IFC International Finance Corporation
World Bank Group

Introduction to Health Impact Assessment

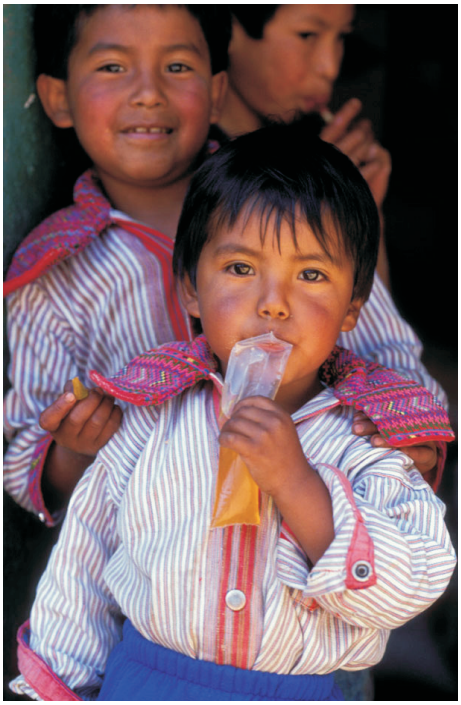


Table of Contents

Introduction 4
Community Health and Business Performance 4
About This Document 5

Section 1: Overview of HIA 6
Understanding Health Impact Assessment 7

Section 2: Screening—How to Decide Whether to Conduct an HIA 16
What Factors Trigger A Comprehensive HIA? 16
When is a Rapid Appraisal (Desktop or Limited In-Country) HIA Appropriate? 18

Section 3: Environmental Health Areas 20
Social Determinants of Health 23

Section 4: Scoping—How Comprehensive Should the HIA Be? 25

Section 5: Baseline Data—What, When, and How Much? 26
Data Sources and Collection Methods 26
Biomonitoring Data 28

Section 6: Stakeholder Engagement 29
Key Components 29
Gender and Cultural Considerations 29

Section 7: Risk Assessment—Assessing and Ranking Impacts 31
How Can Risks Be Estimated? 31
How Can Risks Be Rated? 31
How to Assess Impact Significance 32

Section 8: Health Action Plan 33
Fundamental Concepts 33
How to Evaluate the Health Action Plan 35

Section 9: Monitoring and Verification 37
Monitoring 37
Verification 39

Section 10: Resourcing 40
Allocation of Resources 40
External Expertise 40

Appendices

Appendix A Data Source 41

Appendix B Example of Community-Focused Mitigation Measures 46

Appendix C Typical Health Impact Issues 53

Appendix D HIA Screening Process 54

Appendix E HIA Sample Outline
Comprehensive HIA 57
Limited In-Country HIA 59

Appendix F Recommended Baseline Data Collection Activities and Tasks 61

Appendix G Risk Assessment Approach 64

Boxes

Box 1: Mitigation Strategies in the HAP 33

Box 2: Paris Declaration on Aid Effectiveness—Key Issues 36

Box 3: Three Types of Key Performance Indicators 38

Figures

Figure 1: HIA Roadmap 9

Figure 2: Health Impact Assessment Process 10

Figure 3: Selecting an HIA Type 12

Figure 4: DQO Process 28

Figure 5: Risk-Ranking Matrix 32

Figure 6: Prevention Pyramid 34

Tables

Table 1: Levels and Characteristics of HIAs 11

Table 2: Environmental Health Areas 21

Table 3: Typical Health Impact Issues by Environmental Health Areas 22

Table 4: EHA Population Categories 23

References 66

Acknowledgements 67

Acronyms

CDC	U.S. Centers for Disease Control
CWIQ	Core Welfare Indicators Questionnaire
DQO	Data Quality Objectives
DSS	Demographic Surveillance Sites
DR	Dependency Ratios
E&S	Environmental and Social
EHAs	Environmental Health Areas
EIA	Environmental Impact Assessment
ECMG	External Compliance Monitoring Groups
GIS	Geographical Information System
HDI	Human Development Index
HAP	Health Action Plan
HIA	Health Impact Assessment
HIS	Health Information System
HIV	Human Immunodeficiency Virus
HIV/AIDS	Human Immunodeficiency Virus, Acquired Immunodeficiency Syndrome
HNA	Health Need Assessment
HRA	Health Risk Assessment
KPI	Key Performance Indicators
LSMS	Living Standard Measurement Survey
MDG	Millennium Development Goals
MICS	Multiple Indictor Cluster Survey
MOH	Ministry of Health
M&E	Monitoring and Evaluation
NCD	Noncommunicable Disease
NGO	Nongovernmental Organization
NRC	National Research Council
PAC	Potentially Affected Community
PM&E	Participatory Monitoring and Evaluation
QA/QC	Quality Assurance/Quality Control
SIA	Social Impact Assessment
SDH	Social Determinants of Health
SEIA	Social Environmental Impact Assessment
TB	Tuberculosis
TALK	Traditional and Local Knowledge
TOR	Terms of Reference

All dollar amounts are U.S. dollars unless otherwise indicated.

Introduction

This document is intended to provide good practice guidance for conducting a health impact assessment (HIA) to determine potential impacts on community health as a result of project development. This guidance supports IFC's Performance Standards on Social and Environmental Sustainability. The document does not cover occupational health aspects of work environments.

This document has three objectives:

- To present methodological approaches to assess and address potential community health impacts that might typically be encountered in the development or review of existing or future industrial projects
- To assist in the development of the terms of reference (TOR) that may be needed to conduct the HIA
- To help ensure inclusion of health impact aspects in the social and environmental impact assessment process.

An HIA is a combination of procedures, methods, and tools to assess the potential health impacts of a project on nearby populations, and to recommend mitigation measures. HIA addresses both negative and positive aspects of health. HIA will also try to identify benefits to health that may be enhanced. It may be necessary to include assessment of health impacts in the environmental and social assessment process, depending on their potential significance.

HIA is applicable across industrial sectors (such as agribusiness, infrastructure, extractive industries) and project settings (such as urban, rural, greenfield, brownfield).

This document applies to two generic situations: 1) expansion of existing facilities or projects, and 2) development of new projects or new locations.

Potential health impacts at existing facilities can be triggered by expansions. In these cases, the assessment should consider whether the impacts have already occurred (legacy issues), are presently occurring (assessment of ongoing impacts), and/or will occur as a result of the expansions. Legacy issues are a concern for older facilities that may have operated with minimal or ineffective pollution-control technologies.

Community Health and Business Performance

Community health issues can affect business performance and reputation. For instance, certain diseases, such as malaria and acute respiratory infections, have the potential to cause changes in local workforce productivity, adversely affecting the business. The presence of communicable diseases can also increase the health care costs of local employees and their families. And a rise in the prevalence of noncommunicable diseases such as diabetes, hypertension, cardiovascular, and stress-related diseases can have significant productivity and financial repercussions. On the other hand, direct or indirect health-related support from project developers to local communities is usually well-received and can have significant reputational benefits to the project sponsors. Outreach efforts that improve overall environmental, social, and health quality can turn existing health-associated risks into mutual benefits to businesses and communities.

About This Document

Section 1 addresses the **types of HIAs**, and how to determine which type of HIA is appropriate for the project. It also describes **how an HIA fits into the social and environmental impact assessment process**. Sections 2 and 3 explain when a **comprehensive HIA** may be required, and Section 3 also lists and describes the **environmental health areas**. Sections 4 and 5 focus on the **in-depth level of the HIA** and the **baseline data** needs. Sections 6 and 7 address **health-specific stakeholder engagement** and **risk assessment** aspects. Sections 8 and 9 provide information on the development of the **health action plan** and **monitoring and verification**, including a discussion on **key performance indicators**. And Section 10 focuses on the **resources needed** for conducting health impact assessments. Appendix A contains a list of useful **websites** where you can find additional relevant information on how to conduct HIAs. Appendixes B and C present **mitigation measures** and typical health impact issues. Appendix D is a **screening-process checklist**. And Appendixes E, F, and G provide sample outlines of **comprehensive and limited in-country HIAs**, recommended **baseline data collection** activities, and **risk assessment** activities.

It is essential to identify potential health impacts that occur during construction.

Section 1: Overview of HIA

Project-related activities may directly, indirectly, and even cumulatively change community exposures to environment-based health risks, such as communicable diseases, equipment accidents, and exposure to hazardous materials or conditions. Projects have the potential to affect a broad range of environmental and social determinants of health either positively or negatively.

Factors that may contribute to health impacts include:

- A sudden influx of job seekers or extended family that increases demands on existing health and sanitation infrastructure
- Introduction of infectious diseases (both vector-borne and other communicable diseases)

These types of direct or indirect impacts may cause project delays, damage to relationships with communities or government organizations, legal liabilities, and additional costs. However, when properly managed, community health impacts may reduce unnecessary cost (down time, indemnifications), and help create positive perceptions, such as a social license to operate.

Consider potential impact on roadway accidents due to increased traffic.

The influx of workers and job seekers can impact local sanitation and waste-management systems.

A key consideration for the project is the ability to effectively involve key stakeholders in a realistic and positive participatory process. (Refer to Section 6 for a summary of the relevant approaches to stakeholder engagement in the overall HIA process, and to Appendix A for a list of IFC and World Bank publications on the subject.)

The capacity of the health system, particularly at the local project level, is critical. This capacity should be carefully evaluated to determine whether and how a project might affect local health systems and service delivery capacities. Particular attention should also be given to the health information systems (HIS) that record and summarize clinical medical data.

Many health issues can be resolved with the application of well-established, simple, and cost-effective public health interventions, such as treated bed nets, immunizations, and information, education, and communication programs. A significant portion of the underlying community burden of disease (for example, respiratory, diarrheal-related, or vector-borne) is often effectively addressed by engineering strategies such as housing design, water access and supply,

and surface-water drainage management. (See Appendix B for detailed sample mitigation measures.)

Understanding Health Impact Assessment

This section describes the key characteristics of HIAs, the HIA process, and types of HIAs, as well as how to determine which type of HIA to use and how the HIA fits into the impact assessment process.

Key Characteristics

Two key characteristics define HIAs:

- Predicting the consequences of project-related actions
- Providing information that can help decision makers prioritize prevention and control strategies throughout the project cycle

Hence, the HIA is a critical tool for developing evidence-based recommendations for project decision makers and key stakeholders.

Health is the responsibility not only of the health sector but also of other relevant sectors such as engineering, design, construction, community affairs department, local waste-management service, country road safety department, and local emergency response unit. These sectors also can play an important role in prevention, promotion, and mitigation.

Health impacts can be positive or negative, intended or not, single or cumulative. The range of changes may or may not be evenly distributed across the population; so the HIA should consider the equity of impacts. Vulnerability is a key consideration within the general discussion of social, environmental, and institutional determinants of health. In many cases, certain subgroups (for example, children, women, the aged) may be disproportionately affected.

Proper design of latrines for resettlement housing can have a significant health benefit.

HIA Functions

Overall, the HIA process can contribute to the following:

- Predicting the consequences of different project-related options
- Providing information required to help prioritize prevention and control strategies throughout the project cycle
- Serving as a vehicle to engage companies and key stakeholders in a collaborative decision-making process
- Identifying the most critical environmental and social determinants of health that may be affected by the project
- Addressing health issues that may influence overall sustainability objectives
- Facilitating intersectional collaboration beyond the health sector and capacity building with local, regional, and national host-country health resources
- Enhancing the project "license to operate" in the eyes of local communities and the host government

The HIA Process

The essential elements of the HIA process (Quigley *et.al.* 2006) typically include the following:

- **Screening**—preliminary evaluation to determine whether a proposed project is likely to pose any significant health questions. Specialists should generally assume that projects requiring environmental or social impact assessments are also likely to have potential health impacts. During the screening step, the need for an HIA can be determined.

- **Scoping**—a process for outlining the range and types of hazards and beneficial impacts. The overall types and categories of questions that should be addressed are defined at this stage of the HIA. The input of key stakeholders and the relevant host-country health authorities is critical, so that the HIA adequately addresses a realistic range of health concerns. This stage also is the time to develop the TOR for the scoping. The HIA effort should be "fit to purpose," and it should adequately and realistically match the complexity of the project.

- **Risk Assessment**—includes the key set of activities to investigate, appraise, and qualitatively or quantitatively rank the impacts the project is likely to have, on the health of the defined communities. The spectrum of potential impacts—their relative importance and at what level they are expected to occur—is determined in this step.

- **Health Action Plan**—considers the rankings developed in the risk assessment and develops a written health action plan (HAP). The HAP, also known as a health management plan, establishes the proposed actions needed to mitigate identified impacts and promote health opportunities in the project. Mitigation is a systematic process by which to avoid, reduce, remedy, or even compensate for potentially negative impacts. Review and analysis by key stakeholders, including host-country health authorities, is critical.

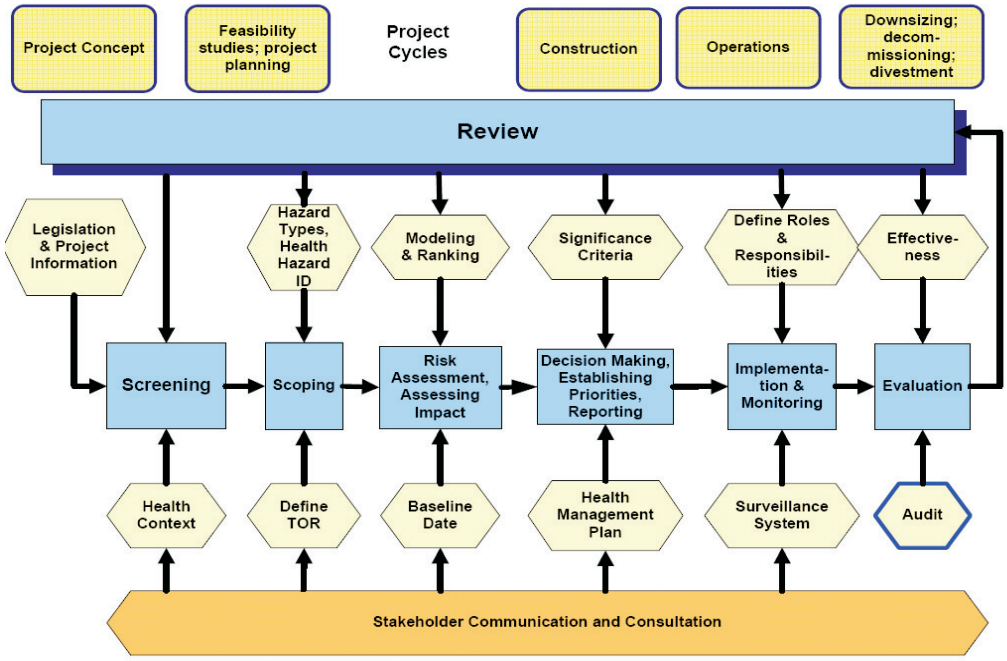
- **Implementation and Monitoring—**occurs after the health action plan is developed. At this point it is necessary to decide how the mitigation actions will be implemented and monitored, and to establish the roles and responsibilities of the companies and key stakeholders. During this process, the project should establish action frameworks and allocation of resources, and it should design monitoring systems to ensure that mitigation progress is satisfactory. In addition, the monitoring system should be designed to capture unanticipated effects or provide an early-warning system to alert that problems, are occurring at the community level. The monitoring plan should define appropriate key performance indicators.

- **Evaluation and Verification of Performance and Effectiveness—**a system for determining that implementation has been accomplished and is achieving the intended results.

Figure 1 illustrates typical process and flow for conducting an HIA (IPIECA, 2005). This diagram follows the same sequence that is used for both environmental and social impact assessments. A chart outlining the entire HIA process is presented in Figure 2. (See page 10.)

The participatory process—including stakeholder communication and consultation—provides active involvement in decision making for those with a stake in the project. A well-designed program will generate a sense of ownership of the overall HIA results and recommendations (IFC, 2007).

Figure 1: HIA Roadmap



Source: Adapted and modified from IPIECA, 2005.

As with all impact assessments, the HIA benefits from frequent review throughout the life of the project—so, the project can adjust the health action plan if necessary.

