ICMM
International Council on Mining & Metals

Good Practice Guidance on Health Impact Assessment

Guidance 2010-1

Good Practice Guidance on Health Impact Assessment

List of Acronyms

AIDS	Acquired Immune Deficiency Syndrome
CSW	Commercial Sex Worker
HIV	Human Immunodeficiency Virus
HNA	Health Needs Assessment
HRA	Occupational Health Risk Assessment/ Hazard Identification and Risk Assessment
HSE	Health, Safety and Environment
EIA	Environmental Impact Assessment
ESHMP	Environmental Social and Health Management Plan
ESHIA	Environmental, Social and Health Impact Assessment
ESHMP	Environmental, Social and Health Management Plan
HIA	Health Impact Assessment
HMP	Health Management Plan
IA	Impact Assessment
HRA	Occupational Health Risk Assessment
ICMM	International Council on Mining and Metals
NGO	Non Governmental Organization
SEAT	Socio-Economic Assessment Toolbox
SIA	Social Impact Assessment
SIP	Social Investment Plan
TB	Tuberculosis
TOR	Terms of Reference

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Foreword

Ensuring that our members' operations contribute positively to the health and wellbeing of our workers and communities is of paramount importance to ICMM.

ICMM has developed a set of tools to help site practitioners assess and address the risks posed by hazards in the mining and metals sector – this Good Practice Guidance on Health Impact Assessment allows the user to substantively assess the impacts of their operations on the health of the local communities, alongside environmental and social impacts. A sister publication Good Practice Guidance on Occupational Risk Assessment (2009) provides those practitioners with the information and tools they need to assess the health and wellbeing of employees and contractors.

ICMM's interaction on this issue is guided by two of our Sustainable Development Principles:

- To seek continual improvement of our health and safety performance
- To contribute to the social, economic and institutional development of the communities within which we operate.

This Good Practice Guidance sets out an overview of how mining and metals operations can affect the health and wellbeing of local communities, describes typical health impact assessment processes and outlines a methodology for undertaking a rapid assessment so that in-house practitioners are involved from the start. The Good Practice Guidance recognizes the imperative to integrate health impact assessment with environmental and social impact assessments and provides the reader with management tools to achieve this.

The ICMM/World Bank Community Development Toolkit provides further practical advice on engaging with local communities and should be referred to in the design of health impact assessment studies.

It is our intention that this publication provides a practical tool to assist companies in protecting the health and wellbeing of their workforce and local communities, and it aims to represent leading practice for companies operating in the mining and metals sector today.

Dr R. Anthony Hodge, President

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SECTION 1: Introduction

1.1 Purpose of the Guidance

Introduction

Health Impact Assessment (HIA) is a systematic approach to predicting and managing the potential positive and negative health effects of policies, plans, programs and projects on local communities and the wider society. The purpose of this guide is to:

- promote the use of HIA in the mining and metals sector
- introduce managers and health and safety advisors to the HIA process
- provide a practical resource for conducting initial in-house rapid HIAs
- support the commissioning of in-depth HIAs either as stand-alone assessments or more usually as part of Integrated Environmental, Social and Health Impact Assessments (ESHIA).

Why do HIA?

Assessment and management of community health, safety and wellbeing impacts is increasingly considered part of the risk management and social responsibility of mining and metals operators. A range of industrial sectors e.g. oil and gas, chemical manufacturing and transportation are increasingly looking to embed HIA within their organizational and project management structures. For new mining and metals projects and modifications, or acquisitions of existing projects, HIA can:

- Identify and maximize the positive community health and wellbeing impacts and opportunities that a mining and metals project can bring.
- Identify, avoid and minimize, through changes to the project design and implementation, the unintended negative community health and wellbeing impacts that can arise.
- Identify existing community health problems, which could amplify the impact of a proposed project and affect its viability.
- Identify country-specific health regulations which may affect the proposed project.
- Provide a process through which the project can work in partnership with local health, social care, and welfare services to jointly alleviate these health problems.
- Form one part of a broader community and local stakeholder involvement and engagement process that can build trust, draw out any community concerns and generate a dialogue about the best ways that the project can benefit local communities.
- Help to make explicit the potential trade offs between community health and wellbeing and other economic, environmental and social objectives of the proposed project.
- Provide an equitable, transparent and evidence-based approach to planning and funding community health infrastructure and development activities to protect and enhance sustainable local livelihoods.
- Help to jointly negotiate those aspects of community health and wellbeing which are the responsibility of the project and those aspects which are the responsibility of local government and local public services.
- Help to manage project sustainability and obtain a long term licence to operate.

