Section 4: Health Effects Categories (HECs)

Health Effects Categories (HECs) supply the fundamental framework for scoping discussions (Section 5). HECs allow the HIA team to systematically review each human health area in the light of the project design, policy description, or program description. The HECs inform baseline health studies considered in the HIA and inform how the HIA team identifies and rates health impacts.

Some international guidance documents use the term “environmental health areas (EHAs)” to address this topic, but for this toolkit the working group selected the term “health effects categories (HECs)”. The working group selected these HECs from a list of previously published EHAs and modified them for the Alaskan context. While health effects not addressed by the HECs can always be considered, international experience and the published literature indicates that the HEC system works well and captures the most important potential human health impacts.

Creation of a health effects categories framework allows for a systematic and consistent analysis.

The table shown below presents a list of health effects relevant for Alaskan resource development projects. The HECs can be used for desktop, rapid appraisal and comprehensive HIAs.
# Health Effects Category Table

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<th>Health Effects Category</th>
<th>Pathway Description</th>
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| **Social Determinants of Health (SDH)**               | This is a broad category that considers how living conditions and social situations influence the health of individuals and communities.  
   - psychosocial issues related to drugs and alcohol,  
   - teenage pregnancy  
   - family stress  
   - domestic violence  
   - depression & anxiety  
   - isolation  
   - work rotations and hiring practices,  
   - cultural change  
   - economy, employment, and education  

   **Limitations:** While SDH are real and important, it is extremely difficult to establish direct causality between a change in a social determinant and a particular health outcome. The language used to communicate impacts related to social determinants should reflect that SDH influence health in complex ways. |
| **Accidents and Injuries**                            | This category includes impacts related to both fatal and non-fatal injury patterns for individuals and communities. Changed patterns of accidents and injuries may arise due to:  
   - Influx of non-resident personnel (increased traffic on roadways, rivers, air corridors)  
   - Distance of travel required for successful subsistence.  
   - Project-related income and revenue used for improved infrastructure (e.g., roadways) and improved subsistence equipment/technology. |
| **Exposure to potentially hazardous materials**       | This category includes project emissions and discharges that lead to potential exposure. Exposure pathways include:  
   - Food. Quality changes in subsistence foods (risk based on analysis of foods or modeled environmental concentrations)  
   - Drinking water  
   - Air. Respiratory exposures to fugitive dusts, criteria pollutants, VOCs, mercury, and other substances.  
   - Work. Secondary occupational exposure such as a family member's exposure to lead on a worker's clothing.  
   - Indirect pathways, such as changing heating fuels/energy production fuels in communities. |
| **Food, Nutrition, and Subsistence Activity**        | This section depends on the subsistence analysis and nutritional surveys (if completed) and considers:  
   - **Effect on Diet:** This pathway considers how changes in wildlife habitat, hunting patterns, and food choices will influence the diet of and cultural practices of local communities. While nutritional surveys are the most effective way to assess dietary intake, conclusions can be drawn if certain assumptions are accepted  
   - **Effect on Food Security:** This discussion considers project-specific impacts that may limit or increase the availability of foods needed |
by local communities to survive in a mixed cash and subsistence economy present in rural Alaska.

| **Infectious Disease** | This category includes the project's influence on patterns of infectious disease: The pathways include:
| | • Influx of non-resident personnel from outside the region
| | • Crowded or enclosed living & working conditions and the mixing of low and high prevalence populations due to influx can create an increased risk for transmission of STIs such as syphilis, HIV, and chlamydia.
| | • Changes to groundwater/wetlands can alter habitat for agents that transmit vector-borne diseases. This is not a likely scenario in Alaska, but with the cumulative effects of climate change it may become an issue of greater concern in the future. |

| **Water and Sanitation** | This category includes the changes to access, quantity and quality of water supplies. The pathways include:
| | • Lack of adequate water service is linked to the high rates of lower respiratory infections observed in some regions, and to invasive skin infections.
| | • Revenue from the project that supports construction and maintenance of water & sanitation facilities.
| | • Increased demand on water and sanitation infrastructure secondary to influx of non-resident workers. |