Types of HIAs

When gathering new field data for the HIA, the project will encounter different levels of effort and needs. The key descriptive terms for these cases—"comprehensive" and "rapid appraisal"—indicate the different depths of analysis and consultation required, and whether the performance of the HIA involves collecting new field data. (See Table 1.) In many situations, a rapid appraisal HIA will be sufficient; however, this assessment may uncover significant data gaps and trigger the need for a more comprehensive HIA, that is, new data collection.

- **Comprehensive HIA.** A comprehensive HIA includes screening, scoping, stakeholder consultation, risk assessment, appraisal, implementation and monitoring, and verification. (See Figure 1.) Stakeholder communication and consultation should take place at all stages—from screening through implementation and monitoring. During the project concept and feasibility studies and project planning phases, the project also will perform a limited level of local community stakeholder consultation.

  A comprehensive HIA is more likely to be considered for large, complex projects, particularly if resettlement or relocation of existing communities is involved or if a significant influx of persons is expected, regardless of whether it is a new-project or new-location situation or a significant expansion of an existing facility. An essential element of the comprehensive HIA is the need for some type of new data collection in potentially affected communities, and for helping to predict changes in health determinants, the associated risks, and health

Figure 2: HEALTH IMPACT ASSESSMENT PROCESS

Screening

1. Assemble the team
2. Identify legislative requirements
3. Gather and review relevant project information
4. Evaluate health context
   - ☑ **Location**
     - ☛ Rural
     - ☛ Urban
     - ☛ Peri-Urban
   - ☑ **Climate**
     - ☛ Tropical
     - ☛ Temperate
     - ☛ Polar
   - ☑ **Endemic Diseases**
   - ☑ **Influx**
     - ☛ Temporary
     - ☛ Permanent
     - ☛ Countries or Locations of origin
5. Review project design
   - ☑ **Water Bodies**
   - ☑ **Roadways, Pipelines**
   - ☑ **Construction Camps**
   - ☑ **Operation s Facilities**
   - ☑ **Sources of Potential Exposure**
   - ☑ **Transmission-Line Corridors**
6. Review the possible health impacts using environmental health areas
7. Identify potentially impacted geographic areas and potentially affected communities
8. Identify key stakeholders
9. Determine whether HIA is needed

Scoping

1. Set the geographical, time scale, and population boundaries to the assessment
2. Determine HIA approach
   - ☑ **Comprehensive**
     - ☛ Significant influx concerns
     - ☛ Resettlement/ Relocation
     - ☛ Significant construction activity
     - ☛ New linear features
     - ☛ Large project in rural setting
   - ☑ **Rapid Appraisal**
     - ☛ Limited In-Country
       - No new data collection anticipated within communities of concern
       - Existing data source review
     - ☛ Desktop
       - Limited review

Baseline Data

1. Literature review by Environmental Health Area
2. Evaluation of existing country survey and research data
   - ☛ Data validation
   - ☛ Statistical analysis
3. Evaluation of data from Key Stakeholders; Traditional and Local Knowledge
4. Evaluation of health data from existing project workers

Risk Assessment

1. Detailed description of risks and potential causation
   - ☛ Use map to brainstorm and make sure all risks are listed
2. Assess impact significance
   - ☛ Perception of risks by potentially affected communities
   - ☛ Nature—direct, indirect or cumulative
   - ☛ Timing and duration
   - ☛ Extent
   - ☛ Magnitude
   - ☛ Frequency
3. Riskranking
   - ☛ Severity
   - ☛ Probability

Health Action Plan addressing risks identified

1. Mitigation Approach
   - ☛ Action
   - ☛ Resource flows and responsibilties
   - ☛ Timing (construction, operations, decommissioning)
   - ☛ Collaborating organizations, if applicable

Monitoring and Evaluation

1. Define Key Performance Indicators (KPIs)
2. Determine approach to data collection
   - ☛ Implement
   - ☛ Evaluate

outcomes. This data collection typically consists of health-questionnaire surveys.

- **Rapid Appraisal HIA.** These assessments require less-intensive efforts; however, in-country investigation may be triggered. Typically, rapid appraisal HIAs are subdivided into desktop HIAs and limited in-country HIAs.

  A **desktop HIA** is a qualitative review of potential health impacts and is used to internally inform and comment on the proposed design of the project. It is also useful for determining whether a more detailed review is needed. The outcome of the desktop HIA may be the definition of scope for the HIA, or even that is required further assessment of health impacts is required.

A **limited in-country HIA** uses information that is already available or easily accessible. Thus, no specific new data collection is required. Data sources may include peer-reviewed scientific literature and "grey literature," that is, health department data. Workshops or discussions with key internal and external stakeholders, which are usually planned in the context of other social and environmental assessment efforts, also can provide useful health-related information. The overall results are typically incorporated into the social and environmental impact assessment, although the limited in-country HIA may also be issued as a stand-alone report. Limited in-country HIAs are appropriate for many expansion scenarios where new data collection is not needed. In some situations large health databases are available,

Table 1: Levels and Characteristics of HIAs

Level of HIA	Characteristics
Desktop HIA	◗ Provides a broad overview of possible health impacts ◗ Analysis of existing and accessible data ◗ No new data collection ◗ Usually takes an experienced assessor 2-3 weeks to perform the appropriate literature searches, analysis, and write-up
Limited In-Country HIA	◗ Provides more detailed information of possible health impacts ◗ Analysis of existing data ◗ Stakeholder and key informant analysis ◗ No new data collection ◗ Typically takes a team of two experienced assessors 10-14 days in the field, followed by 4-8 weeks of analysis and document preparation, with literature (desktop) searches performed prior to the field work
Comprehensive HIA	◗ Provides a comprehensive assessment of potential health impacts ◗ Robust definition of impacts ◗ New data collection ◗ Participatory approaches involving stakeholders and key informants ◗ Requires approximately 2-4 weeks of in-country field work (Community surveys typically require a minimum of 2-4 months for data collection and analysis, depending upon the size and complexity of the survey. Typically, one survey team should be able to cover 4-5 households per day. A typical survey team includes 2-4 members.)

Perform the type of HIA needed to best understand and mitigate potential project impacts.

Formal community surveys are complex, time-consuming, and expensive if several hundred households are covered. A minimum cost of $500-1,000 per day is typical for formal large-scale household survey efforts that include both local and international consultants.

sufficient for documenting current baseline community conditions, making new field collection efforts unnecessary.

How Does a Company Determine the Type of HIA?

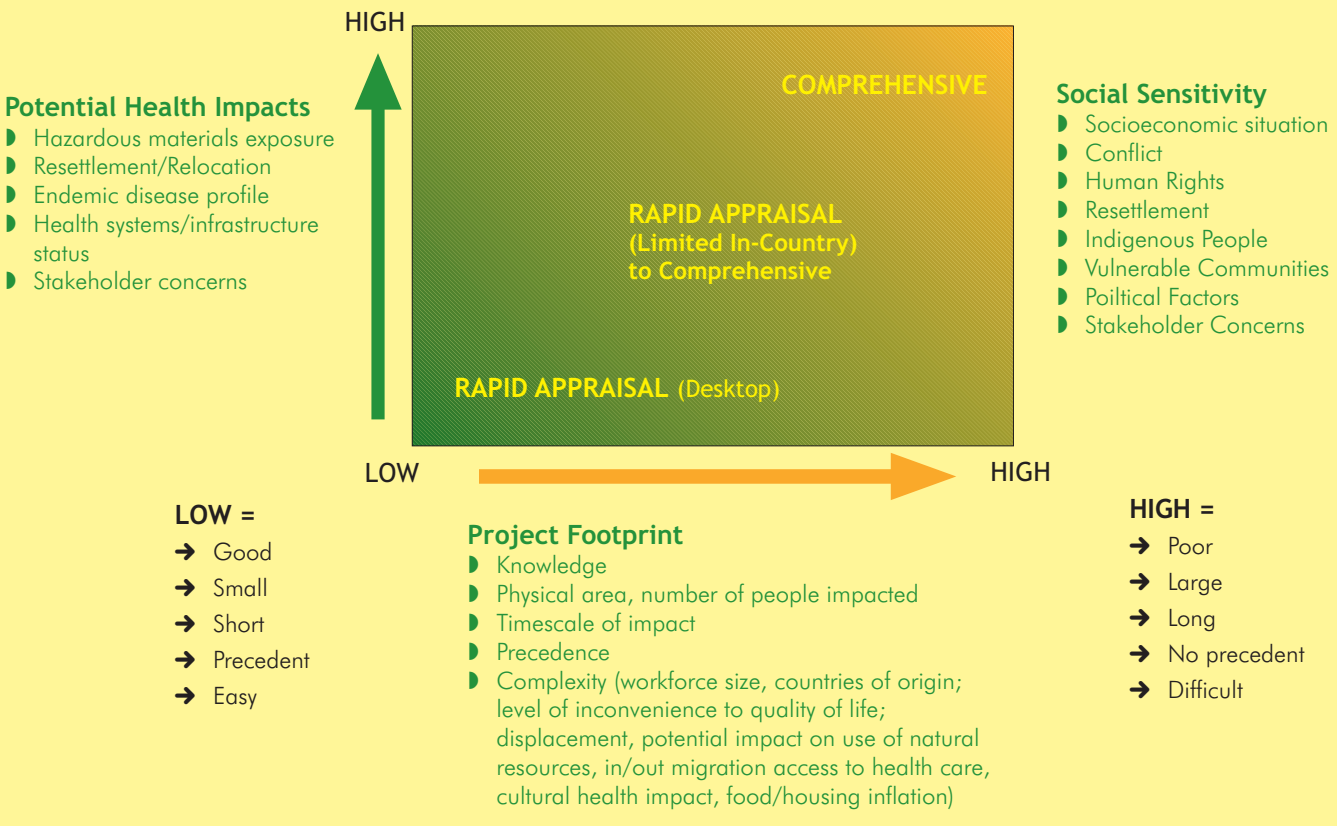
No clear dividing line exists to indicate whether a project needs a comprehensive HIA or a desktop or limited in-country HIA. (See Figure 3.) However, it is important to establish a rationale for performing a limited in-country HIA.

In Figure 3, the ***potential health impact*** axis considers health issues in the proposed project location, such as:

- Hazardous materials exposure—how the facility will operate, and what the potential exposures are to physical, biological, and chemical agents
- Resettlement or relocation—moving communities or providing compensation for relocation
- Endemic disease profile—malaria, dengue, HIV/AIDS, tuberculosis, schistosomiasis, and so on
- Health systems and infrastructure—poor or nonexistent health infrastructures
- Stakeholder concerns—critical community issues, such as water quality or access, increased road traffic and accidents

The ***social sensitivity*** axis covers a broad range of issues, many of which are typically addressed within the social analysis of the potentially affected communities (for example, conflict, resettlement,

Figure 3: SELECTING AN HIA TYPE



political factors, vulnerable communities, human rights, and equity concerns). The vulnerable status includes factors such as gender, ethnicity, culture, sickness, physical or mental disability, poverty or economic disadvantage, and dependence on unique natural resources.

The ***project footprint*** axis applies to:

- Physical area, and number of communities and people impacted by construction, operation, and decommissioning (consider adjacent communities)
- Temporary and permanent inconvenience to the population's quality of life or economic activity, such as dust, noise, transportation corridors, temporary or permanent rerouting of roads and rerouting or damming of rivers
- Workforce size, potential countries of origin, and housing
- Impact on natural resources used by the communities (for example, land for forestry, farming, subsistence hunting and fishing, foraging, and water supplies for drinking, fishing, farming, and industry)
- Physical displacement (that is, resettlement or relocation of individuals or communities that may increase the footprint)
- Potential of the project to cause local violence or other significant disruptions of community cohesion
- Impacts on population size and profile (influx), such as in- or out-migration potentially triggered by the project
- Indigenous peoples' and local communities' cultural health practices
- Local people's access to health infrastructure and services
- Distortion of local prices, especially of land, food, water, and property

The HIA variables listed in Figure 3 are good indicators of health aspects. Key environmental health areas (EHAs) are discussed in detail in Section 3, and a list of EHAs is presented in Table 2.

HIA for New Projects or New Locations

The HIA for new projects or new locations ideally seeks to identify and estimate the significant changes that may occur in the health of a defined population as the result of different actions. When a concurrent or retrospective health assessment is triggered, it aims to determine whether impacts are occurring or have occurred. Therefore, the timing of the HIA is critical. For maximum benefit, the project should conduct the HIA before the final engineering design specifications and construction contract are "locked in."

> Timing is critical:
>
> Maximum benefit occurs when the HIA comes before the final engineering design specifications and construction contract are "locked in"—when it can influence decision making.

The HIA is not the best predictive tool for performing cause-effect analyses of specific community concerns—for example, whether past facility releases (air, water) may have impacted health or caused changes in underlying rates of diseases, such as malaria, reproductive outcomes, or respiratory diseases. For these types of situations, standard epidemiological investigations are much more appropriate. Also, these types of investigations are quite complex and require expert consultation.

When the HIA is performed concurrently with the environmental and social assessments, there is a greater ability to effect change, and significant opportunities for cost-effective improvements by public health engineering. Unfortunately, in many situations, a comprehensive HIA is performed, 1) after final design has occurred and construction has begun, and/or 2) after performance of a superficial rapid appraisal HIA, which is often embedded in the social environmental impact assessment (SEIA).

How Does an HIA Fit into the Impact Assessment Process?

Since health impacts need to be assessed as part of the social and environmental impact assessments, the project should include the health component as part of the SEIA terms of reference. The proper integration of an HIA into its SEIA includes resolving boundaries, avoiding duplication, integrating mitigation measures, and integrating executive summaries.

How deep to take the health analysis and consultation depends on the project's potential health impacts. A company that identifies, through the screening process, potentially significant health impacts of the project should establish the need for conducting a comprehensive HIA, which can be incorporated into the SEIA instead of being a separate document. In such cases, the company should seek advice from health-assessment qualified experts, or include health experts on the team conducting the SEIA, or both.

All projects, particularly large projects, should consider the following aspects:

- The nature and extent (geographical distribution of effects) of potential health impacts may not match the communities defined in the SEIAs.
- How were potentially affected communities (PAC) and households defined and selected by the different impact assessments?
- Health equity considerations that are key to PAC and other key stakeholders have impacts that are felt disproportionately across different population subgroups.
- The biology of disease transmission is complex and variable across geographical settings (for example, urban, peri-urban, and rural), seasonal aspects, and cultural practices. The geographical areas, and the communities and households located within them, may differ from the way they are defined on a purely environmental or social basis.
- The utility and validity of existing health databases generated at the district and provincial levels could be overestimated.
- The range and depth of potential household- and community-level health impacts, particularly when there is resettlement or relocation, are often complex, subtle, and potentially long-lasting.

If the HIA is part of the social and environmental impact assessment, the health analysis should be carefully reviewed and held to the same standards of a stand-alone HIA.

Since data obtained during the social and environmental assessment process can and should be used in the HIA, it is important to structure joint planning and coordination of household and community surveys to avoid having communities and individual households experience "survey fatigue." This also saves time and cost of assessment.

Stakeholders are often concerned about water quality and access.

The recommendations that are developed in the HIA are further discussed and analyzed either within the mitigation section of the SEIA or in a separate health action plan. The HAP is an important tool for defining the roles and responsibilities for the various proposed mitigation measures.

Related Health Assessments

Health Risk Assessments (HRAs) refer to either: 1) the quantitative calculation of incremental individual risk due to exposures to potential hazardous materials in the environment, or 2) the assessment of the risks and hazards that may be encountered by project workers (including expatriates), such as chemical exposures, heat stress, safety hazards, and so on.

Health Need Assessments (HNAs) generally describe the health needs and health assets of different groups in the local population; its primary function is to inform decisions about strategies, service priorities, commissioning, and local delivery plans. In contrast with the HIA starting point, which is the proposed development or project in relation to the community, the HNA starting point is the existing community. The HNA focuses on critical health problems, deficiencies, and assets that exist in a community, unrelated to a proposed project.

The different types of health assessments may overlap, and these assessments can benefit from exchanging and sharing data. The HNA is important in developing health management plans and investment strategies.

Joint planning and coordination of household and community surveys is essential.

Section 2: Screening—How to Decide Whether to Conduct an HIA

Screening a is preliminary evaluation to determine whether a proposed project is likely to pose any significant health questions, and whether an HIA is needed.