The business case for managing community wellbeing impacts

A proactive approach to preventing ill health and maximizing health and wellbeing benefits can improve the financial performance of a project and parent company. Key bottom line benefits include:

- Speedier achievement of a mining and metals project's licence to operate
- Lower planning and associated legal and consultancy costs
- Access to international funding[1] [2]
- Lower risk of disruptive protest or sabotage
- Lower risk of damage to a project and parent company's reputation
- Lower risk of future community-led liability and litigation
- Reduced absenteeism and health care costs for employees from local communities
- Improved general employee morale.

This *Good Practice Guidance* is complementary to the HIA guide developed by the International Finance Corporation, the forthcoming guide by the World Health Organization and the guide developed by the International Petroleum Industry Environmental Conservation Association (IPIECA). The ICMM guidance focuses on an approach that takes account of emerging HIA methodology in both developed and developing country settings and the particular needs of the mining and metals sector. It describes a flexible and holistic approach that can easily be modified to take account of the needs and requirements of mining and metals companies and their projects.

For those interested in Occupational Health Risk Assessment (HRA) there is a sister ICMM report *Good Practice Guidance on Occupational Health Risk Assessment* that provides guidance on the HRA of new and existing projects.

Photo courtesy AngloGold Ashanti

[1] The Equator Principles: a benchmark for the financial industry to manage social and environmental issues in project financing. www.equator-principles.com

[2] International Finance Corporation. Performance Standard 4: Community health, safety and security. 2006.

1.2 Community Health and Wellbeing Impacts of Mining and Metals Projects

Introduction

This section gives an overview of how mining and metals projects can affect the health and wellbeing of local communities and outlines the types of impacts that are relevant when conducting an HIA.

All communities have existing health problems and health assets. Similarly, all development projects have the potential to generate positive and negative health and wellbeing impacts. It is within this wider context that the community health impacts of mining and metals projects should be considered.[3] Both positive and negative impacts occur because a project can change the economic, social, sanitary and natural environments within which communities live and work. Good design and management can help to maximize the positive health and safety impacts and avoid or minimize the negative ones.

The health and wellbeing impacts described here can occur at any time during the mining and metals lifecycle from exploration and construction to operation and closure.

These impacts can be classified into *health outcome, health determinant, health equity/inequality and cumulative impacts* and are discussed in the following sub-sections.

Impacts of mining and metals projects on health outcomes

Health outcomes are measurable changes in the health status of an individual, group or population which are attributable to an intervention or series of interventions. Health outcomes may be intended or unintended, and may not become apparent for many years. Table 1 shows the main categories of health outcomes, with examples of each.

Table 1: Types of health outcomes considered in HIA

Health Outcomes	Examples *an increase or decrease in the rates of...*
Infectious diseases	Malaria, HIV and influenza
Chronic diseases	Heart disease, cancer, bronchitis and asthma
Nutritional disorders	Malnutrition, vitamin deficiencies and obesity
Physical injury	Accidents, heavy metal and chemical poisoning and community violence
Mental health and wellbeing	Suicide, depression, stress and anxiety

[3] Some HIA guides discuss health impacts in terms of hazards and risks. However, the terms hazard and risk may not be seen by some stakeholders as broad enough to encompass all the determinants of health that can be changed by a project. In addition, both terms focus the discussion on negative influences and diminish the potential for identifying positive influences and opportunities for enhancing community health and wellbeing. See Appendix 3 Key Definitions and Concepts.

