence” include residing, working, or attending school. The case definition is not intended to address the occupational exposures of individuals working within the shale gas industry.

Proposed Case Definition *(continued)*

The case definition takes into account the recognized short term health effects of both the ubiquitous air emissions, as well as the more sporadically occurring water contamination. The case definition also recognizes that based on both source characteristics and weather variables, exposures, and therefore symptoms, may be episodic, persistent, or transient.

The case definition includes only the acute health effects experienced by residents exposed to UNGD contaminants. Exposure to many of the contaminants responsible for the short term symptoms also increase the risk for serious long term adverse health consequences, such as chronic respiratory disease, chronic neurologic dysfunction, and cancer.

Residents living in proximity to shale gas activities frequently report the new onset of psychological symptoms that interfere with normal functioning, including anxiety, depression, difficulty focusing and feeling a loss of control. Although it is important to recognize and to address these disabling symptoms they were not included in the case definition, as they may often be attributed to other circumstances. They may be ascribed to a wide range of social factors associated with shale drilling.

Criteria for a **Confirmed** Case of Health Effects Related to UNGD Environmental Exposures

Environmental Exposure	A documented* air and/or water exposure to an emission or contaminant originating from a shale gas site. *Instrument or laboratory measured air contaminant. Laboratory confirmed water contaminant.
AND Clinical Signs or Symptoms	The development of signs or symptoms or worsening of pre-existing signs or symptoms from two or more of the following systems: <ol style="list-style-type: none">1. Respiratory (cough, shortness of breath, wheezing, throat soreness or irritation, sinus problems, or nosebleeds)2. Dermal (rash, pruritus, or irritation)3. Neurological (headache or dizziness)4. Gastrointestinal (nausea or abdominal pain)5. Constitutional (sleep disruption or fatigue)6. Eye Symptoms (pruritic, painful, or dry)

Criteria for a **Probable** Case of Health Effects Related to UNGD Environmental Exposures

Environmental Exposure	A presence for a period of at least 20 hours/week during a minimum of at least one month within one kilometer of one or more facilities extracting, transporting, processing or storing shale gas or waste.
AND Clinical Signs or Symptoms	The development of signs or symptoms or worsening of pre-existing signs or symptoms from two or more of the following systems: <ol style="list-style-type: none">1. Respiratory (cough, shortness of breath, wheezing, throat soreness or irritation, sinus problems, or nosebleeds)2. Dermal (rash, pruritus, or irritation)3. Neurological (headache or dizziness)4. Gastrointestinal (nausea or abdominal pain)5. Constitutional (sleep disruption or fatigue)6. Eye Symptoms (pruritic, painful, or dry)

Criteria for a **Suspected** Case of Health Effects Related to UNGD Environmental Exposures

Environmental Exposure	A presence for a period of at least 20 hours/week during a minimum of at least one month within one to two kilometers of one or more facilities extracting, transporting, processing or storing shale gas or waste.
AND Clinical Signs or Symptoms	The development of signs or symptoms or worsening of pre-existing signs or symptoms from two or more of the following systems: <ol style="list-style-type: none">1. Respiratory (cough, shortness of breath, wheezing, throat soreness or irritation, sinus problems, or nosebleeds)2. Dermal (rash, pruritus, or irritation)3. Neurological (headache or dizziness)4. Gastrointestinal (nausea or abdominal pain)5. Constitutional (sleep disruption or fatigue)6. Eye Symptoms (pruritic, painful, or dry)

In order for a reported symptom to be considered potentially related to UNGD activity, the onset or worsening must have occurred after the beginning of the UNGD activity and must not have been as easily explained by a pre-existing medical condition, brief unrelated illness, or alternative exposure. **New or worsening symptoms may be episodic, persistent or transient.*



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