Screening should be based on a complete description of project characteristics and potential impacts.

The following are some factors of the projects that should be subjected to HIA.

What Factors Trigger a Comprehensive HIA?

Several factors should be considered when evaluating the need to perform a comprehensive HIA. These factors should be based on potential impacts due to project characteristics, potential environmental and social hazards, and community concerns.

The following are examples of factors to be considered:

- **Significant influx concerns.** Influx can occur due to job seeking, commercial opportunities, small-scale trading, extended-family in-migration, and so on. Significant influx, regardless of cause, can put tremendous strains on fragile local infrastructures and existing vulnerable populations. (IFC is developing a new guidance note for evaluating and managing environmental, social, health, and security impacts related to project-induced in-migration. This guidance note will provide detailed approaches for risk assessment and management of influx-triggered impacts.)

Camp followers are attracted to projects, particularly during construction phases.

- **Significant resettlement or relocation of local communities.** To document short-term, long-term, and cumulative impacts, the project should obtain accurate presettlement baseline data. It is unlikely that the SEIA will capture the full range of potential health impacts that are likely to occur.

- **Significant construction phases.** These including new major construction or expansion at existing facilities that may involve **large temporary workforces** often located at multiple work camps at different geographic locations. Construction activity typically acts as a magnet, causing an influx of people into the project area. The area of influence may be surprisingly large and not confined to the immediate host communities; hence, potential regional effects should be considered. Even if the workers are completely housed within camp construction sites, spontaneous settlements populated by "camp followers" are sure to develop.

Camp followers are those individuals and families newly attracted to an area because of the economic and employment opportunities associated with the construction phase of a new project. The ratio of worker to camp follower is unknown, but field experience indicates that a large construction site (more than 1,000 workers) will attract at least an equal number of camp followers, such as small traders, guest houses, shops, bars, restaurants, and sex workers.

- **Prominent and new linear features, with emphasis on road transport.** Linear features are structures such as railway lines, power transmission lines, pipelines, roads, and canals. Linear features may cross over and typically connect a variety of ecological and human communities. Changes in road and traffic patterns, particularly the increase in long-haul truck trips, can be a significant issue during all phases of a project. Their impacts include changes in sexually transmitted infections, increases in accidents and injuries, and greater exposures to road dust and vehicle emissions.

  Changes in transportation corridors are important from both a social and a disease-transmission dynamic, because the spread of diseases (for example, sexually transmitted infections and certain vector-borne diseases) can be dramatically facilitated by the rapid influx of job seekers and construction workers into previously "sterile" geographical areas and communities. Although improved transportation corridors may bring many benefits, their presence also includes the potential for significant and long-lasting negative community impacts. Therefore, the overall potential impacts triggered by new linear features require careful review and analysis.

- **Large projects in rural settings.** The existing public health systems in rural areas may be weak or nonexistent, and the underlying burden of disease in local communities is high. Therefore, although it is important to systematically review the available data in the host country's health information system (HIS), it is appropriate to exercise caution when evaluating the existing disease databases that may be available (Erlanger, 2008b). In general, there is massive underreporting and misreporting of disease burdens. Rural households that may have little or no access to health care services will not necessarily be captured in the reported health statistics. In addition, the published data may be a result of "syndromic diagnoses," purely based on clinical analysis without objective laboratory confirmation. Therefore, it is critical for the health assessment to dig deep and to consult a variety of sources, such as published scientific literature, nongovernmental organizations, and general literature searches using Internet search engines and standard textbooks of public health and tropical medicine. Appendix A provides a detailed list of useful Web sites, published scientific papers, and commonly consulted textbooks.

Communities are aware of potential impacts on water sources such as rainwater catchment areas.

The hallmark of almost all of these cited situations is project-triggered influx.

So, ask: Will the proposed project cause or facilitate (via transport corridors) in- and out-migration within its area of potential influence?

If the answer is yes, then the project should consider some level of new baseline data collection.

And a comprehensive HIA is appropriate.

Overreliance on country HIS data can be illustrated by the difficulty of evaluating reported diagnoses of malaria. Typically, in areas with malaria transmission, virtually all cases of fever are "suspect malaria" and reported as such. Fever is often the most commonly reported clinical diagnosis within a local HIS. However, if objective laboratory testing is performed, the number of confirmed malaria cases can fall dramatically, that is, 5-10-fold reductions in confirmed versus syndromically diagnosed cases (Amex, 2004). Therefore, a project that used the reported local statistics as a baseline may demonstrate significant postproject improvement by simply improving the local health provider's ability to accurately diagnosis common diseases such as malaria.

When is a Rapid Appraisal (Desktop or Limited In-Country) HIA Appropriate?

Performing a rapid appraisal HIA does not mean that, 1) the level of effort or analysis is minimized, or 2) the potential for significant health impacts is missing. The term rapid appraisal HIA only implies that new field data collection efforts are not expected, because a careful literature survey may reveal availability of some or all of the following sources:

- Health surveys, such as demographic health surveys (DHS), multi-indicator cluster surveys (MICS), core welfare indicators questionnaires (CWIQ), or living standards measurement surveys (LSMS), may have been performed (Rutstein and Johnson, 2004). Typically, these surveys are well-designed and well-executed and have large sample sizes. DHS and MICS have been performed around the world, but particularly in Sub-Saharan Africa and Southeast Asia. For example, several of the more recent DHS, particularly in Sub-Saharan Africa, have included HIV testing and thus contain reliable population-based data on HIV seroprevalence. The CWIQ survey has been performed only in Sub-Saharan Africa. LSMS coverage is variable and limited; however, many countries use this survey as a basis for performing their own national surveys. Nevertheless, caution should be exercised when applying national or regional results to specific project locations, because the number of samples obtained in a given geographical location may be very small.

- Other sources of data include published academic research studies that cover the proposed project areas. These studies may be far more sophisticated, particularly with regard to biomonitoring data, than the standard efforts typically proposed for impact assessments. Similarly, the project may have access to academic or government demographic surveillance sites (DSS), with comprehensive survey coverage. DSS data is collected under internationally recognized protocols (www.indepth-network.org) and is highly reliable and useful, if the geographical coverage matches the project requirements. DSS data are limited to locations that have a formal functioning site. There are over 30 DSS locations around the world, with many sites in Southeast Asia and Sub-Saharan Africa. Nevertheless, DSS coverage is far from complete, and the presence of a DSS does not mean that the specific project location will be within the defined catchment area.

Those conducting the HIA may find either of the following:

- Sufficient health data are available (rapid appraisal may be appropriate).
- No health data are available (comprehensive assessment is needed).

Section 3: Environmental Health Areas

The environmental health[1] areas (EHA) framework defines the types of health impacts and provides a structure for organizing and analyzing potential project impacts on the community. Table 2 presents a list of EHAs. The EHAs can be used for both comprehensive and rapid appraisal HIAs.

Based on experience in analyzing and mitigating the key burden of health impacts (for example, respiratory problems, vector-borne diseases, accidents and injuries, diarrheal diseases, and so on), the HIA should identify the environmental health areas that are likely to broadly capture the vast majority of linkages between project-related activities and community-level impacts (Listorti and Doumani, 2001).

To further assist with the identification and development of the EHA analysis, Table 3 and Appendix C present a list of key issues (for example, influx, linear features, and so on) that can strongly help identify applicable EHAs. In addition, Appendix D includes an HIA screening process checklist through EHA that will facilitate a consistent analysis.

Potential health impacts are considered in 1) the broad perspective associated with development and mitigation of adverse environmental conditions, and 2) the narrower context of diseases and injuries associated with water, sanitation, solid waste, housing, vector control, and hazardous materials. Thus, the potential linkages between infrastructure-related activities and overall environmental health conditions need to be emphasized. These linkages are useful when considering the range of potential mitigation strategies for project impacts. World Bank research has demonstrated that a significant percentage (as much as 44 percent in Sub-Saharan Africa) of the typical burden on health can be mitigated by infrastructure improvements in four sectors: housing, water and sanitation, transportation, and communication (Listorti, 1996).

The project should identify the specific populations affected by each environmental health area. These population categories are designed to be consistent with the age groupings used in common demographic health surveys, as described in Table 4. (See page 23.)

Although not every EHA may be relevant for a given project, experience indicates that the project should consider EHAs while preparing the HIA. The EHA approach also captures some workforce issues that could impact relevant communities, for example, housing and respiratory issues (such as communicable respiratory diseases that could spread from construction camps to local communities), but it primarily focuses on the relationship between potential project impacts and communities. The EHA framework covers a broad view of environmental health, and encompasses a wide spectrum of health determinants, including social and institutional issues.

[1] Environmental health is the body of knowledge concerned with the prevention of disease through control of biological, chemical, or physical agents in the air, water, and food, and the control of environmental factors that may have an impact on the well-being of people. Environmental health encompasses the human living environment and stresses primary prevention based on engineering and design improvements. (Listorti, 1996)

Table 2: Environmental Health Areas

Vector-Related Diseases	Malaria, schistosomiasis, dengue, onchocerciasis, lymphatic filariasis, yellow fever, and so on (Keiser, 2005; IPIECA, 2006; www.rollbackmalaria.org/; www.who.int/entity/heli/risks/vectors/vector/en/index.html)
Respiratory and Housing Issues	Acute respiratory infections (bacterial and viral), pneumonias, tuberculosis; respiratory effects from housing, overcrowding, housing inflation (Richeldi, 2006; Ezatti and Kammen, 2002; www.who.int/gtb)
Veterinary Medicine and Zoonotic Issues	Brucellosis, rabies, bovine TB, bird flu, and so on (Zinsstag, 2005; http://www.ipfsaph.org/En/default.jsp)
Sexually Transmitted Infections	HIV/AIDS, syphilis, gonorrhea, chlamydia, hepatitis B; (www.who.int/hiv/en/ ; http://www.census.gov/ipc/www/hiv/)
Soil- and Water-Sanitation-Related Diseases	Giardiasis, worms, water access and quality, excrement management (Cairncross, 2003; DFID, 2003; www.who.int/water_sanitation_health/)
Food- and Nutrition-Related Issues	Stunting, wasting, anemia, micronutrient diseases (including deficiencies of folate, Vitamin A, iron, iodine); changes in agricultural and subsistence hunting, fishing, and gathering practices; gastroenteritis (bacterial and viral); food inflation (Ehrhardt, 2006; www.childinfo.org/; http://www.who.int/nutrition/en/)
Accidents and Injuries	Road-traffic related, spills and releases, construction (home- and project-related) and drowning (http://internationaltransportforum.org/irtad/datasets.html)
Exposure to Potentially Hazardous Materials	Pesticides, fertilizers, road dust, air pollution (indoor and outdoor, related to vehicles, cooking, heating, or other forms of combustion or incineration), landfill refuse or incineration ash, and any other project-related solvents, paints, oils or cleaning agents, by-products, or release events (Sullivan and Krieger, 2001; www.who.int/pcs/)
Social Determinants of Health (SDH)	Including psychosocial, social production of disease, political economy of health, and ecosocial issues such as resettlement or relocation, violence, gender issues, education, income, occupation, social class, race or ethnicity, security concerns, substance misuse (drug, alcohol, smoking), depression and changes to social cohesion, and so on (CSDH, 2008; www.who.int/social_determinants/en/)
Cultural Health Practices	Role of traditional medical providers, indigenous medicines, and unique cultural health practices (www.who.int/topics/traditional_medicine/en/)
Health Services Infrastructure and Capacity	Physical infrastructure, staffing levels and competencies, technical capabilities of health care facilities at district levels; program management delivery systems; coordination and alignment of the project to existing national- and provincial-level health programs (for example, TB, HIV/AIDS), and future development plans (www.theglobalfund.org/EN/)
Noncommunicable Diseases (NCDs)	Hypertension, diabetes, stroke, cardiovascular disorders, cancer, and mental health (http://www.who.int/chp/en/index.html)

TABLE 3: TYPICAL HEALTH IMPACT ISSUES BY ENVIRONMENTAL HEALTH AREAS

HEALTH IMPACT ISSUES							
Environmental Health Areas	**Influx** Camp followers, job seekers, family, service workers	**Resettlement; Relocation**	**Water Management** Including creation of new water bodies, altering existing water bodies, and changes in drainage patterns	**Linear Features** Roadways; transportation routes; transmission lines	**Hazardous Materials Control and Disposal** Including waste containers (drums)	**Changes in income & Expenditure Consumption** Including food/housing inflation	**Infrastructure; Facilities** Including on-site housing, catering facilities, housing & laundry, sewage-treatment plants (STP), surface-water runoff control, dams and containment facilities
Vector-Related	increasing human parasite burdens (malaria)	movement to different prevalence area	creation and movement of breeding grounds	improper drainage, temporary water-pool creation	creation of breeding sites with drums at household level		creation and movement of breeding grounds, improper drainage, temporary water-pool creation
Respiratory & Housing	crowded housing, both work camps and community	number of occupants per room, mix of occupants children/elderly/adults (different vulnerability)		facilitating mixing/interaction of different groups		housing inflation triggered crowding	crowded housing in work camps, spread of ectoparasites
Veterinary Medicine	movement and migration of livestock due to influx of new groups	movement and migration of livestock due to influx of new groups	creation and/or movement of livestock watering locations		inadvertent water-source contamination, of streams/rivers		changes in movement and migration of livestock
Sexually Transmitted Infections; HIV/AIDS	mixing of high- and low-prevalence groups	mixing of high- and low-prevalence groups		facilitating movement of high-risk groups into rural settings		men with money mixing with vulnerable women	Inappropriate access to project housing by local community members
Soil, Water, & Sanitation	overburdening existing services/systems; explosive food-borne epidemics	failure to anticipate extended-family influx in initial design	changes in surface-water flows/quality, potential groundwater drawdown		releases into surface water; long-term impacts to groundwater		releases into surface water from STP, changes in surface-water flows/quality, potential groundwater drawdown
Food & Nutrition	influx of extended family, more mouths to feed	shift from subsistence agriculture to peri-urban living/petty trading	changes in crop/garden selection and planting cycle	changes in access to gardens or local markets		food inflation further marginalizing vulnerable groups	food inflation, food related illnesses, changes in local dietary habits
Accidents & Injuries	overcrowding, falls, burns, road traffic		drownings, boat accidents	road traffic, increased pedestrian activity	unplanned releases/emissions		overcrowding, falls, burns, road traffic
Hazardous Materials Exposure	squatter developments adjacent to industrial facilities with unplanned releases			movement via trucks of hazardous materials across communities to project areas	use of project drums and containers for water and food storage; inadequate incinerator design		release of contaminants into local community streams and rivers
Social Determinants of Health; Psychosocial; Gender Issues	cultural shock due to rapid social change	transformation of rural to peri-urban/urban lifestyle		greater ease of mixing of different social/ethnic groups		sudden money influx into a barter-based economic structure	greater ease of mixing of different social/ethnic groups
Cultural Health Practices	introduction of new practices and/or elimination of existing practices	introduction of new practices and/or elimination of existing practices				shift to western medicine	introduction of new practices and/or elimination of existing practices
Health Services Infrastructure & Capacity	increased visits for outpatient and inpatient services	increased visits for outpatient and inpatient services, if access improves		changes in access		attraction of additional private providers/increase in insurance enrollment	changes in access
Noncommunicable; Hypertension, Diabetes	changes in diet	peri-urban living versus high-intensity subsistence farming				shift from high physical activity to sedentary lifestyle	changes in diet

	High Risk Potential		Medium Risk Potential		Low Risk Potential

Social Determinants of Health

Human health is strongly linked to "determinants" —the range of personal, social, economic, institutional, and environmental factors that determine the health status of individuals or populations.[2]

In low-HDI (Human Development Index)[3] countries, individuals and entire populations suffer from high rates of illness, particularly infectious disease and malnutrition, due to inadequate food sources and supplies, poor water access/supply and quality, low levels of sanitation and shelter, lack of appropriate medical care, and failure to deal with the environments that lead to high exposure to infectious agents. Similarly, noncommunicable diseases also represent the major burden of disease for people at the lower end of the social gradient in middle- and high-income countries.

The role of the HIA is to disentangle the determinants of health—that is, individual, social and environmental, and institutional factors that are directly, indirectly, or cumulatively affected by the proposed project—to allow better management of the risks associated with individual determinants.