Infectious diseases

The environmental, social and economic changes that mining and metals projects bring can increase the level of new and existing infectious diseases. For example, pressure on local water resources may occur because the project uses local water for its own processes and workers at the expense of local community's sanitation systems and access to clean drinking water. This in turn can lead to the spread of water borne diseases such as typhoid and cholera (bacterial); hepatitis A and polio (viral); schistosomiasis and guinea worm (parasites); and amoebiasis and giardiasis (protozoal). A project can also create or remove habitats where malaria-carrying mosquitoes or schistosomiasis snails can flourish such as through the creation of wastewater pits which can serve as a breeding ground for some insect vectors.[4]

An influx of large groups of workers can also lead to overcrowded conditions where air-borne diseases such as tuberculosis, influenza and meningitis can spread easily.[5] This in-migration can also lead to the introduction of new infections to remote areas where local communities have little or no natural immunity to them.

The improved economic status of the area and the influx of new people, living away from their families, can also lead to an increased risk of sexually transmitted infections such as HIV/AIDS, gonorrhoea and chlamydia.[6]

Major outbreaks of infectious diseases can have a devastating effect not only on communities, but on the viability of a mining and metals project.

The ICMM publication *Good Practice Guidance on HIV/AIDS, Tuberculosis and Malaria* provides further information about how these diseases are spread and how they can be managed and controlled in mining and metals projects. Good planning and an integrated disease and vector control program alongside preventative health promotion programs can minimize any project related effects and even reduce existing rates of endemic infectious diseases.

Chronic diseases

Local communities may already be exposed to low background levels of potentially hazardous materials (e.g. dust, particulate matter, heavy metals) that can be associated with health problems such as respiratory illnesses, skin diseases, organ damage, circulatory problems, birth defects, cancers and neurological disorders. Mining and metals projects can potentially change these exposures by adding or removing substances in the air, water and/or soil. Some of the substances that may be added can remain in the environment and/or the food chain for decades after the closure of a project (e.g. mercury, pesticides), and therefore may have transgenerational health impacts.[7]

[4] Vectors are organisms that act as hosts and carriers of micro-organisms such as bacteria, viruses and parasites. They are generally unaffected themselves but spread the bacteria or viruses onto other species where they multiply to manifest as a full blown disease.

[5] International Finance Corporation. 2009. The migration effect: risk assessment and management strategies for addressing project-induced in-migration.

[6] These migrants come to work in the project and/or to serve project workers. Migrants who come to serve project workers are sometimes referred to as camp followers because project workers tend to live in camps separate from local communities.

[7] Transgenerational impacts are those impacts which can affect future generations i.e. they lead to ill health in children and grandchildren even after the project has closed.

Projects can also bring changes that affect people's lifestyles (e.g. diet, level of physical activity, smoking, alcohol and drug consumption) that increase or decrease their risk of chronic illnesses such as heart disease, diabetes, and cancer and can also affect the mental health status of the local population. This can be through increased incomes as well as the increased availability of tobacco, alcohol and narcotic drugs. Alongside infectious diseases, cardiovascular diseases (heart disease and strokes) are one of the leading causes of death, ill health and disability worldwide. Even small changes in these chronic disease risk factors can have significant long term effects on local community health and wellbeing.

The potential increase in chronic disease risk factors may be at least partially minimized through support for NGOs and local health and social care services in delivering health promotion that emphasises moderation and the long term adverse effects of substance abuse; and working with the local police service to regulate black market economies and what may be legally sold to workers.

Nutritional disorders

Mining and metals projects can increase the range, quality and amount of food available, leading to improved nutrition and positive health and wellbeing impacts. However, projects can also reduce access to traditional food sources by, for example, using agricultural land for other purposes or increasing the demand, and therefore prices, of locally grown food. There may also be risks associated with increased availability and affordability of manufactured food products that are high in fat, salt and sugar. Obesity and micronutrient deficiencies can co-occur when calorie intake is high and the food eaten is low in essential vitamins and minerals. Similarly, food borne parasitic infections such as trematodiasis[8] can increase as intensively reared fish and seafood become available or there are changes to local aquaculture that make these parasites more common. This is a particular risk in regions of rapid economic development, where the influx of cash income into a subsistence economy can disrupt traditional patterns of food production, food distribution, land access and water use. These impacts often fall disproportionately on those most susceptible and least able to cope such as those on very low incomes, children, those with existing disease/disability and the elderly.

