Section 10: Monitoring and Evaluation

Once mitigation strategies are selected, the HIA team must develop an objective method to demonstrate that the intervention strategies achieve their intended effect. To monitor effectiveness, the monitoring and evaluation (M&E) plan is often anchored to a set of key performance indicators (KPIs). In general KPIs can measure:

- A health outcome (e.g., clinic visits per month for asthma exacerbation)
- An intermediate health risk indicator (Body Mass Index is a risk factor for problems such as cardiovascular disease and diabetes mellitus)
- A health hazard or health determinant (fine particulate levels are a health hazard that influences asthma rates)

Key Performance Indicators

Numerous KPIs have been established for monitoring health performance (Mosse and Sontheimer, 1996), but in general KPIs fall into three categories:

Structural – Assess buildings, equipment, drugs, medical supplies, and vehicles; personnel; money; and organizational arrangements.

Process – Assess the effectiveness of the actions, and identify who is involved and whether the various programs are working.

Outcome – The five Ds (death, disease, disability, discomfort, and dissatisfaction) are typically considered outcome measures. The morbidity and mortality outcome indicators are calculated as rates.

Some examples of the more common KPIs are:

**Structural**

- Household characteristics (household size, number of rooms)
- Pharmacy supplies of specific categories of drugs
- Sanitation systems such as septic tanks, latrines, etc.
- Water supply systems – indoor supply percent
- Solid waste – permitted landfill vs. open dump

**Process**

- Access to maternal medical services (such as trained birth attendants) and number of pre-delivery visits
- In-migration patterns (place of origin of household members, professional status of household members)
- Training with follow-up knowledge, attitudes, practices, beliefs concerning prevailing diseases
Outcome

- Disease-specific prevalence rates
- Anemia prevalence
- Anthropometric measurements of young children
- Alcohol use, smoking rates, domestic violence, and accidents
- Toxicology-biomonitoring (lead, arsenic, and so on), if relevant
- Increase in prevalent disease
- Appearance of new disease

Appendix 2 presents a more detailed list of potential KPIs by health effects category.

The baseline health assessment must be as complete as possible in order to observe changes in the KPIs. As discussed in Section 6, Alaska reports health information at the state or regional level, but not for individual communities. Given these limitations, the HIA team should choose KPIs that can be tracked using state or regional data. The selection of appropriate and relevant KPIs requires careful technical review by epidemiologists and biostatisticians.

There are several features common to a well-selected KPI. First, KPIs should be measurable. In small rural Alaskan communities this presents a particular challenge because the size of the population limits the statistical reliability of many disease rates. Even so, the HIA team can select KPIs that report health risk factors or intermediate health indicators that serve as a proxy for the health issues of interest.

Second, KPIs should measure impacts to both the project workforce and the community. For instance, a KPI that measures a health impact in the project workforce may also give excellent information about the wider rural or urban environment surrounding the project. This is especially true when the project employs a large local workforce. Therefore, many of the monitoring strategies originate inside the fence line and extend outside to specific project-affected areas.

Third, KPIs should detect both acute and chronic changes within PACs. Acute changes appear within weeks to months, such as acute disease-rate changes for respiratory infection. Chronic non-communicable disease-rate changes for diabetes or cardiovascular disorders evolve over a much longer period of time. A well-selected set of KPIs will detect both acute and chronic changes in health status.

Fourth, the HIA team should select KPIs that are clearly linked to the project. Monitoring and evaluating community health changes unrelated to a project is important, but beyond the scope of the HIA.

Fifth, the KPIs should capture both positive and negative health impacts. For example, the alleviation of income poverty will produce both positive and/or negative changes across many health outcomes.

Finally, KPIs should be drawn from existing health information systems. Alaska administers a state version of the Behavioral Risk Factor Surveillance System (BRFSS) each year, so KPIs drawn from BRFSS will be available for review on an annual basis.
Internationally, the development of district and local-level demographic surveillance systems (DSS) has been shown to be an effective method of long-term longitudinal surveillance.

**Verification**

The HIA team can also plan a verification system so that the progress of the mitigation efforts can be reviewed at a community level. For most projects, it is unrealistic to begin the verification process before the project has collected at least 6–12 months’ worth of information. For most health indicators, yearly verification reviews are likely to be sufficient. Formal external verification for health performance should be performed at selected time intervals, but it is possible to create a platform for more frequent community stakeholder involvement and input. Verification systems should be integrated with, and not duplicative of, other environmental verification systems (such as periodic environmental audits already required by the State for mining projects).