| **Non-communicable and Chronic Diseases** | This category considers how the project might change patterns of chronic diseases. The pathways include:
| | • Nutritional changes that could eventually produce obesity, impaired glucose tolerance, diabetes, cardiovascular disease.
| | • Pulmonary exposures that lead to tobacco related chronic lung disease, asthma; in-home heat sources; local community air quality; clinic visits for respiratory illness
| | • Cancer rates secondary to diet changes or environmental exposures
| | • Increased rates of other disorders, specific to the contaminant(s) of concern |

| **Health Services Infrastructure and Capacity** | This category considers how the project will influence health services infrastructure and capacity. The pathways include:
| | • Increased revenues can be used to support or bolster local/regional services and infrastructure
| | • Increased demands on infrastructure and services by incoming non-resident employees or residents injured on the job, especially during construction phases. |

The HIA team should also realize that while not every HEC is relevant for a given project, they should at least give initial consideration to all of the standard HEC categories during scoping exercises.

**Social Determinants of Health**

It is widely accepted that human health is strongly influenced by a constellation of factors such as political change, impoverishment, educational opportunity, family dynamics, and
social integration. Social and health scientists often refer to these factors as “determinants”, because their influence on health is so strong. The World Health Organization (WHO) definition describes the social determinants of health (SDH) as “the circumstances in which people are born; grow up, live, work and age, and the systems put in place to deal with illness.” In remote rural Alaskan settings communities often suffer from high rates of illness due to poor water quality and quantity, poor sanitation, inadequate shelter, indoor air pollution, limited access to appropriate medical care, and the inability to control exposure to infectious agents. Urban settings in Alaska have their own set of determinants that should also be considered in the SDH analysis.

As the HIA team describes how project features affect each HEC, it must also describe whether the effects will be individual and/or community wide, and whether the impacts are direct, indirect, or cumulative. Evidence-based studies of Arctic populations are few and often unrelated to health questions encountered during scoping exercises. Even though this process is complex and evidence may be sparse, it is important to employ professional experience to make reasonable predictions about project effects on the HECs and to identify measurable outcomes.

Psychosocial Issues
The term psychosocial refers to social situations that produce psychological distress or psychological relief. Many adverse health behaviors are selected to cope with psychological distress just as many beneficial health choices are engaged during periods of psychological optimism and relief. In Alaska, poverty, rural isolation, urban isolation, cultural change, and a host of other social factors can produce psychological distress. Project features should be reviewed with psychosocial issues in mind and overt sources of psychosocial distress should be identified and avoided. While it is true that subsistence-based rural populations suffer significant psychological distress associated with perceived changes in their lifestyle and cultural stability, this reaction is not always uniform since some community members (e.g., younger members or those who have moved away) may feel less bound to traditional practices. Some of the most challenging health issues for Alaskans are social and cultural changes that produce psychological distress resulting in adverse health behaviors (especially substance abuse and addictive behaviors) followed by depression and, in some cases, suicide. While psychosocial impacts are most often indirect impacts involving a constellation of choices and causal factors, there may be instances when a project feature clearly exacerbates or ameliorates a psychosocial issue and the associated health outcomes. The most common examples are community fear that a project will affect their subsistence foods or the fear of environmental catastrophe such as an oil spill or tailings dam failure. Careful professional judgment should be employed to ensure that the HIA addresses psychosocial impacts that are clearly related to the project.

Individual Factors
Many SDH are strongly influenced by individual factors, such as genetic traits, lifestyle choices, and personal circumstances. Examples of individual determinants include gender, age, dietary intake, exercise patterns, alcohol and tobacco use, educational attainment, and employment. The causal relationship between a project and SDH for any given individual is very complex, but some level of causality can be predicted for subgroups within a community that share certain individual traits (e.g., pregnant women).
Institutional Factors

Institutional factors refer to infrastructure and address the adequacy of public sector services such as health care facilities, schools, transportation resources, sanitation, and communications infrastructure. It is especially important for the HIA team to understand the project’s potential impacts on the local health system since a large influx of workers can overwhelm already understaffed local health clinics, police departments, fire departments, emergency response services, and other services critical to public health and safety. Positively, many large projects have their own internal medical services and have developed outreach programs with local clinics to benefit community health service delivery. In addition, projects can improve local economies and one possible outcome is better health care facilities and improved program delivery.