Physical injury

Mining and metals projects can provide employment opportunities which are relatively safe and well-managed compared with other options available to many workers, particularly in developing countries, and can reduce work-related injuries in the population overall. However, project-related accidents, poorly controlled use of explosives or chemicals, equipment failure and truck movement can all potentially lead to physical injuries in local communities. If not well managed, decommissioned mining and metals projects may also pose injury risks, for example via falls, cave-ins, drowning, land slips and derelict buildings.

Projects may also affect injury rates indirectly through the social and economic changes they bring about. They may reduce the risk of violence in the community by providing gainful employment for young men, and by increasing the overall wealth of a community. However, the influx of large groups of, generally, male workers can sometimes lead to social unrest which may include violence and sexual assault.

[8] caused by liver flukes, lung flukes and intestinal flukes

Mental health and wellbeing

Access to jobs, income, goods and services can enhance mental health and wellbeing and reduce stress. Having a sense of control over one's life is crucial for mental wellbeing, so mining and metals projects can improve mental health by reducing poverty, increasing self esteem and empowering local communities.

However, if not well managed, the disruption and uncertainty brought on by a new project can increase worry, stress, and feelings of powerlessness, particularly for those who face involuntary resettlement. If the price of local housing, food and other services increases as a result of the project, the financial stress on low income families can be great. The visual impact on the environment and the lighting, odour and noise associated with mining and metals projects can also affect mood, heighten stress levels and lead to sleep disturbance. Lack of job security may also lead to stress amongst employees and dependants, particularly when the project only provides short term employment contracts or the project nears closure.

Impacts of mining and metals projects on health determinants

Health determinants (also known as the wider environmental and social determinants of health and wellbeing) are the social, economic, environmental and cultural factors – the living conditions - that indirectly influence health and wellbeing. They include what we eat and drink; where we live and work; and the social relationships and connections we have with other people and organizations. Some determinants such as sex, age, family history of illness are unmodifiable while others are modifiable through community interventions. It is the modifiable determinants that are the focus of HIA (See Figure 1 and Table 2).

HIA assesses both the *direct physical health impacts* on community health, for example traffic injury, emissions into the air, water and soil; and the *indirect impacts on health via health determinants*. The following Sub-sections outline the various ways a mining and metals project can influence the wider environmental and social determinants of health and wellbeing.

Employment and economy

Mining and metals projects can bring prosperity and new goods and services to an area and thereby help improve the quality of life and living standards of local people. The increase in income, development of new local businesses linked to the project, access to new markets for local goods and produce and access to new services and amenities can have a significant beneficial effect on individual and community health and wellbeing.

However, new goods and services can negatively impact some sectors of the local economy. Employment opportunities in a new project may also preclude people from carrying out other important roles that they previously fulfilled e.g. child care, food gathering, and leadership roles in the community. The employment of women may have particularly significant effects on family and community social relationships and thus appropriate support mechanisms should be considered. Similarly, an increase in commercial sex workers (CSW) while having short term benefits for clients and CSWs can have significant, long term, negative individual and community health and wellbeing impacts.

The potential peaks and troughs in international demand for mined materials and the limited lifespan of such projects (10-20 years) can have significant social, economic and personal costs. For example, when a mine closes and migrant workers leave, it is not only the mining jobs that are lost, but local businesses, supplying goods and services to the mine and its workers, are also affected in ways that cannot be reversed when the project closes. In such a situation a return to traditional industries (e.g. agriculture) may not be possible if land use has changed and skills have not been passed on from one generation to the next.

Good enhancement and mitigation measures with a focus on local recruitment, enhancing local skills and developing plans for what will happen as and when the project closes are likely to minimize the potential negative impacts. *ICMM's Planning for Mine Closure Toolkit* provides useful additional information for consideration.