Individual Factors

Many of the determinants of health are strongly influenced by individual factors, such as genetic, biological, lifestyle or behaviors, and specific circumstances. Examples of individual determinants include gender, age, dietary intake, exercise, alcohol and tobacco use, educational attainment, and employment. The relationship between a project and the individual determinants is complex and often controversial. The HIA is not a "social engineering" exercise; instead, the assessment should systematically analyze those potential direct, indirect, and cumulative community impacts that are predicted to occur due to the project.

Table 4: EHA Population Categories

- Children and infants < 5 years (childhood illnesses)
- Children ages 5-14 years (older childhood, adolescent health effects)
- Women of reproductive age
- Adults ages 15-64 (working adults)
- Elderly > 65 years

Institutional Factors

Institutional factors include the capacity, capability, and coverage of public sector services such as health, schools, transportation, and communications. The EHAs capture those institutional factors that are most critical for the health impact analysis, for example, the "health services infrastructure and capacity." It is critical to understand the project's potential impacts on the local health system, because large projects can trigger significant community influx that can overwhelm understaffed local health clinics. Conversely, many large projects that have their own internal medical services have developed outreach programs with local clinics that positively impact community health service delivery. The social and environmental impact assessment typically analyzes institutional factors; hence, it is important to coordinate the analyses to avoid redundancy.

Although the SDH analysis is important, it is

[2] Because marked differences exist in the distribution of health determinants across different groups within a population or community, the World Health Organization set up the Commission on Social Determinants of Health (CSDH) in 2005. The commission released a final report in 2008 (CSDH, 2008).

[3] The HDI—human development index—is a summary composite index that measures a country's average achievements in three basic aspects of human development: health, knowledge, and a decent standard of living. Health is measured by life expectancy at birth; knowledge is measured by a combination of the adult literacy rate and the combined primary, secondary, and tertiary gross enrolment ratio; and standard of living by GDP per capita (PPP US$). http://hdr.undp.org/en/statistics/indices/hdi/

necessary to avoid possible overlaps with the social and environmental impact assessments. The EHA framework is designed to include and cover the most significant health determinants. However, professional judgment and care should be exercised to ensure that the HIA focuses on those impacts that can be clearly related to the project. Similarly, as will be discussed in Section 8, mitigation strategies proposed in the health action plan (developed as part of the HIA) should also be realistic and tied to specific project impacts. (See Appendix B for examples of mitigation measures.)

Section 4: Scoping—How Comprehensive Should the HIA Be?

Scoping is a process of outlining the range and types of hazards and beneficial impacts, and setting the geographical, timescale, and population boundaries to the assessment. This stage of the HIA process also establishes TOR if needed. The overall types and categories of questions that should be addressed are defined at this stage. And it is essential to develop a description and general knowledge of the project, covering location, size, workforce, surrounding communities, operations, and likely exposures.

The project should give careful consideration to the following questions:

- Who is at risk during the different phases of a project (for example, construction workers, contractors, employees, community residents)?
- What related activities are under consideration (for example, movement of product or feedstock, transportation patterns and risks, secondary in-migration and development such as squatter camps, and so on)?
- What are the potential risks associated with the project?
- Are cumulative or residual impacts present, or likely to be present?

The level of effort to assess health impacts should be proportional to the potential health impacts and risks. It is vital to get a good balance that allows health issues to be integrated into project planning and implementation in a timely and cost-effective manner. The types of HIA and how a company determines the type of HIA are summarized in Section 1.

Knowledge of surrounding communities is important to identify the potential risks.

- **Outline the range and types of hazards and potential impacts.**
- **Define the types and categories of questions.**
- **For older facilities, consider the potential for impacts from past release events into air, water, and soil.**
- **Consider the appropriate level of initial stakeholder communication.**

See examples of annotated contents outlines for a comprehensive HIA and for a rapid appraisal HIA in Appendix E.

It is also important to perform careful scrutiny of the social impact assessment (SIA) or social environmental impact assessment (SEIA) for health elements, particularly if health has been integrated into the overall assessment without a separate HIA. Any SIA or SEIA is likely to be a significant source of data for an HIA, especially with regard to social determinants of health.

Additional information on types of expertise requirements is in Section 10.

Section 5: Baseline Data—What, When, and How Much?

Is there actually a need to collect new data? In many situations careful literature searches, review of host-country health information systems, and consultation with key stakeholders are sufficient.

Baseline data collection may include the following:

- A baseline literature search, review, and analysis
- Fact-gathering meetings with project personnel
- Fact-gathering meetings with government/ institutional personnel
- Site visits and review of each project location
- Meetings with community member focus groups.

Appendix F provides activities and tasks recommended for performing baseline data collection.

Baseline data collection is an iterative process that repeats up to three times. At the early stage, it depends on Internet-based resources for literature review at the international level. This review is followed by an assessment of the quality of data collected to determine whether there appear to be significant gaps in available knowledge. If so, then a second review of the secondary literature should take place. This review typically will be performed in-country, using a local consultant who has access to local sources, including grey literature. This is followed by a gap analysis. If significant gaps still exist, then primary data collection will be needed.

There may be very different levels of capacity and information available between countries at diverse levesl of economic development. Nevertheless, it is critical to work with the government authorities responsible for public health issues in the design, collection, and analysis of data.

If new health data collection is required, it should be conducted in a culturally sensitive and ethical manner, with a clear understanding of how the information will be used in the HIA, and what it means. New data-collection exercises can be a critical vehicle and positive opportunity for involving key stakeholders and local health officials in a collaborative and positive process. A participatory stakeholder process increases the likelihood of long-term acceptance and success.

Data Sources and Collection Methods

A wide variety of sources and data-collection methods can be used, including the following:

- Rapid appraisal methods, including key informant interviews, focus group discussions, community group interviews, direct observations, and mini-surveys (IFC, 2007)
- Questionnaires and surveys of knowledge, attitudes, beliefs, and practices
- Objective health-screening surveys for certain diseases or conditions, such as malaria and micronutritional deficiencies
- Health needs assessments (HNAs)
- Demographic health surveys
- Food-consumption and nutrition surveys

Rapid appraisal methods of data collection are efficient and appropriate.

Various sources and types of data are available for use in the HIA. Active methods include participatory stakeholder meetings where both health concerns and traditional and local knowledge (TLK) can be solicited—TLK is a critical source of information about such issues as household-level nutrition and patterns of subsistence agriculture, including hunting and fishing. Formal household-level surveys are another active data-collection strategy and typically provide the most accurate source of disaggregated demographic and health data. Formal studies can also include knowledge, attitudes, practices, and belief (KABP) for specific diseases such as malaria and HIV/AIDS. KABP surveys are highly useful for isolated rural communities, which frequently are not covered by national sampling efforts.

Passive sources of data include Web searches and formal literature searches, including peer-reviewed papers and grey literature—that is, district-, provincial-, or national-level health data published by the national ministry of health (MOH). Grey literature can be variable in quality and geographical coverage. In rural areas, passive MOH data collection is not always available, since many local residents do not use the health system due to access and cost issues. Therefore, the data available may miss or underestimate the burden of disease for the most vulnerable groups. Web information should be used cautiously, because it may consist of anecdotal statements that have little or no scientific validity. Peer-reviewed published literature is useful when the geographical coverage of the study correctly matches the potentially affected communities under consideration in the HIA.

Data-collection activities should be carefully planned.

Collection of relevant and high-quality data is highly important. A variety of quality-management systems and quality-assurance and quality-control (QA/QC) programs can be consulted, such as the International Organization for Standardization (ISO 9000) and the U.S. EPA Data Quality Objectives (DQO) process. Although the QA/QC process is highly developed for the environmental sciences, it is less codified for HIA-triggered data-collection exercises. Nevertheless, many of the management systems and QA/QC processes are perfectly suited for use in impact assessment and are applicable for both social survey and health data-collection exercises.

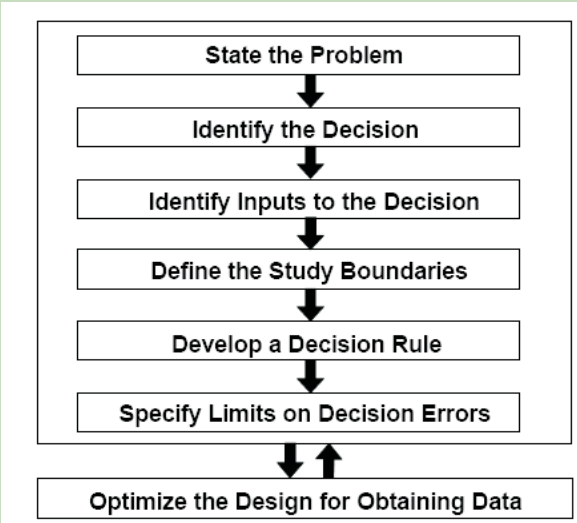
For many projects, the formal structured process is not needed, and assessments will be made on existing data. In addition, historical reviews of other similar projects may be informative. Nevertheless, new data collection is required for many high-profile and complex projects. Therefore, it is important for projects to develop logical and structured data-collection processes, such as that presented in Figure 4.

Biomonitoring Data

Human biomonitoring is a scientific technique for assessing human exposures to environmental agents and their effects, based on sampling and analysis of an individual's tissues and fluids. Blood, urine, breast milk, and expelled air are most commonly measured, but hair, nails, fat, bone, and other tissues may also be sampled (http://www.enhis.org/object_binary/O2819_HIAGuidelines_BLL_children_uneditedVersion_September2007_v2.pdf). Due to complex ethical and technical issues, as well as uncertainty associated with linkages between results and exposures, biomonitoring typically is not performed by the private sector as part of HIAs. In exceptional cases when data collection requires biomonitoring, companies must conduct it in collaboration with national or international institutions.

In most countries worldwide, it is essential to obtain permission from the relevant local health authorities—as well as informed consent by each participant—to conduct epidemiological surveys with a biological component

Figure 4: DQO Process



Section 6: Stakeholder Engagement

Effective stakeholder engagement is integral to the quality of health impact assessment and to the success of associated mitigation actions (IFC, 2007).

> **Stakeholders are those individuals and groups that are affected by or express an interest in the project.**

Stakeholders are persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project or the ability to influence its outcome, either positively or negatively. Stakeholders may include locally affected communities or individuals and their formal and informal representatives, national or local government authorities, politicians, religious leaders, civil society organizations and groups with special interests, the academic community, or other businesses.

Key Components

Key components of stakeholder engagement include stakeholder identification and analysis, information disclosure, stakeholder consultation, negotiation and partnerships, grievance management, stakeholder involvement in project monitoring, and reporting to stakeholders.

Project information disclosure, stakeholder consultation, grievance management, and stakeholder involvement in project monitoring are key aspects of any project involving potentially significant health impacts. Since health-related concerns and perceptions are often sources of misunderstanding and stress among local communities, they should be carefully handled to prevent delays and poor project-stakeholder relations. Early disclosure of potential project impacts and possible mitigation measures, full discussion of associated stakeholder concerns relating to health, the establishment of functioning grievance mechanisms allowing for ongoing stakeholder feedback on health issues, and active involvement of stakeholders in monitoring of health-related impacts via participatory monitoring methods can all contribute greatly to good community relations and smooth project development. A good reference for dealing with these components is the IFC good practice publication titled, *Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets* (IFC, 2007).

For practical reasons, health-related stakeholder engagement should be integrated into the project's overall environmental and social impact assessment process. That way, a company can avoid going back to the communities for separate consultation regarding health issues. (Stakeholders can experience "consultation fatigue" just as easily as "survey fatigue.")

Gender and Cultural Considerations

During the stakeholder identification and analysis phase, it is important to address gender and cultural practices. In many places, women make the key health-related decisions; therefore, it is important to have a strategy that involves women at the community level.

In numerous cultural settings, women will not be vocal or comfortable in a gathering that includes men. Therefore, it is a good approach to establish separate, women-only discussion groups focused on health.

It is also critical to address needs and expectations of indigenous peoples and rural communities who have different health traditions and often are exceptionally vulnerable to project-induced health risks.

In some areas, public health facilities and supplies are poor or inadequate, resulting in frequent requests for related project assistance. However, in most settings there are chronic structural staffing shortages for trained medical personnel at all levels. Neither local authorities nor communities have the systems, skills, or financial resources to maintain the new or expanded public health infrastructure requested from sponsors. Prolonged and realistic engagement involving government agencies, communities, health NGOs, and other key stakeholders is required to establish whether, when, and how public health facilities and supplies can be supported in a sustainable manner (if at all).

Women make key health decisions in developing countries. Women's focus groups are beneficial.

Section 7: Risk Assessment—Assessing and Ranking Impacts

Risk assessment methods can be used to investigate, assess, and qualitatively or quantitatively rank the potential project health impacts to help prioritize management actions. The risk assessment process in HIA may include:

- An in-depth review of available national, regional, provincial, and district health data
- Comparison of study-area data to national, regional, and provincial and district health data
- Analysis of special at-risk subpopulations (such as children under the age of five years, pregnant women, elderly, camp followers, resettlement villagers, construction workers)
- Field survey visit by an HIA study team
- Consultation with relevant health representatives, particularly ministry of health officials at the national, district, provincial, and local levels.
- Seasonality considerations, that is, rainy versus dry season, potentially significant differences in agricultural or cultivation practices, water use and associated disease-transmission dynamics
- Variability of existing health care infrastructure across different project areas
- Coordination and alignment with existing national disease-control programs and strategies (for example, TB, HIV/AIDS, and malaria)

How Can Risks Be Estimated?

Risks can be estimated based on several factors, which may include:

- Perception of risks by a potentially affected community (Individuals and social groups generally perceive risks based on whether it is voluntary or involuntary, and based on the familiarity with the risk.)
- Nature—direct, indirect, or cumulative
- Timing and duration—construction, operations, decommissioning
- Extent—localities most likely to experience the projected impact (local, regional, national)
- Magnitude—degree, extensiveness, and scale, particularly with regard to existing baseline conditions
- Frequency—the overall rate of recurrence

How Can Risks Be Rated?

Results of these analyses should be prioritized as part of an action plan based on the likelihood and severity of the consequence of the risk. Figure 5 is an example of a qualitative risk-ranking or -analysis matrix to help identify priorities.

In Figure 5, numbers can be assigned to each category within the scale (for example, low=1, medium=2, and so on) to create a quantitative scale of the probability-weighted impact. Both the assigned probability (very low, low, medium, high) and the severity of a risk are often a function of how the impacts of the risk are calculated or perceived by the group performing the analysis, rather than how they're perceived by the community. For example, community members potentially exposed to the risks might weight the impacts very differently than would scientific experts focusing only on statistical probabilities. Therefore, it is highly important to develop a process that rates risks from multiple perspectives and allows for adequate stakeholder participation. (See "Stakeholder Engagement," Section 6.)

Defining the risk-rating scale within the overall impact assessment process is crucial, because it allows for health risks to be fully considered and compared against projected environmental and social impacts. Risk assessment approach and examples of risk-rating and -ranking scales are shown in Appendix G.

How to Assess Impact Significance

To assess impact significance, the project can consider several critical elements, including magnitude, duration, frequency, and geographical limits of the potential impacts.

Magnitude

The project can ask the following questions to assess the magnitude of impacts:

- Will there be a large change over health-related baseline data (for example, doubling of disease rates, crime rates, and so on)?
- Is there local capacity to absorb the change?
- Do local stakeholders think the change is acceptable?
- Are the predicted changes likely to exceed internationally recognized standards (for example, water quality standards)?
- Will there be persistent cumulative additions that will eventually lead to threshold exceedences?

Duration

Answers to the following questions will help the project determine the duration of impacts:

- What is the anticipated length of time the changes will last (days, years, decades)?
- How rapidly will the predicted changes occur (during a specific project phase such as planning, construction, operations, decommissioning)?

Figure 5: Risk-Ranking Matrix

	PROBABILITY				
SEVERITY		Very Low	Low	Medium	High
	Very High	MEDIUM	HIGH	VERY HIGH	VERY HIGH
	High	LOW	MEDIUM	HIGH	VERY HIGH
	Medium	VERY LOW	LOW	MEDIUM	HIGH
	Low	VERY LOW	VERY LOW	LOW	MEDIUM

Frequency

To assess the frequency of impact, ask:

- How often will the change be observable—intermittent (what is the interval), continuous?

