



Pollution – Pathway – People

Central to Blacksmith's approach is the model of Pollution-Pathway-People as the basis for understanding and assessing risks at a particular site. This model is consistent with risk assessment approaches used internationally (by USEPA, WHO and so on) but is very much simplified for use at our practical level.

Blacksmith is focused on people's health. However, many pollution related health impacts are chronic and are difficult to attribute directly to one source. In the context of an ISA it is unusual to be able to demonstrate clearly the health consequences of a particular site. What can be done is to show that there is a credible risk attached to the site and that this risk deserves further investigation, as part of the design of an intervention.

The existence of the risk depends on all three components: there must be a source of pollution (at a high enough level to be hazardous); there must be a population in a nearby area who are potentially exposed to the pollution; and there must be a pathway for the pollution to actually impact the people.

Preparation of the ISA is the process by which these components are identified and assessed at any site.

POLLUTION

There are many substances which are hazardous to peoples' health. In Blacksmith's work on legacy industrial and mining sites, there are a relatively small number of key pollutants which occur repeatedly. These include heavy metals and some organic chemicals.

The form and characteristics of the pollutant are important (mercury, for example, is relatively harmless as a metal but toxic as a vapour and bio-accumulates in methyl compounds.) The amounts of the pollutant are also critical. Investigators try to estimate the total volume of the hazardous material but a key factor is the concentration, which is measured on site if possible or is determined through sampling and subsequent testing. The critical parameter is the "over-standard" – the factor by which the concentrations of the pollutant exceed relevant national or international standards. This is the quantitative indicator of the hazard posed by the site.

POPULATION

A hazard is relevant when a population is exposed to or impacted by the pollution. A challenge for the investigator is to identify the relevant population, since the exposure will be determined by the pathways that exist. The first step, however, is to identify all the population groups within the probable area of influence of the polluted site. This is best done using a local map and local information, by identifying nearby villages and urban areas (with estimated populations). Not all of these will be at risk: that depends on the pathways that exist.

PATHWAY

A pathway is a physical mechanism by which the pollution can reach the population, in a form which can have potentially toxic effects. (See section on "Toxicity" for more detail.) Substances can be toxic through ingestion (swallowing, often in food or water), through inhalation (as dust or vapour), or by direct contact (typically on the skin). Radioactivity can, in some forms, act at a distance without direct contact and so proximity itself is a "pathway".

In practical terms, therefore, the key pathways are direct contact (if a site is unsecured), airborne as dust or vapour, or waterborne either in groundwater or surface water. Extend pathways are where contaminants dispersed through one of these pathways are further transported by another route. The most obvious is through food grown on land contaminated by (direct or airborne) pollutants or irrigated using contaminated water.

Exposure



The overall result of going through this logic is to be able to identify the populations that are potentially affected through the Pollution-Pathway-People connection. These people are therefore the population at risk.

The exposure is easier to demonstrate when the pathway is direct and data on contamination is good. However, the objective of the ISA is not to attempt to prove a specific health impact. It is to identify a credible and significant risk to a population. Subsequent interventions may then include either further studies or actions to remove the pollution or to eliminate the pathway and therefore the risk.