Table 2: Modifiable determinants of health considered in HIA

Modifiable Determinants of Health		
Main Determinant	**Determinant Sub-category**	**Example**
Individual and Family	Physiological	Vaccination status Nutrition
	Behavioural	Lifestyle and daily routines Physical activity Use of tobacco, alcohol & other drugs Acceptability of health services Risk taking behaviour
	Socio-economic circumstances	Income and wealth Education and learning Employment and economy
Environmental	Physical	Housing and shelter Transport and connectivity Exposure to chemicals Agriculture and food supply Land and spatial – air, water and soil
	Social	Community infrastructure Crime and safety Leisure and recreation Arts and culture Faith, spirituality and tradition Social capital and community cohesion
	Economic	Employment and economy Investment Access to goods and services Affordability of health services

Main Determinant	Determinant Sub-category	Example
Institutional	Organization of health care	Availability of health services Accessibility of health services Adequacy of health services Quality of health services
	Other institutions	Social care Police service Emergency services Judiciary NGOs Local government
	Policies	Governance and public policy – industrial, health, transport, housing, etc. Private sector norms Third sector norms

Housing and shelter

Mining and metals projects can help to support local housing markets by building new accommodation; providing higher employment incomes with which local people can buy land and/or improve their existing homes; and by increasing private sector rental opportunities.

Hostel accommodation and camps are commonly constructed to house project workers. This can bring with it a range of risks and opportunities in relation to heath and wellbeing e.g. water supply, sanitary installations, ventilation and the control of infectious diseases – especially for FiFo (Fly in Fly out) operations.[9] The influx of workers can also create pressures on existing housing leading to higher land and house prices, higher rents, housing shortages for existing residents, and overcrowding.

In addition, existing local housing can be affected physically through vibration effects both during construction and operation that, in severe cases, can lead to subsidence and physical damage. In some cases, local communities may need to be resettled away from the project site and this too can have negative health impacts from the social, economic and cultural dislocation that occurs.[10 11 12]

Good planning and close working with local communities and local government can help to reduce the potential negative impacts on local housing.

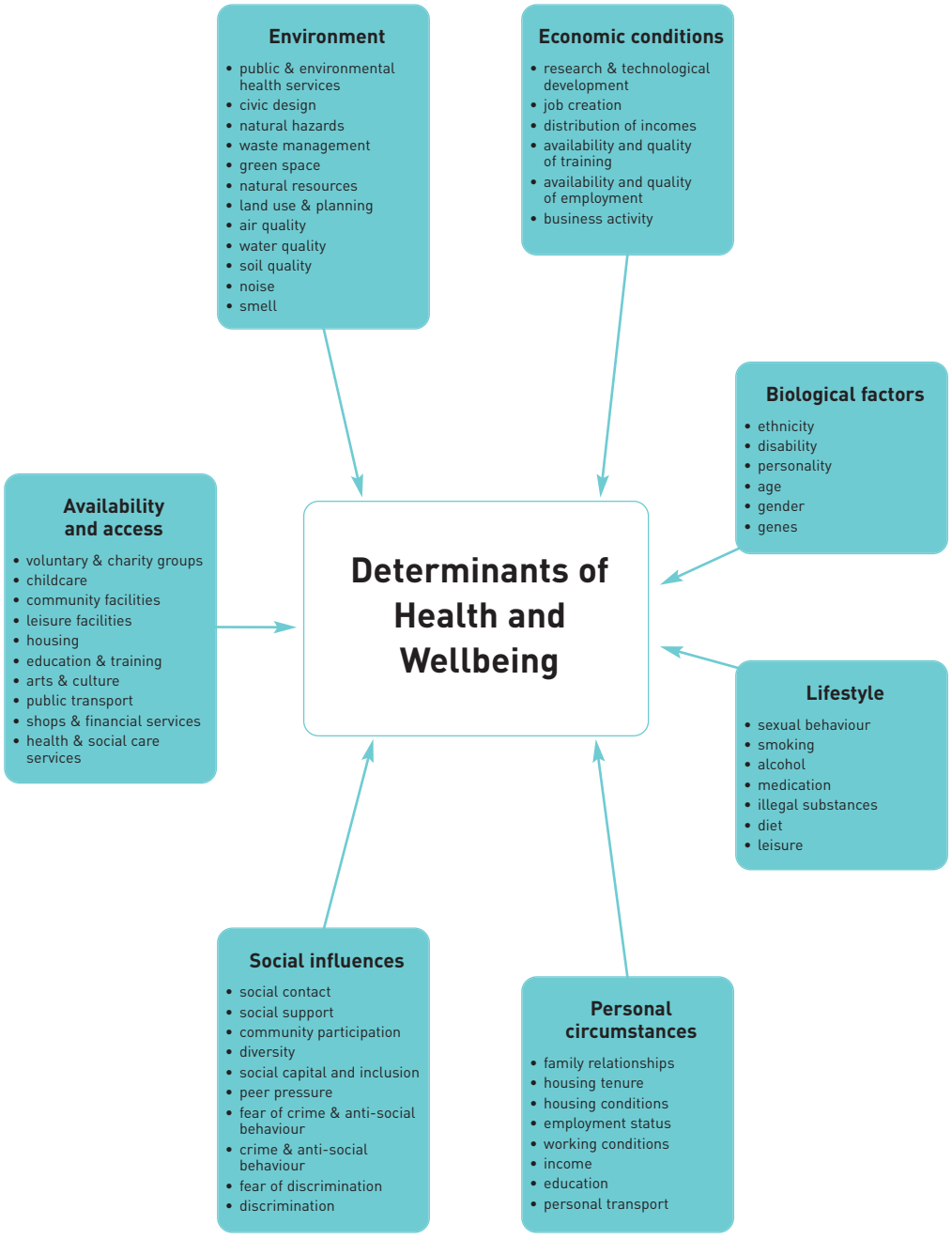
[9] International Finance Corporation and European Bank for Reconstruction and Development. Worker's accommodation: processes and standards. 2009.