Geographical Limits

- Can geographical limits of health impacts be local, regional, or national?

Section 8: Health Action Plan

The project can use the outcomes of the risk assessment step to establish actions that will potentially mitigate the identified impacts. These mitigation actions should be written into the health action plan. (See Box 1.)

The HAP may be issued as a separate document or incorporated within the HIA. Often the health mitigation actions are rolled into the social development plan; however, if the project is large or complex, consider producing a separate chapter (or report) on how to mitigate health impacts.

Fundamental Concepts

HAPs are generally organized around two fundamental public health concepts:

- Disease prevention
- Health promotion and education

Disease Prevention

Disease prevention includes any intervention that seeks to reduce or eliminate diagnosable conditions. It may be applied at the individual level (as in immunization) or at the community level (as in chlorination of the water supply).

Chlorination of the water supply is a community-focused disease-prevention strategy.

The concept of disease prevention is often illustrated by the prevention pyramid (Figure 6), which is composed of the following actions:

- **Primary.** The base of the pyramid covers individual- or population-oriented actions designed before health problems develop. These actions included elimination (eliminate certain features or aspects of the project), substitution (for example, new housing provided as part of a resettlement or relocation program), design or engineering, and administrative controls (including personal protective measures such as treated bed nets).
- **Secondary.** The second level covers clinical preventive services for populations at high risk, where interventions are designed to prevent a condition (such as sexually transmitted infection prevention, hand-washing programs, and so on).
- **Tertiary.** The top of the pyramid covers treatment intervention or rehabilitation with existing, serious problems (such as treatment of children with lead poisoning from a decommissioned mine site).

Box 1: Mitigation Strategies in the Health Action Plan

Mitigation Strategies

The project should consider including the following in the health action plan:

- Types of health-protection processes that may be required
- Availability of different mitigation strategies
- Timelines of mitigation strategies
- Availability of interim measures or modifications
- Local capacity to absorb the proposed mitigation strategies

The primary objective of the HAP should be the prevention of health impacts. But when prevention is not enough to eliminate possible health impacts on the communities, then cures need to be considered.

Appendix B presents examples of mitigation and implementation tables for addressing community-focused measures, and it illustrates the importance of appropriate coordination and communication with host-country health authorities. Even though well-developed generic health intervention strategies have been developed for the major infectious diseases, it is important to develop mitigation strategies that are both scientifically defensible (evidence-based) and locally acceptable.

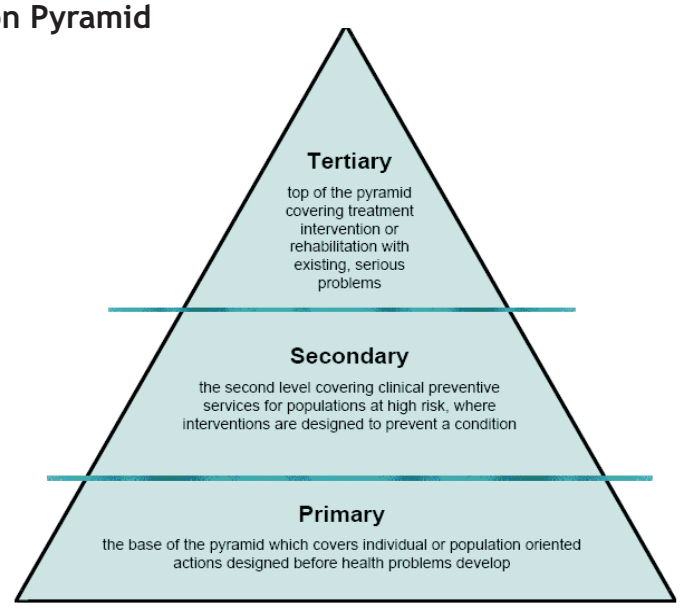
It is essential that there be a clear understanding of the difference between impact mitigation and a project's discretionary community-outreach efforts. Impact mitigation is usually specific and tied to a project-related effect. Community-outreach efforts may not be tied to a specific project impact but may be selected because the project sees long-term benefit in measures that may enhance overall community services. It should be understood that a "pure" selection of mitigation measures rarely occurs, because local and national political considerations can influence the overall process. Therefore, it is important that project proponents engage key stakeholders to ensure that the identification of impacts and the selected mitigation measures are understood and agreed to. Significant adverse community reaction can develop when the boundary conditions for project-related mitigation are not clarified and explained.

Health Promotion and Education

Health promotion and education is a mitigation action that will help improve or protect health. It includes any combination of health education and related (that is, organizational, political, economic) interventions designed to facilitate behavioral and environmental adaptations to achieve better health. In combination with primary prevention, health promotion and education is the most efficient and cost-effective method of managing potential impacts.

A workforce health promotion and education effort spearheaded by the project can significantly impact behaviors and practices in local communities by using the project workforce as "peer educators and

Figure 6: Prevention Pyramid



ambassadors" to local communities. The overwhelming evidence in the prevention literature is that peer educators are the most successful change agents at the household level.

How to Evaluate the Health Action Plan

Evaluation of the project's HAP requires careful review of several critical elements, including resource flows and responsibilities, government capacity, and social and environmental determinants.

Resource Flows and Responsibilities

A critical aspects of determining the effectiveness and success of the HAP implementation is the establishment of adequate resource flows, and assignment of responsibilities between relevant sectors and entities. These factors can help ensure the effective use of limited resources and the successful collaboration between the project and the various stakeholders, including the host government at local, regional, and even national levels.

> Assess the capacity of the involved parties to perform specific activities.

Government Capacity

Among the most challenging tasks is assessing local and national government capacity and identifying viable partners that can help ensure the long-term sustainability of the project. The capacity issue includes preparation, experience, and sufficient human and financial resources.

Long-term sustainability should be ensured before building new structures.

In numerous examples, projects will build and refurbish hospitals, clinics, or dispensaries as "mitigation." Although these activities are highly visible and initially well-received, in many cases they tend to have poor long-term sustainability due to a significant shortage of technical support staff (nurses, laboratory technicians, and so on). To be successful and sustainable, structural improvements should be coupled with a realistic and long-term assessment of the human resources that are actually available.

Mitigation measures have a greater sustainability success rate when they are focused on specific, targeted potential project effects, such as adequate drinking-water supply, solid and human waste disposal, and appropriate drainage systems to deal with the influx of workers in a community.

However, to assure sustainability, the project should implement these mitigation measures through collaborative and supportive efforts with existing local governments, NGOs, and local relevant agencies.

Social and Environmental Determinants

It is also critical that the project identify social determinants of health as well as environmental determinants, such as alterations of the physical environment, through the implementation of an engineering-based mitigation strategy. The project should consider strategies that deal with key social determinants of health (alcohol, drug use, gender violence), but such strategies are likely to require a multidisciplinary effort, involving social and medical specialists as well as community stakeholders.

A good tool for assessing the responsibility levels of the HAP is the 2005 Paris Declaration on Aid Effectiveness, which is relevant to the implementation of the proposed mitigation actions for the health risks identified. This declaration emphasizes the need for measurable effectiveness. (See Box 2.)

These issues should be adequately addressed in parallel to the assessment process—and ***before*** a program is designed, initiated, and rolled out to the community.

Box 2: Paris Declaration on Aid Effectiveness—Key Issues

Paris Declaration Key Issues:

- **Ownership:** Who will exercise effective leadership over the effort and coordinate actions?
- **Alignment:** Are the efforts aligned with the government's overall strategies, and can they help strengthen government regulations and procedures?
- **Harmonization and Simplification:** Are the proposed actions harmonized and transparent?
- **Managing for Results:** Are the available financial resources being managed for verifiable results?
- **Mutual Accountability:** What system will be developed to hold both government and the project accountable for results?

Section 9: Monitoring and Verification

The mitigation strategy and the health action plan established by the company should include 1) long-term monitoring and evaluation (M&E), and 2) verification programs.

Monitoring

For a large and geographically diverse project, a formal system of monitoring (surveillance) should be considered, and as appropriate, ***the local health information system should be reviewed for fit and reliability*** (Ezzati, 2005).

For the M&E plan to capture early effects and unanticipated consequences, it should be based on appropriate, applicable, and relevant key performance indicators (KPIs) (World Bank, 2004). Defining KPIs can be a complex undertaking, and specialized consultation is often advisable.

The M&E system is designed to ensure:

- Satisfactory progress
- The capture of unanticipated effects
- Early warnings of population-level problems (at single or cumulative levels)

M&E should be based on Key Performance Indicators.

Monitoring strategies should take into consideration that impacts may affect both the project and the community. For instance, the project workforce is not only part of the inside-the-fence-line community but also sometimes part of the wider external rural or urban environment surrounding the project. Therefore, many of the monitoring strategies originate inside the fence line and extend outside to specific project-affected areas.

Monitoring strategies should detect both acute and chronic changes within the defined potentially affected communities. Acute changes are those that can be manifested within weeks to months, such as acute disease-rate changes for malaria or respiratory infections. In contrast, chronic noncommunicable disease-rate changes for cardiovascular disorders evolve over a much longer period of time. The differences in timing, and acute versus chronic changes, help illustrate the importance of establishing appropriate key performance indicators (KPIs).

Key Performance Indicators

Numerous KPIs have been established for monitoring health performance (Mosse and Sontheimer, 1996). Health indicators can be divided into three types:

- **Structural indicators** assess buildings, equipment, drugs, medical supplies, and vehicles; personnel; money; and organizational arrangements.
- **Process indicators** assess the effectiveness of the actions, and identify who is involved and whether the various programs are working.
- **Outcomes indicators** measure the long-term effects of a program. The five Ds (death, disease, disability, discomfort, and dissatisfaction) are typically considered outcome measures. The morbidity and mortality outcome indicators are calculated as rates.

Box 3 provides some examples of the three types of KPIs.

Note that the Millennium Development Goals (MDGs) established a significant number of health-based performance indicators (such as under-five mortality rate, maternal mortality rates, and HIV and malaria rates) that may be of use in the selection of KPIs.

The key concept embedded within the health MDGs is the notion of rate (that is, changes in the level,

Box 3: Three Types of Key Performance Indicators

Examples of KPIs

Structural
- Household characteristics (household size, number of rooms)
- Pharmacy supplies of specific categories of drugs (such as anti-malarials)
- Numbers of latrines
- Number of stem pipes, boreholes

Process
- Changes in access times for secure water supplies
- Access to maternal medical services (such as trained birth attendants) and number of predelivery visits
- In-migration patterns (place of origin of household members, professional status of household members)
- Training with follow-up knowledge, attitudes, practices, beliefs (KABP) concerning prevailing diseases (including malaria, soil-transmitted helminths, HIV, and so on)

Outcomes
- 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

over time), of some measurable performance indicator. Due to the complexity of objectively demonstrating that rate changes (positive or negative) have occurred, it is important to have as good a baseline health assessment as possible. However, it is easier to obtain this information at a country or large regional level than for small populations where the number of measured "events" is small and variable over the standard time period (one year). One highly reliable source of country-level data is the Demographic Health Surveys (DHS), which are performed in many countries every four to five years. Unfortunately, these data are never presented (disaggregated) below a provincial or regional level, due to sample-size issues. Therefore, any project should carefully consider how to choose a realistic suite of KPIs.

Monitoring System

The M&E system should be designed to be capable of capturing a variety of positive and negative trends across the community over different time scales. Monitoring strategies should also consider that a variety of positive community-level impacts will occur. For example, rapid changes in and alleviation of "income poverty" is likely to produce significant improvement in the nutrition status of children under five years of age. Nutritional changes can occur both

Nutritional-effects data are captured by measuring height, weight, and age of children under age five.

acutely (over days and weeks) and chronically (over months and years) with significant direct effects on other disease states, such as anemia, malaria, pneumonia, and so on. Nutritional-effects data are relatively easy to capture by systematically measuring height, weight, and age in children under age five.

When measuring positive impacts, measurements such as underweight (weight for age), stunting (height for age), and wasting (height for weight), which are known as anthropometric data, can be rapidly and reliably performed in the field, and they require minimal technology. These anthropometric data are sensitive to

both acute and chronic changes within time periods (3-12 months), and they can be readily measured and monitored by a project, making them very good KPIs.

Disease-specific rate changes (such as for malaria or HIV/AIDS) are far more complex. Malaria rates tend to have marked seasonal variations, even in locations that have year-round parasite transmission. Therefore, the timing and frequency of community monitoring surveys are critical to obtaining valid data. Similarly, collecting community HIV data is a highly sensitive process that should be performed by or in conjunction with the relevant public health authorities. However, disease-prevention efforts (such as for malaria or HIV) should be strongly encouraged. Many projects enthusiastically participate in and support such efforts.

Some projects may benefit from host-country monitoring systems, such as demographic surveillance systems (DSS), or other monitoring information gathered as part of a country-specific HIA policy and infrastructure. But these types of monitoring systems typically are not appropriate or realistic for most small-to-medium projects, whose needs may be met by a few well-chosen indicators, such as anthropometric measurements, village-level disease-specific surveys (malaria), immunization rates, symptom prevalence surveys, anemia prevalence, changes in bed-net usage, drinking-water source and access, and toilet type and access.

Verification

The project should establish a verification system to allow the project proponent as well as external stakeholders to review the progress of the mitigation efforts.

HIV prevention efforts are strongly encouraged.

The HIA should provide the information necessary for external reviewers and key stakeholders to verify what is actually occurring at a household and community level. It is essential that simple KPIs be selected to ensure that data are available in a timely fashion. 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 the external verification to be effective, it should not begin prematurely, since it takes time and can be costly. 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.

Section 10: Resourcing

Projects should assign budget and resources for the development and implementation of the applicable health impact assessments, health studies, monitoring and evaluation programs, and health management and verification plans.

Allocation of Resources

The allocation of financial and human resources to conduct an HIA ought to be commensurable to the potential anticipated risks. Costs are largely a function of scope, schedule, and final deliverable report. Key aspects to consider include development of clear terms of reference and a careful assessment of the adequacy of existing baseline data. New data collection is often a difficult, time-consuming, and expensive process.

Some projects may require comprehensive HIAs, but most projects will not. For those projects that do require new data collection, some level of specialty consulting support may be required. Local and national public health authorities should always be consulted, since their knowledge and expertise is critical and is grounded in the realities of the project's location and overall country situation. In addition, specialized support or an independent review process may help identify gaps or other issues not fully considered by an internal team, and may enhance validity and transparency.

External Expertise

When conducting an HIA, the project may require external help in the following competency areas:

- Public health planning at a community level
- Risk assessment—qualitative and quantitative modelling and ranking
- Risk communication
- M&E system planning
- Assessment of psychological impacts and possible relocation effects
- Community stakeholder facilitation
- General infectious diseases (tuberculosis and respiratory diseases)
- HIV/AIDS assessment (including modelling, prevention, and planning)
- Insect and pest control
- Epidemiology (knowledge of diseases endemic to the area under consideration)
- Sanitation (including food-, water-, and waste-related issues and diseases)
- Geographical Information Systems (GIS) mapping of disease and impact areas
- Assessment of existing health infrastructure (systems analysis)
- Accidents, injuries, risks related to chemical exposure, and so on

For large projects where cultural sensitivities may conflict with the need to thoroughly assess certain diseases (such as HIV/AIDS), it may be advisable to appoint an independent advisory board.