[10] International Finance Corporation. Performance Standard 5: Land Acquisition and Involuntary Resettlement. 2007.

[11] World Bank. Involuntary resettlement in development projects: policy guidelines in World Bank-financed projects. 1988.

[12] World Bank. Resettlement sourcebook: comprehensive guidelines for the resettlement and rehabilitation of project-displaced people. Forthcoming.

Figure 1: The wider social and environmental determinants of health and wellbeing.[13]



[13] Vohra S. Centre for Health Impact Assessment, IOM. Adapted from Harris A. Rapid Health Impact Assessment: a guide to research. 2003.

Water supply and sanitation

Access to clean water and good sanitation are a fundamental determinant of health, and can be positively or negatively affected by mining and metals projects. Projects can be heavy users of local water and can also release materials into existing water sources. Similarly, projects can place pressures on existing sanitation and water supply systems because of the increase in population in the area.

A water supply and sanitation plan for project workers is vital. This can include separate water supply and sanitation systems and/or social investment in upgrading existing local water supply and sanitation systems. Such enhancement can improve local public health as well as the productivity of workers through reduced sickness absence and reduced demand on both project and community health and social care services.

Transport and connectivity

Mining and metals projects can lead to the construction of new road, airport, rail and port connections. These can have positive health impacts because they create easier access to public and commercial goods and services (e.g. health care) as well as enabling people to access new economic and educational opportunities in other villages, towns and cities.

However, they can have negative health effects through traffic injuries, chemical spillages, air pollution, noise pollution, oil/fuel run offs, and reduced physical activity due to the use of motorised transport in place of walking and cycling. They can also facilitate human and animal pest migration in ways that can increase the transmission of new and existing infectious diseases. Heavily trafficked roads can also become a barrier to the free movement of people within a community (severance) if traffic flows are high, there are few safe crossing points and roads are damaged by heavy lorries.

These potential negatives can be minimized through good design, transport planning and appropriate transport mitigation measures.

Learning and education

Skills learnt in the mining and metals industry, and related businesses, can help to make local people more employable in the other industries. In addition, mining and metals projects may bring wider prosperity that improves local infrastructure such as schools and libraries, and increases the educational opportunities and resources that parents can afford for their children.

However, as identified earlier, there can be a loss of traditional skills in agriculture and local crafts as young people focus on getting jobs linked to the project.

Photo courtesy SNMPE

Support for local schools and for local industries through funding, volunteering and the teaching of more cost-effective methods for existing activities, can ensure that the diversity of local sources of employment and traditional skills are maintained and enhanced.

Crime and safety

The increased income and economic opportunities that a project brings can reduce the potential for crime and enhance community safety as more legitimate economic opportunities develop. However, the influx of new people also has the potential to increase crime and anti-social activities. The mixing of communities from separate ethnic groups and cultures may lead to tensions or the weakening of social controls that have traditionally maintained order in local communities. The project itself, as well as the increase in the local population, may stretch the capacity of local police, fire and other related services to deal with incidents.

Understanding the local context, good communication and working in partnership with local communities and the local police service can ensure that many crime and safety issues are prevented from happening.

Health, social care and public services

Mining and metals projects can have a positive impact on health and social care services – whether provided by the public, voluntary or private sectors – by identifying existing community health problems and needs, putting additional funding into local services and infrastructure, and working jointly with local health, social care and community development workers to address local needs. Due to increased prosperity and other improvements, the proportion of households requiring assistance may also be reduced.

However, projects may also place additional pressures on local health, social care and public services (including emergency services) due to the increase in population that they can bring, particularly if they also cause disruption and lead to new, or exacerbate existing, health and social problems.

Most mining and metal projects have their own medical facilities and services available to the project workforce. These can be overwhelmed by local people demanding to be treated in them if existing local health services are seen to be inadequate, inaccessible or expensive.

Developing a good baseline profile of the existing health and wellbeing status of local communities and the capacity of local health services is critical in minimizing any potential pressures on local public services. There also needs to be close partnership with local health, social care and NGO welfare services in order to develop a plan to manage demand, enhance service capacity (medical supplies, equipment and personnel), and most importantly, develop and implement preventative public health measures.

A *health facilities audit* can help to get a clear understanding of the capacity of the local health system to deliver health and social care. Such an audit should consider the private as well as the public health system - in many countries most of the primary and secondary health care may be provided by private specialists who charge a fee. Traditional medical practices and individual and family health

seeking behaviours should also be assessed. Traditional practitioners are often important health actors and act as gatekeepers to some community sub-groups.

Alongside building local health service capacity and funding health promotion and disease prevention programs it is also important to develop effective health information systems and health management systems to help monitor and evaluate the positive and negative health and wellbeing impacts of the project. It may also be useful to allow limited public access to the project's medical services so that capacity building within local health services can take place.

Commercial goods and services

The increase in access to a wider range of goods and services (e.g. medicines, food and household supplies) that a mining and metals project can bring can lead to positive health and wellbeing impacts through reducing exposure to risks, enhancing individual and community resilience, speeding up recovery from illnesses and stabilizing existing health problems.

However, high demands on existing local goods and services could increase costs for local people. Any price increases for basic items will disproportionately impact on those on low incomes. There is also a risk that 'junk' food, cigarettes, gambling, alcohol and drugs may become more available and affordable to local communities, thus increasing their risk to new health and social problems. In addition, demand for prostitution may increase, leading to long term psychosocial harm for those forced into the sex industry, as well as increased transmission of sexually transmitted infections and other social harms associated with commercial sex work.

Many of these can be mitigated through good planning and working closely with local communities, NGOs, local government and health and social care agencies.

Social capital and community cohesion

The stimulus that a mining and metals project can bring to a local economy can help to strengthen and deepen social ties by increasing the prosperity of the community and providing resources for people to take on a wider range of social and community activities.

Photo courtesy AngloGold Ashanti

However, community tensions can arise if there is conflict between those who support and those who oppose a proposed project. In addition, the new people who come into the area may further affect the cohesion of local communities. For example, as young people are exposed to new ideas, new ways of doing things and different perspectives they may clash with existing social structures, traditions and norms. There may also be tensions between skilled and unskilled workers and discrimination against migrants.

To deal with these issues effectively there needs to

be a detailed understanding of the local social and cultural context and good links with local communities, religious institutions and local NGOs.