DATA SOURCES

- General
  - *Entrez Pubmed* (http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed)
  - *UNICEF*
    http://www.childinfo.org/MICS2/Gj99306k.htm
    Multiple Indicator Cluster Survey. Developing-country national/country-level surveys for under-five children
  - *DFID* (U.K. Department for International Development):
    http://www.dfid.gov.uk/countries/allcountries.asp?view=region
    Country profiles focused on developing world
  - *DHS* (Demographic Health Surveys)
    http://www.measuredhs.com/countries/start.cfm
    Key health surveys for the developing world
  - *WHO* Statistical Information System (WHOSIS)
    http://www.who.int/whosis/en/
    Country-specific health Key Performance Indicators (KPIs)
  - *WHO Regional Office Europe*
    http://www.euro.who.int/countryinformation4
    Covering Eastern Europe, Russian Federation, Newly Independent States
  - *Millennium Development Goals (MDGs)*
    http://www.un.org/millenniumgoals/
    Summary by country of current and projected KPIs
  - *Centers for Disease Control and Prevention (CDC)*
    http://wwwn.cdc.gov/travel/default.aspx
    Travel—Yellow Book information
  - *Roll Back Malaria (RBM)*
    http://www.rbm.who.int/countryaction/index.html
    Country-specific data for malaria
  - *MARA/malaria maps Africa*
    http://www.mara.org.za/mapsinfo.htm
    Key vector and disease maps for malaria in Africa

- *Pan-American Health Organization (PAHO)*
  http://www.paho.org/english/dd/ais/coredata.htm
  Core statistical, country-specific data

- *National Library Medicine (PubMed)*
  http://www.ncbi.nlm.nih.gov/sites/entrez?db=PubMed&itool=toolbar
  Key medical database search engine for peer-reviewed papers

- *INDEPTH Network. Demographic Surveillance System (DSS)*
  http://www.indepth-network.org/
  Detailed health data for 38 developing-country sites

- *World Bank Living Standards Measurement Surveys (LSMS)*
  http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTLSMS/0,,contentMDK:21610833~pagePK:64168427~piPK:64168435~theSitePK:3358997,00.html
  Key statistical source for LSMS data for developing countries

- *World Bank*
  http://www4.worldbank.org/afr/stats/news.htm
  Statistics about Africa

- *Core Welfare Indicators Questionnaire (CWIQ)*
  http://www4.worldbank.org/afr/stats/cwiq.cfm
  Key survey, including selected health outcomes

- *World Bank Data and Statistics*
  http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,menuPK:232599~pagePK:64133170~piPK:64133498~theSitePK:239419,00.html

- *USAID*
  http://www.usaid.gov/locations/
  General page with links to developing-country projects and publications

- *Asian Development Bank (ADB)*
  http://www.adb.org/Countries/

- *U.S. Department of Labor Occupational Safety & Health Administration (OSHA)*
  http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=9791
  Regulations for temporary labor camps by the U.S. Department of Labor

- Biomonitoring
  - *European Union Biomonitoring Web site*
    http://ec.europa.eu/environment/health/biomonitoring.htm
  - *Health Canada Biomonitoring Web site*
    http://www.hc-sc.gc.ca/ewh-semt/contaminants/biomonitoring-biosurveillance_e.html
  - *U.S. Centers for Disease Control and Prevention (CDC) Web site for biomonitoring*
    http://www.cdc.gov/biomonitoring/
  - *WHO Biomonitoring Issues*
    http://www.who.int/foodsafety/chem/pops/en/index.html
  - *WHO Public Health Practices Water and Sanitation*
    http://www.who.int/water_sanitation_health/resources/hia/en/index .html

- WHO Social Determinants of Health
  www.who.int/social_determinants/en/

- HIA Methods Web sites
  http://www.iaia.org
  http://www.who.int/hia
  http://www.hiagateway.org.uk
  http://www.hiadatabase.net
  http://www.who.dk/eprise/main/WHO/Progs/HMS/Home
  http://www.hc-sc.gc.ca/ewh-semt/pubs/eval/index_e.html

- Data Quality Issues
  - A Guide to Reviewing Published Evidence for use in Health Impact Assessment
    http://www.lho.org.uk/Download/Public/10846/1/Reviewing%20Evidence-Final%20v6.4_230806.pdf
    Types and uses of evidence for HIA as well as considerations to be made when reviewing this evidence
  - http://www.hanford.gov/dqo/ or www.epa.gov/quality

- General Articles on HIA
  - Banken, R. 2001. "Strategies for institutionalizing Health Impact Assessment." Health Impact Assessment Discussion Paper, Number 1 (September). WHO European Centre for Health Policy. Brussels, Belgium.

- enHealth Council, Commonwealth of Australia. 2001. *Health Impact Assessment Guidelines* (September). Canberra, Australia.

- Erlanger, T. E., G. R. Krieger, B. H. Singer, and J. Utzinger. 2008. *Environmental Impact Assessment Review* 28 (2008): 349–358.

- Kemm, John, *et al.* (eds). 2004. *Health impact assessment: concepts, theory, techniques and applications*. Oxford University Press. Oxford, United Kingdom.

- Kemm, J. 2003. *Perspectives on health impact assessment*. Bulletin of the World Health Organization 81: 387.

- Krieger, N., M. Northridge, S. Gruskin, *et al*. 2003. "Assessing health impact assessment: multidisciplinary and international perspectives." *Journal of Epidemiology and Community Health* 57: 659–662.

- Listorti, J. A., and F. M. Doumani. 2001. *Environmental health: bridging the gaps:* 372. World Bank, Washington, DC.

- Listorti, J. A., and F.M. Doumani. 1996. *Bridging environmental Health Gaps*. World Bank, Washington, DC.

- Morgan, R. K. 2003. *Health impact assessment: the wider context*. Bulletin of the World Health Organization 81: 390.

- Public Health Advisory Committee (New Zealand). March 2004. *A guide to health impact assessment: A policy tool for New Zealand*. National Health Committee. Wellington, New Zealand.

Books—Dams and Water Projects

- Fewtrell, Lorna, and David Kay, ed. 2008. *A guide to health impact assessment of sustainable water management.* In Press.

- Scudder, Thayer. 2005. *The Future of Large Dams: Dealing with Social, Environmental, Institutional and Political Costs*. Earthscan.

- WHO. 2000. *Human health and dams*. World Health Organization, Geneva.

Stakeholder Engagement and M&E

- IFC (International Finance Corporation). 2007. *Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets*. International Finance Corporation, Washington, DC.

- World Bank. 2004. *MONITORING & EVALUATION: Some Tools, Methods & Approaches*. World Bank, Washington, DC.

- World Health Organization. 2006. Monitoring and Evaluation Toolkit: HIV/AIDS, Tuberculosis and Malaria. The Global Fund, Vernier: Geneva. http://www.theglobalfund.org/documents/me/M_E_Toolkit.pdf General guidance and indicator of health systems strengthening as well as disease-related indicators.

General Public Health and Burden of Disease

- Cairncross, Sandy, and Richard. G. Feachem. 1993. *Environmental Health Engineering in the Tropics: An Introductory Text*. 2nd ed. Chichester, UK: WileyBlackwell.

- Chin, J., ed. 2000. *Control of Communicable Diseases Manual*. 17th ed. Washington, DC: APHA.

- Davis, Jan, and Robert Lambert. 2002. *Engineering in Emergencies, A Practical Guide for Relief Workers*. Warwickshire, UK: Practical Action Publishing.

- Ezzati, M., A. D. Lopez, A. Rodgers, *et al*. 2002. "Selected major risk factors and global and regional burden of disease." *Lancet* 360: 1347–60.

- Ezzati, M., J. Utzinger, S. Cairncross, A. J. Cohen, and B. H. Singer. 2004. "Environmental exposure indicators in the developing world: review, conceptual framework, and examples." *Journal of Epidemiology and Community Health* (submitted for publication).

- Hunter, J. M., L. Rey, K. Y. Chu, E. O. Adekolu-John, and K. E. Mott. 1993. *Parasitic diseases in water resources development: the need for intersectoral negotiation*. World Health Organization, Geneva.

- Lindsay, S. W., M. Jawara, K. Paine, *et al*. 2003. "Changes in house design-reduce exposure to malaria mosquitoes." *Tropical Medicine and International Health* 8: 512–517.

- Prüss-Üstün, A., C. Mathers, C. Corvalán, and A. Woodward. 2003. *Introduction and methods: Assessing the environmental burden of disease at national and local levels*. World Health Organization Environmental Burden of Disease Series, No. 1: Geneva, Switzerland.

EXAMPLE OF COMMUNITY-FOCUSED MITIGATION MEASURES

This table presents examples of mitigation measures that can be implemented for a large project within a community in a rural setting. It is not meant to serve as a template, but rather to illustrate some of the actions that can be taken. These actions were developed based on risks identified in the health impact assessment.

■ = Specific Health Mitigation Target	**PE** = Pre-Employment	**WHO** = World Health Organization
C&C = Company and Contractor Health Plan	**Co.** = Company	**PACs** = Potentially Affected Communities
RR = Resettled or Relocated Health Plan	**EHA** = Environmental Health Area	**WATSAN** = Water Sanitation Agency
Timing: **C** = Construction, **O** = Operations, **DC** = Decommissioning,	**CDC** = Centers for Disease Control	
PD = Predesign; **D** = Design phase		

COMMUNITY HEALTH ACTION PLAN—MITIGATION COMMUNITY-FOCUSED MITIGATION MEASURES EXTERNAL TO THE PROJECT	TIMING	ACTION PLAN		RESPONSIBILITY	Potential COLLAB. AGENCY; ORG, Resource.	INDICATORS	SURVEILLANCE METHOD
		C&C	PACs				
Respiratory & Housing: Respiratory Diseases—Tuberculosis (TB), Upper Respiratory Infections (URIs); Housing Design							
Risk: Transmission of respiratory diseases (within project facilities) that impact community members							
Communicate with local-level TB-control program coordinator to initiate case finding, treatment, and follow-up with family members and others living within the same housing compound as workers diagnosed with active TB.	C→DC		■	Company, local TB-control program case manager	Country TB-control program		Project medical records review
Review resettlement housing design related to indoor cooking practices.	D		■	Company			Housing audit
Risk: Respiratory Illness, psychological and social stress in resettled communities due to resettlement housing design							
Review resettlement home design space requirements, i.e., total square meters vs. number of rooms.	D-C		■	Co. Engineering Design, Construction		Occupants per room	Resettlement site assessment

COMMUNITY HEALTH ACTION PLAN—MITIGATION COMMUNITY-FOCUSED MITIGATION MEASURES EXTERNAL TO THE PROJECT	TIMING	ACTION PLAN		RESPONSIBILITY	Potential COLLAB. AGENCY; ORG, Resource.	INDICATORS	SURVEILLANCE METHOD
		C&C	PACs				
Sexually Transmitted Infections including, HIV/AIDS							
Risk: Increased rates of sexually transmitted infections (STI) and HIV/AIDS that impact local community rates							
Issue TOR for HIV prevention program targeting high-risk groups, particularly Sex Workers (SW). Include requirements for case-finding and treatment of curable STIs, social marketing of condoms, peer-educators program, condom distribution, and Voluntary Counseling & Testing (VCT) targeting PACs. Implement and evaluate quarterly.	C→DC		■	Company HIV Program Coordinator	Country health services, local HIV NGOs	Number of STIs treated	Program assessment
Vector-Related, Insect-Related							
Risk: Increased rates of vector- and insect-related diseases (malaria, schistosomiasis, onchocerciasis, Buruli Ulcer) impacting local communities							
Implement an ongoing entomological survey program for mosquitoes and snails in PACs (resettlement communities and potentially affected communities).	C→DC		■	Company, DSS	Country health services; vector-control division	Entomologic-al infection rate (i.e., infected bites/yr.) and parasite prevalence rates in children	DSS report reviews
Resettlement **design and construction** • During resettlement design planning sessions conducted with communities to be resettled, include visually based educational sessions with women leaders of the communities regarding protective measures offered by the construction and maintenance of screened windows and doors.	D, C		■	Company Community Affairs Dept.	Local women's groups		Assessment of resettlement houses
• Conduct resettlement housing design educational sessions with communities to be resettled, led by women who are leaders in the communities, who have attended educational sessions, regarding malaria protective measures provided by screened windows and doors.	C		■	Community Affairs Dept.	Local women's groups		Assessment of resettlement houses

COMMUNITY HEALTH ACTION PLAN—MITIGATION COMMUNITY-FOCUSED MITIGATION MEASURES EXTERNAL TO THE PROJECT	TIMING	ACTION PLAN		RESPONSIBILITY	Potential COLLAB. AGENCY; ORG, Resource.	INDICATORS	SURVEILLANCE METHOD
		C&C	PACs				
• Construct resettlement housing with 16-mesh screening over windows and rooftop eaves (if applicable), and with screen doors (if acceptable to the local community).	C		■	Co. Engineering and Construction	Local malaria-control officer		Assessment of resettlement houses
Locate resettlement housing at least 500 m from significant anopheles breeding sites.	PD, D		■	Design, Engineering and Construction	Country health services	Entomologic-al survey results	Site assessment
Consider malaria transmission data per community in decisions regarding placement of resettlement housing, e.g., avoid locating communities with current low transmissions within/near communities with high transmission rates.	PD, D		■	Design, Engineering and Construction	Country health services	Entomologic-al survey results	Site assessment
Design project-initiated boreholes according to country design requirements for this area, with appropriate drainage such that mosquito breeding sites are not created.	D		■	Design, Engineering and Construction, community WATSAN agency	Country WATSAN specifica-tions		Site assessment
Provide support to district health malaria-control programs to provide long-lasting Insecticide Treated Nets (ITNs) at reduced costs to PACs, to proactively manage the perception that malaria will become worse due to the project. Educate women leaders in the community regarding benefits and proper use. Include women leaders who have been educated in education and distribution campaigns. Redistribute every 5 years.	C→DC		■	Company, country health services	District health service	Bed net use	DSS
Educate project community representatives regarding environmental-management measures within the PACs for control of vector breeding sites and maintain proper drainage in flood-prone areas, especially in rainy seasons. Project community representatives collaborate with local WATSAN committees to implement environmental-management measures during community clean-up days.	C→DC		■	Company, WATSAN committees	Local and district environ-mental health officer		Site audit

COMMUNITY HEALTH ACTION PLAN—MITIGATION COMMUNITY-FOCUSED MITIGATION MEASURES EXTERNAL TO THE PROJECT	TIMING	ACTION PLAN		RESPONSIBILITY	Potential COLLAB. AGENCY; ORG, Resource.	INDICATORS	SURVEILLANCE METHOD
		C&C	PACs				
Soil-, Water-, Sanitation-related							
Risk: Transmission of water-related diseases (cholera, etc.), worms, rodent- and fly-related diseases, and exposure to sewage outfall impacting local communities							
Provide adequate numbers of toilets and urinals for workers at each work site (establish number per local or applicable international guidance/requirements).	C→DC	■		Co. Site Services			Site assessment
Conduct health education programs for project workers regarding fecal/oral transmission of diseases, transmission of helminthic diseases (ascaris, pinworm, etc.), and safe drinking water and food safety. Provide pictorial take-home handouts.	C→O	■		Company Educational Dept.	District environ-mental health officer		Training records audit
Collaborate with local waste-management services to implement nonhazardous-waste-management plans in resettlement communities, such that: • Number of garbage cans and dumpsters provided is sufficient to hold accumulated garbage • Garbage is stored in rodent-proof containers, and with tightly fitting lids • Sanitary and solid waste is collected daily and covered daily with a solid layer of soil (15–30 cm) or incinerated, to prevent insect and rodent access • Prohibit the movement of large quantities of foodstuffs to local animal farmers, so that rodent and reptile habitats are not created • Appropriate container program, to avoid breading waterborne vectors (i.e., dengue control)	C→DC		■	Company Site Services, catering supervisor, local waste-management services	District environ-mental health officer		Site assessment

COMMUNITY HEALTH ACTION PLAN—MITIGATION COMMUNITY-FOCUSED MITIGATION MEASURES EXTERNAL TO THE PROJECT	TIMING	ACTION PLAN		RESPONSIBILITY	Potential COLLAB. AGENCY; ORG, Resource.	INDICATORS	SURVEILLANCE METHOD
		C&C	PACs				
Food and Nutrition							
Risk: Transmission of food-borne diseases, increases in vitamin-deficiency diseases							
Collaborate with the government-sponsored DSS to conduct anthropometric monitoring (height, weight, age) within the PACs.	C→DC		■	DSS		Stunting, wasting, un-derweight, z scores	Demographic Surveillance System
Collaborate with local health-education services to provide materials (from food- and nutrition-related health-education programs conducted for workers) to local health-education services and school programs.	C→DC		■	Company, local health education service	Country health services		
Assist with food sanitation awareness materials to local district environmental sanitation officers for educational sessions with food handlers and slaughterhouses, particularly vendors who sell food to project workers.	C→DC		■	Company	Local Environ-mental Dept. Internet sources		
Accidents and Injuries							
Risk: Potential increase in roadway-related accidents and injuries							
Collaborate with the district road-safety unit to establish and maintain pictorial road-safety signage in local language and English language (if needed); descriptions along project roadways directly surrounding project facilities, including conveyor-belt routes, roadway rerouting areas, heavy-equipment crossing areas, etc.	C→DC		■	Company, Country Road Safety Dept	District road safety work group	Traffic accidents	Roadway audits

COMMUNITY HEALTH ACTION PLAN—MITIGATION COMMUNITY-FOCUSED MITIGATION MEASURES EXTERNAL TO THE PROJECT	TIMING	ACTION PLAN		RESPONSIBILITY	Potential COLLAB. AGENCY; ORG, Resource.	INDICATORS	SURVEILLANCE METHOD
		C&C	PACs				
Hazardous Materials Exposure							
Risk: Potential exposure of community to project-related materials							
Implement emergency spill response plans and procedures, including medical monitoring plans, for each potential contaminant (project and community). Test at least quarterly.	C→DC		■	Company, local emergency response units			Program audit
Conduct pest-management program (for workers and resettled farmers) that focuses on organic methods and includes education campaigns regarding hazards of handling and using fertilizers and pesticides.	C→DC		■	Company, local government agricultural agency			Program audit, DSS
Psychosocial							
Risk: Potential increase in violence-related activities and alcohol drinking							
Collaborate with the authorities to establish a system to monitor violence and community cohesion related to project activities. Conduct violence-prevention education programs, particularly focusing on gender violence. Conduct alcoholism-prevention education programs.	C→DC		■	Company, local government Gender Violence Unit			Program audits
Throughout all project-cycle materials published for the community, include information about the closure and decommissioning phase and its effects on both workers and communities.	C→DC		■	Company	Local education system		Communica-tions materials assessment
Health Systems Infrastructure							
Risk: Potential disruption of access to health care by resettled population							
Provide assistance for the provision of national health insurance to resettled populations.	C→DC		■	Company, Country health service			DSS

COMMUNITY HEALTH ACTION PLAN—MITIGATION COMMUNITY-FOCUSED MITIGATION MEASURES EXTERNAL TO THE PROJECT	TIMING	ACTION PLAN		RESPONSIBILITY	Potential COLLAB. AGENCY; ORG, Resource.	INDICATORS	SURVEILLANCE METHOD
		C&C	PACs				
Cultural Health Practices							
Risk: Potential disruption to local cultural health practices through resettlement or relocation							
Understand local cultural health practices so that resettlement conditions accommodate local practices and behaviors and provide opportunities for health improvement, if feasible.	C→DC		■	Company, district social services dept.			DSS
Noncommunicable Diseases							
Risk: Potential increases in hypertension and diabetes due to changes in lifestyle							
Provide educational handouts used in worker education programs to country health service for use in local clinics.	C→DC		■	Company	Local health services		Records audit
Veterinary Medicine							
Risk: Potential increases in livestock-related diseases, such as TB and brucellosis, due to changes in pastoralists, migration patterns							
Collaborate with local agricultural programs to implement animal vaccination programs.	C→DC		■	Company, local agricultural programs	Swiss Tropical Institute	Animal vaccination rates	Surveys
Monitoring and Evaluation							
Risk: Lack of adequate in-country vital-statistics services, resulting in inability to evaluate key performance indicators related to project impacts							
Collaborate with existing government and vital-statistical services to strengthen capacity and perform future monitoring surveys.	C→DC		■	Company, government statistical services	INDEPTH Network	Demographic Surveillance System data	DSS

TYPICAL HEALTH IMPACTS ISSUES

Influx Management

When the project triggers significant migration (laborers, extended families, service providers, and so on) to the project area, it can pose potential significant impacts to surrounding communities. These impacts may occur, to varying degrees, across all phases of the project (exploration, preconstruction, construction, operations, and decommissioning). A strong interaction and mixing among local workers, imported specialty workers, and expatriates can facilitate the spread of respiratory disease, including the production of explosive epidemics that can pass back and forth between the project and the community. In addition, explosive food-borne epidemics are significant and can spread back and forth between the project worksite and the community via food handlers or petty traders.

Resettlement, Relocation

The health effects of resettlement or relocation should be carefully considered above and beyond the typical social and anthropologic analysis that is triggered by resettlement or relocation.

Water Management

During active construction periods, projects may create new breeding sites for key mosquito vectors. Resettlement and relocation communities may be in closer proximity to water bodies, which will significantly increase the vector-borne disease risk. New water bodies, such as surface-water environmental-control dams or new reservoirs, may become magnets for local community members and increase the risks of injury, including accidental drowning. In addition, water-storage facilities require careful environmental engineering (for example, shoreline slopes and vegetation control) to prevent development of vector breeding sites. During construction and operations phases, tires, drums, and other containers may become significant breeding sites for mosquitoes, with subsequent increased risk of dengue fever outbreaks.

Linear Features

Any physical structure (roads, bridges, transmission lines, pipelines, river systems, and so on) that crosses and/or connects diverse ecologic or human populations can be considered a linear feature. Linear features have the potential for both positive and negative health consequences, since they significantly facilitate the movement and interaction of diverse groups of humans and livestock.

Hazardous Materials Control and Disposal

These materials are often "recycled" within communities, with unusual consequences (for instance, increased small-scale breeding grounds for the mosquito vectors of dengue and other arboviral diseases). In addition, waste-storage drums that have industrial residues may adversely impact household water and food supplies, because these containers are often prized as inexpensive storage devices.

Changes in Income and Expenditure Consumption

Projects have significant potential to positively alter underlying levels of community- and household-income poverty. These potential positive effects can have profound impact on a variety of health performance indicators for all populations in a community (for example, children under age 5, women of reproductive age, elderly, and so on). Conversely, projects can trigger significant inflation, impacting both food and housing in surrounding communities. Significant food or housing inflation can adversely impact existing vulnerable groups, with negative consequences on individual- and community-level health performance indicators. Significant food or housing inflation can make recruitment and retention of health care workers and teachers extremely difficult for local communities. Significant and sudden changes in income can have a marked effect on alcohol usage and subsequent gender violence. Workforce education and training are potential key mitigation activities.

Infrastructure and Facilities

Large projects will build a significant number of physical structures that can impact the overall human environment. Within the fence line, projects construct temporary and permanent housing, sewage-treatment plants, catering facilities, maintenance yards, and a variety of administrative and management office buildings. In addition, for many extractive-industry projects, containment ponds known as environmental-control dams are often constructed due to the need to capture sediments and surface-water runoff. Large mining projects may have large conveyor systems and invariably have tailings dams, along with open pits or underground works. All of these structures can potentially impact, positively or negatively, local communities. Careful analysis of distinct facilities is important so that primary design changes can be made to efficiently and cost-effectively mitigate negative impacts.

HIA SCREENING PROCESS CHECKLIST

Basic Information

- ✓ Type of project
  - Greenfield / Expansion
- ✓ Project location
  - Country / Rural / Urban / Peri-Urban
- ✓ Presence of nearby communities or populations (within 30 km)
- ✓ Evidence that social and/or environmental assessment activities have been completed
  - (If not, are any under consideration?)

Identify potential health impacts

Environmental Health Areas (EHAs)	Aspects to consider
✓ **Vector-related** diseases—malaria, schistosomiasis, dengue, onchocerciasis, lymphatic filariasis, yellow fever	o Are any of these present in the project area? o Will the existing pattern of water and roadway distribution change because of the project? o Will there be worker influx from other areas?
✓ **Respiratory and Housing** issues—acute respiratory infections (bacterial and viral), pneumonias, tuberculosis; respiratory effects from housing, overcrowding, housing inflation	If there is a construction phase: o Will it trigger an influx of workers? o Will there be any work camps?
✓ **Veterinary Medicine/Zoonotic** issues—brucellosis, rabies, bovine TB, bird flu, etc.	o Will there be interaction between the project and local animal husbandry?
✓ **Sexually transmitted infections**—HIV/AIDS, syphilis, gonorrhea, chlamydia, hepatitis B	o Will the project trigger influx? o Will the project trigger long-haul truck trips?
✓ **Soil- and Water-borne** diseases—giardiasis, worms, water access & quality, excrement management	o Will the project trigger influx? o Will the project change water or soil quality or distribution in nearby communities
✓ **Food- and Nutrition**-related issues—stunting, wasting, anemia, micronutrient diseases (including folate, Vitamin A, iron, iodine), changes in agricultural and subsistence hunting/fishing/gathering practices, gastroenteritis (bacterial and viral); food inflation	o Will the project trigger influx? o Will the project change agricultural practices or food distribution?
✓ **Accidents/Injuries**—road-traffic-related, spills and releases, construction (home- and project-related), and drowning	o Will the project trigger influx? o Will the project trigger changes in existing road/rail/shipping/air transportation patterns? o Will there be temporary or permanent increases in road transportation?

Environmental Health Areas (EHAs)	Aspects to consider
✓ **Exposure to potentially hazardous materials**—pesticides, fertilizers, road dust, air pollution (indoor and outdoor, related to vehicles, cooking, heating, or other forms of combustion/incineration), landfill refuse or incineration ash, any other project-related solvents, paints, oils, or cleaning agents, by-products, or release events	○ For an existing facility: ▪ Is there any history of past releases into air/water/soil? ▪ Have there been any community complaints or concerns related to past releases? ○ Will hazardous-material residues be transported to/from the site? ○ Will hazardous material be used at the site? ○ Any anticipated air/water/soil releases? ○ Any community exposure concerns anticipated related to facility construction and operations phases?
✓ **Psychosocial** (social, including Key Determinants of Health)—resettlement/relocation, violence, security concerns, substance misuse (drug, alcohol, smoking), depression, and changes to social cohesion	○ Will the project trigger influx? ○ Will there be work camps? ○ Is resettlement/relocation required? ○ Will the project change existing subsistence practices, i.e., access to hunting/fishing/farming? ○ Will temporary or permanent jobs be created for local populations? ○ Will the project have any effect on equity or equality?
✓ **Cultural health** practices—role of traditional medical providers, indigenous medicines, and unique cultural health practices	○ Will the project change access to or the status of traditional health providers?
✓ **Health-services infrastructure and capacity**—physical infrastructure, staffing levels and competencies, technical capabilities of health care facilities at district levels; program-management delivery systems—coordination and alignment of the project to existing national- and provincial-level health programs (e.g., TB, HIV/AIDS), and future development plans	○ Will the project trigger influx? ○ Will the project provide all health services for its workers?
✓ **Noncommunicable Diseases (NCDs)**—hypertension, diabetes, stroke and cardiovascular disorders, and cancer	○ Will the project trigger influx? ○ Will there be work camps? ○ Will temporary or permanent jobs be created for local populations?

Identify potentially affected communities

- ✓ Use the EHA results to determine whether the communities may be affected by the project.
- ✓ Determine whether existing medical infrastructure will be affected by the project.

Determine the type of health impact assessment needed

- ✓ Situations that are likely to trigger the need for an HIA include:
    - Relocation or resettlement of people
    - New large construction-related work camps
    - Large project footprint with large populations affected
    - Long construction timescale
    - Long operations timescale with potential health impacts
    - Significant decommission phase, e.g., plant closure affecting community workforce
    - Potential for significant change in existing burden of disease
    - Potential for significant changes in key social determinants of health
    - Anticipated impact on local health services and infrastructure
    - Potential significant community exposures
    - Large project footprint, with significant development of linear features such as roads, transmission lines, railways, pipeline, etc.

HIA SAMPLE OUTLINE

Comprehensive HIA

EXECUTIVE SUMMARY

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

1.0 INTRODUCTION

- 1.1 Project Background
- 1.2 Objectives and Scope

2.0 PROJECT DESCRIPTION

- 2.1 Location
- 2.2 Key Operational Aspects of the Proposed Project: Timing and schedule, particularly (i) front-end design aspects, (ii) construction, and (iii) scheduled date for actual commencement of operations
  - 2.2.1 Site Access: Description of project location and accessability (i.e., remote and/or difficult access); need for new transport features (i.e., road/rail/port/airstrips be constructed)
  - 2.2.2 Operational Support: Are outside, (e.g., third-country nationals expected to be brought in for construction activities; is there a series of subcontractors under a prime contrator reporting to the companies?
  - 2.2.3 Project Timing/Schedule: Timing issues: Are seasonality effects (rainy season, etc.) expected to affect project scheduling?

3.0 LEGAL, ADMINISTRATIVE , AND LEGISLATIVE FRAMEWORK: Is there host-country legislation requiring health analysis?

4.0 HIA FRAMEWORK AND METHODOLOGY

- 4.1 HIA within the Proposed Project: How does the HIA "fit" within the other impact assessments, e.g., environmental and social?
  - 4.1.1 Scope of the HIA: Are there areas that will not be covered in the HIA?
- 4.2 Impacts Categorization: What system will be used in the HIA to describe potential impacts?
  - 4.2.1 Direct versus Indirect Effects: Will indirect effects be considered; regional level effects; national effects?
  - 4.2.2 Cumulative Effects: How will this be defined and evaluated, if at all?
  - 4.2.3 Specific Comprehensive HIA Methodology—Sectoral approach: Llooks at impacts across broad sectors.
    - 4.2.3.1 Housing: Will new housing be built within or for potentially affected communities?
    - 4.2.3.2 Water Supply, Sanitation, and Food: Will there be changes in access to water quantity and supply sources; will local sanitation services be improved, overwhelmed, or otherwise affected?
    - 4.2.3.3 Transportation: Changes in roads/rail/ports/air access.
    - 4.2.3.4 Communications, Information Distribution
  - 4.2.4 Environmental Health Areas (EHAs): As described in IFC Guidance Note 4 for Performance Standard 4, "Community Health, Safety and Security," these are the 12 defined areas to examine for potential project impacts.

4.2.5 Potentially Affected Communities (PACs): Which communities are most likely to be impacted; are these communities the same as defined by the environmental and/or social assessment; why or why not?

5.0 BASELINE ANALYSIS: What are the exisitng data sources; what were the data gaps that required new household surveys; have the key data gaps been filled?

5.1 Baseline Data at the National, Regional, and Provincial Levels: What are the existing sources of health data relevant to the project; what are the existing data, if any, from Demographic Health Surveys (DHS), etc.? Are there regional-level data that can be applied to the project; are there provincial-level data sources; what is the quality assessment of these data?

5.2 Baseline Data at the District Level: Are there any data available for the potentially affected communities; what is the age and quality of these data?

5.3 Baseline Data from Detailed Household Surveys: Describe the data from project-specific household surveys; were the data from proportionate population sampling or comprehensive (>90% of all affected households sampled); how do the project data compare to regional- and national-level surveys, assuming they exist? If there are significant differences, these should be explained. Are the health household data consistent with the social survey data; have social determinants of health been assessed?

6.0 STAKEHOLDER ANALYSIS: Who are the key stakeholders for health; are there differences between stakeholders associated with health issues versus social/environmental issues; what are the power relationships across and between the stakeholders and the project?

7.0 RISK ANALYSIS

7.1 Analysis: Each of the 12 EHAs should be considered for potential impacts, positive, negative, or both; risk is a combination of impact and likelihood.

7.2 Overall Summary Analysis

8.0 MITIGATION: What are the general strategies and actions that can be used; what is the role and responsibility for the host government versus the project proponents; how will interventions be coordinated?

9.0 MONITORING AND EVALUATION (M&E): Describe the system that will be used for this activity; define key performance indicators; define roles and responsibilites between the project and the host government.

10.0 SUMMARY

11.0 BIBLIOGRAPHY

HIA SAMPLE OUTLINE

Limited In-Country HIA

EXECUTIVE SUMMARY

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

1.0 INTRODUCTION

1.1 Project Background

1.2 Objectives and Scope

2.0 PROJECT DESCRIPTION

2.1 Location

2.2 Key Operational Aspects of the Proposed Project: Timing and schedule, particularly (i) front-end design aspects, (ii) construction, and (iii) scheduled date for actual commencement of operations.

- 2.2.1 Site Access: Is the proposed project location remote or difficult to access; will new transport features, e.g., road/rail/port/airstrips be constructed?
- 2.2.2 Operational Support: Are outside, (e.g., third-country) nationals expected to be brought in for construction activities; is there a series of subcontractors under a prime contrator reporting to the companies?
- 2.2.3 Project Timing/Schedule: Timing issues: Are seasonality effects (rainy season, etc.) expected to affect project scheduling?

3.0 LEGAL, ADMINISTRATIVE, AND LEGISLATIVE FRAMEWORK: Is there host-country legislation requiring health analysis?

4.0 HIA FRAMEWORK AND METHODOLOGY

4.1 HIA within the Proposed Project: How does the HIA "fit" within the other impact assessments, e.g., environmental and social?

- 4.1.1 Scope of the HIA: Are there areas that will not be covered in the HIA?

4.2 Impacts Categorization: What system will be used in the HIA to describe potential impacts?

- 4.2.1 Direct versus Indirect Effects: Will indirect effects be considered; regional-level effects; national effects?
- 4.2.2 Cumulative Effects: How will cumulative effects be defined and evaluated, if at all?
- 4.2.3 Specific Mini-HIA Methodology: Sectoral approach: Looks at impacts across broad sectors.
- 4.2.3.1 Housing: Will new housing be built within or for potentially affected communities?
- 4.2.3.2 Water supply, Sanitation and Food: Will there be changes in access to water quantity and supply sources; will local sanitation services be improved, overwhelmed, or otherwise affected?
- 4.2.3.3 Transportation: Changes in roads/rail/ports/air access.
- 4.2.3.4 Communications, Information Distribution

4.2.4 Environmental Health Areas (EHAs): As described in IFC Guidance Note 4 for Performance Standard 4, "Community Health, Safety and Security," these are the 12 defined areas to examine for potential project impacts.

4.2.5 Potentially Affected Communities (PACs): Which communities are most likely to be impacted; are these communities the same as defined by the environmental and/or social assessment; why or why not?

5.0 BASELINE ANALYSIS: Current available data. Since this is a mini-HIA, no new health-specific field data collection is anticipated; what are the data sources; are they adequate; data-gaps analysis?

6.0 STAKEHOLDER ANALYSIS: Who are the key stakeholders for health; are there differences between stakeholders associated with health issues versus social/environmental issues; what are the power relationships across and between the stakeholders and the project?

7.0 RISK ANALYSIS

7.1 Analysis: Each of the 12 EHAs should be considered for potential impacts, positive, negative, or both; risk is a combination of impact and likelihood.

7.2 Overall Summary Analysis

8.0 MITIGATION: What are the general strategies and actions that can be used; what is the role and responsibility for the host government versus the project proponents; how will interventions be coordinated?

9.0 MONITORING AND EVALUATION (M&E): Describe the system that will be used for this activity; define key performance indicators; define roles and responsibilites between the project and the host government.

10.0 SUMMARY

11.0 BIBLIOGRAPHY

RECOMMENDED BASELINE DATA COLLECTION ACTIVITIES AND TASKS

Activities	Comments
☐ Obtain a demographic profile for the impacted community. Include important community features, such as: • Residential, commercial, agricultural, farming, and industrial areas • Locations of schools, churches (i.e., places of worship and other sacred sites), health care facilities, and recreational areas • Location of water sources, local food sources, reservoirs, sewage/waste system • Languages of the area	Translating this information into maps of the potentially impacted area is an excellent way to show results. Maps also help the project anticipate possible project impacts. Coordinate with SIA social mapping exercise.
☐ Identify community health issues that have been identified from other HIAs, published studies, reports, or communiqués on projects similar to this one.	
☐ Identify health risks and define baseline data according to each of the 12 environmental health areas listed in Table 2.	The technical nature of this material will likely require a public health specialist to collect and/or interpret information on disease and risk factor prevalence.

Tasks

Conduct a baseline literature search, review, and analysis. Determine data gaps. Review current and updated project documents and data:

- Social impact/management reports
- Environmental impact/management reports
- Drinking water sampling results
- Influx management plan
- Sewage-treatment plant capacity plans
- Medical response to spills plan
- Food and water safety plans and procedures
- Any anticipated survey efforts (before the surveys are conducted)
- Existing baseline data collected
- Stakeholder consultation meeting minutes/reports

Fact-gathering meetings with project personnel

- Project management—regarding community health-related concerns, project perceptions of health/social/environmental impacts
- Environmental representative—regarding air emissions, road dust, water
- Hydrogeology representative—regarding water-management practices and water monitoring
- Social representative—regarding social impacts identified that may relate to health and potentially affected communities
- Geographical Information data representative (ArcGIS or CAD)—regarding regional and district GIS/map files
- Head construction contractor—regarding managing contractor personnel

Fact-gathering meetings with governmental/institutional personnel (with emphasis on project location)

- Ministry of Health representatives in the area
- Water Sanitation representatives
- Transportation Safety Department (if present)
- HIV/AIDS—Sexually Transmitted Infections Control Program
- Malaria Control Program
- Tuberculosis Control Program
- Road Safety Department
- Alcohol Prevention Program
- Domestic Violence Prevention Program
- Ministry of Health—Health Education Department
- Water Sanitation programs

Ground Truthing (site visit and review) of each project location

Field activities will include:

- Characterization of the project from a health perspective
- Where the project will be located (visual evaluation of adjacent and surrounding communities—no community population interviews)
- Physical structures and facilities
- How it will operate
- Important potential exposures to the community from physical, biological, and chemical substances (what, how much, how often)
- Workforce size
- Workforce countries of origin
- Planned locations of these worker populations

- Identify communities that are downstream and downwind
- Transportation corridor(s)
- Transmission-line corridors
- Pipeline corridors (if applicable)
- Project timing
- Physical issues (weather, topography)
- Environmental issues related to health (EIA)
- Social issues related to health (SIA)
- Current health infrastructure and systems in potentially affected communities (discussions with local health services representatives may be needed)
- Sustainability-capital data analysis

Community Members Focus Groups

- Individual perceptions of health impacts (including project personnel)
- General view of community lifestyles
- Traditional and local knowledge (TLK)
- Women's groups (currently organized religious, water/sanitation, or support groups)

RISK ASSESSMENT APPROACH

Risk assessment can be used to qualitatively or quantitatively rank the potential project health impacts to help prioritize the mitigation measures. Activities included in the risk assessment process are described below.

Risk Assessment Activities

Activities	Comments

☐ **Health Risk Assessment**
Estimate the magnitude of potential health effects resulting directly from project-specific hazards within each potential health-impact area of concern (e.g., resettlement areas, construction camps, camp followers, etc.):
• Qualitative: Using expert judgment, rate each hazard as high, medium, or low, based on the consequences of the exposure the target population(s) will receive and the probability that the exposure will occur.
• Consequences are related to:
  • Health Effect (incidence, severity)
  • Health Hazard (toxicity)
  • Exposure Level (frequency, duration, dose)
  • Population(s) at Risk (number, degree of susceptibility)
  • Probability of Exposure (high, medium, low)
  • Modifying Factor(s), e.g., cultural, personal habits, availability of medical treatment, etc., (hazard-modifying influence: increase, neutral, decrease)
• Quantitative: As appropriate (based on the degree of risk or stakeholder requirements), determine or estimate hazard potency (i.e., disease per unit exposure) and probabilities of exposure to the community. Apply to the estimated number of people affected and adjust to reflect modifying factors.
• Classify each potential health effect: high, medium, low, none, or enhanced.
	In either a qualitative or quantitative analysis, the magnitude of the potential health effect on the worker and community populations is a function of:
	• hazard's potency,
	• exposure level,
	• number of people exposed,
	• probability that exposure occurs, and
	• modifying factors.

☐ **Estimate magnitude of potential health effects related indirectly to the project:** • See strategies above for direct effects.	If disease incidence rates are not available, qualitative impacts may be estimated (e.g., adverse dietary effects from loss of crop land).
☐ **Ranking of health risks:** • Rank the relative health risks and select the health risks that will be mitigated.	Health risks are ranked in order of highest concern by health impact area of concern, or by hazard, or by other metrics as appropriate.
☐ **Set mitigation priorities for selected risks:** • Consider project health impacts and probability of occurrence on all items identified in the health risk assessment. • All health impacts identified should be discussed in the HIA, and the reason(s) for not mitigating selected ones stated. • Classify each potential health effect: high, medium, low, none, enhanced (meaning the project will likely have a positive impact).	Mitigation priorities are typically based on the seriousness and magnitude of the impact resulting from the project and the probability that it will occur. Priority rankings may be determined using a consensus process among the HIA team and stakeholders.

Manageability

Manageability is the ability to influence risk through risk responses (proactive or reactive) and is illustrated in the example below.

Manageability Scoring

Scoring Scale—Manageability	
HIGH	Within the control of the Project Management team. Can control probability and/or impact.
MEDIUM	Within the influence of the Project Management team. Can influence probability and/or impact.
LOW	Outside the influence of the Project Management team. Can only influence impact.

Risk Assessment Examples

Probability Determination of an Oil and Gas Project

Probability			
Scale	Description	Probability	Frequency
HIGH	Likely	>25%	More than 1 in 4 projects experience this
MEDIUM	Less Likely	5% to 25%	*Circa* 1 in 10 projects experience this
LOW	Unlikely	1% to 5%	*Circa* 1 in 50 projects experience this
VERY LOW	Very Unlikely	<1%	Fewer than 1 in 100 projects experience this

Community Health Impact Levels from Safety and Environmental Threats

Severity			
Scale	Community Health	Safety (inside the fence)	Environment Threats
VERY HIGH	High level of concern or interest from local community due to health-related issues. National and/or international media interest. Serious breach of regulation, resulting in investigation by regulator. Operation suspended, licenses revoked.	One or more fatalities or multiple permanent injuries	Damage is long-term and/or extensive
HIGH	Increasing rate of health-related complaints, repeated complaints from the same area (clustering). Increased local/national media interest.	Serious injury	Short-term damage within facility boundary
MEDIUM	Small numbers of sporadic community health complaints. Local media inquiries.	Recordable injury, first aid, serious occurrence	Rapid onsite clean-up
LOW	Isolated community health complaint. No media inquiry.	Minimal impact	Minimal impact

References

Amex, M., R. Tolhurst, G. Barnish, and I. Bates. 2004. "Malaria misdiagnosis: effects on the poor and vulnerable." Lancet 2004 (364): 1896-98.

Cairncross, S. 2003. "Editorial: Water supply and sanitation: some misconceptions." Tropical Medicince and International Health 8 (3): 193-195.

Carroquino, M.J. 2007. "How to conduct a Health Impact Assessment (HIA) of Blood Lead Levels in European ChildrenGuidelines." http://www.enhis.org/object_binary/o2819_HIAGuidelines_BLL_children_uneditedVersion_September2007_v2.pdf.

CSDH (Commission on Social Determinants of Health). 2008. *Closing the gap in a Generation. Health equity through action on the social determinants of health*. Geneva: World Health Organization.

DFID (Department for International Development). 2003. "Health, Environment and The Burden Of Disease: A Guidance Note." London, U.K.: DFID.

Ehrhardt, S., G. D. Burchard, C. Mantel, et al. 2006. "Malaria, Anemia, and Malnutrition in African Children—Defining Intervention Priorities." *Journal of Infectious Diseases* 194 1 (July): 108-114.

Erlanger, T., S. Sayasone, G. R. Krieger, M. Tanner, P. Odermatt, and J. Utzinger. 2008b. "Baseline health situation of communities that will be affected by the Nam Theun 2 hydroelectric project in central Lao PDR, including indicators for monitoring." *International Journal of Environmental Research* 18 (3): 223-242.

Ezzati, M., and D. M. Kammen. 2002. "The Health Impacts of Exposure to Indoor Air Pollution from Solid Fuels in Developing Countries: Knowledge, Gaps, and Data Needs." *Environmental Health Perspectives* 110 (11): 1057-68.

Ezzati, M., J. Utzinger, S. Cairncross, A. J. Cohen, and B. H. Singer. 2005. "Environmental risks in the developing world: exposure indicators for evaluating interventions, programmes, and polices." *Journal of Epidemiology and Community Health* 59: 15-22.

IFC (International Finance Corporation). 2007. *Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets*. Washington, DC: IFC.

IPIECA (International Petroleum Industry Environmental Conservation Association). 2006. *A Guide to Malaria Management Programmes in the oil and gas industry.* London, U.K.: IPIECA.

IPIECA (International Petroleum Industry Environmental Conservation Association). 2005. *A Guide to Health Impact Assessments in the oil and gas industry.* London, U.K.: IPIECA.

Keiser, J., B. H. Singer, and J. Utzinger. 2005. "Reducing the burden of malaria in different eco-epidemiological settings with environmental management: a systematic review." *Lancet Infectious Diseases* 5: 695-708.

Listorti, J. A. 1996. "Bridging Environmental Health Gaps. Lessons for Sub-Saharan Africa Infrastructure Projects." AFTES Working Paper No. 20, World Bank, Washington, DC.

Listorti, J. A., and F. M. Doumani. 2001. "Environmental Health: Bridging the Gaps." World Bank Discussion Paper No. 422, World Bank, Washington, DC.

Mosse, R., and L. E. Sontheimer. 1996. "Performance Monitoring Indicators Handbook." World Bank Technical Paper No. 334, World Bank, Washington DC.

Quigley, R. L., P. den Broeder, A. Furu, B. Bond, B. Cave, and R. Bos. 2006. "Health Impact Assessment International Best Practice Principles." *Special Publication Series* (5): Fargo, U.S.A.: International Association for Impact Assessment (IAIA).

Richeldi, L. 2006. "An Update on the Diagnosis of Tuberculosis Infection." *American Journal of Respiratory and Critical Care Medicine* 174: 736-742.

Rutstein, S. O., and K. Johnson. 2004. "The DHS Wealth Index." DHS Comparative Reports (6): Calverton, Maryland: ORC Macro.

Sullivan, J. B., and G. R. Krieger. 2001. *Clinical Environmental Health and Toxic Exposures*. 2nd ed. Baltimore, Maryland: Lippincott Williams & Wilkins.

World Bank. 2004. *Monitoring & Evaluation: Some Tools, Methods & Approaches*. Washington, DC: World Bank.

Zinsstag, J., E. Schelling, K. Wyss, and M. B. Mahamat. 2005. "Potential of cooperation between human and animal health to strengthen health systems." *Lancet* 2005 (366): 214-245.

Acknowledgements

This good practice guidance: *Introduction of Health Impact Assessment* has been prepared by the Environment and Social Development Department of the International Finance Corporation, with primary contribution from Josefina Doumbia (IFC Principal Environmental Specialist), Alex Indorf (IFC Senior Environmental Specialist), Ikuko Matsumoto (IFC Policy Officer), Gary Krieger (NewFields), and Marci Balge (NewFields).

Additional contributors include: Motoko Aizawa, Diana Baird, Martin Birley, Robert Bos, Hannah Buckley, Christine Copley, Carlos Dora, Craig Firedmann, Alistair Fulton, Rob Horner, Anna Hidalgo, Larry Jiang, Stephen Lintner, Alessandro Palmieri, Michaela Pfeiffer, Justin Pooley, Greg Radford, Ken Satin, Jorge Villegas, Liz Wall, and Richard Welsh. Publication was edited by Shannon Roe. Design and layout by Vanessa Manuel.

Thanks are also due to all those who provided valuable comments to the team on various drafts during the Health Impact Assessment training and public comment process.

Photos courtesy NewFields
Cover photos courtesy World Bank Group Staff

For more information on IFC's Good Practice Publications, please
contact the Environment and Social Development Department
www.ifc.org/sustainability

Disclaimer

The purpose of the *Introduction to Health Impact Assessment (HIA)* is to share information about private sector approaches for addressing a range of environmental and social issues. This HIA provides guidance and examples of basic good practice approaches that businesses have successfully applied in their operations. IFC has not financed all the projects or companies mentioned in the HIA. Some of the information in the HIA comes from publicly available sources such as company Web sites. IFC has not verified the accuracy of such information nor the companies' practices.

This HIA does not represent a commitment by IFC to require projects it finances to take certain or all of the actions specified in the HIA. Instead, any issues arising in an IFC-financed project will be evaluated and addressed in the context of the particular circumstances of the project.

2121 Pennsylvania Avenue, NW
Washington, DC 20433 USA
Telephone: 202 473-1000
www.ifc.org