Spirituality, faith and traditions

Mining and metals projects generally do not have any direct effects on people's spirituality, faith and traditions. However, spiritual and traditional activities and events (e.g. festivals, religious ceremonies and birth, death and marriage rites) may be disrupted by construction and operation activities. For communities whose spirituality and identity are strongly connected to the land, damage to the landscape caused by a project's activities or loss of access to sacred sites may harm their spiritual wellbeing. In such communities, relocation is likely to be doubly damaging to their sense of self and mental wellbeing.

Here again good links and communication with local communities, religious institutions and NGOs alongside good training of project staff can help to ensure that sacred places are not inadvertently desecrated and that spiritual customs are respected.

Arts and cultural activities

Mining and metals projects may expand the audience for local arts and crafts, and help to develop commercial markets for traditional arts and culture. Projects may also bring in new forms of art and culture e.g. movies and new forms of dance. Conversely, they may disrupt communal artistic or cultural activities.

Good links with local communities and local NGOs can help to ensure that cultural activities are not disrupted, and are even potentially enhanced through support of these activities through money, staff time and other resources e.g. building materials, paints, skills, etc.

Leisure and recreation

There can also be both positive and negative effects on local leisure and recreational activities because of the changes that a mining and metals project brings. Of particular interest, from a public health perspective, are changes to levels of physical activity. Small daily changes in walking, cycling or sporting activity can have significant effects on a range of health outcomes including heart disease, certain cancers and mental wellbeing.

Good links with local communities and community health and development workers can help to ensure that any such disruption is kept to a minimum.

Lifestyle and daily routines

There can be temporary or long term changes to people's lifestyles and daily routines as a result of mining and metals projects, especially in isolated indigenous communities. Many of these changes have already been discussed and include changes to livelihoods, food supply, access to goods and services, means of transport, faith and traditions, educational opportunities and exposure to chemicals and infectious diseases.

The greater the collective incidence of such factors, which interfere with and disrupt lifestyles and everyday routines, the greater the mental, emotional and community nuisance and turmoil that the project is likely to generate. These in turn can manifest in physical and mental ill health, stress, anxiety and opposition to the project.

Developing an integrated approach to mitigation and enhancement and good communication can ensure that disruption is kept to a minimum and is tolerated by local communities.

Governance and public policy

Large mining and metals projects can have a major influence on national and local governance and public policy. In turn, existing governance structures and public policies can have a significant effect on how a mining and metals project is implemented, and on the impact the project is likely to have on community health and wellbeing. Strong, stable and transparent local government and other public institutions are more likely to be proactive in developing project partnerships to protect and enhance local communities' health and wellbeing. In contrast, weak, unstable, less participative and less transparent public institutions can make it harder for projects to work with local agencies.

Whatever the local structures, proactive engagement of, and partnership with, local government can help to improve the likely overall benefits of a project for local people - and help to plan for the future once the project ends. In addition, approaches such as having a clear and explicit anti-corruption policy for project workers and partners can also help to reduce individual and institutional corruption.

Energy and waste

The choice of energy sources used by a mining and metals project and the project's approach to dealing with waste can have important long term and transgenerational effects on a local community's health and wellbeing. This can occur, for example, through soil and water contamination from landfills affecting local agriculture and fisheries and the depletion of local fossil fuel stocks increasing heating and cooking costs.

Projects should, as much as possible, use sustainable energy sources and manage waste in a safe way, using the 3R principles, both to protect local communities and the wider environment.[14]

Land and spatial

Mining and metals projects can change the quality of local landscapes, soils and waterways both directly through their activities, and indirectly as the project becomes a focal point for the local and regional economies.

Land use changes cannot always be easily reversed and, as discussed earlier, can

[14] The 3 Rs of sustainable and healthy waste management are Reduce (Do not create waste in the first place), Reuse (Reuse waste generated in one process in another process or activity), Recycle (Extract the minerals and metals from the waste).

increase insect vectors and overcrowding leading to an increase in infectious diseases. The transmission of disease can be from human to human, insect to human and domestic animals to human as land and spatial changes make some or all of these routes more favourable. It also includes emissions of various chemicals, including heavy metals, into the air, water and soil. Lastly, when a project closes a community may be left with unproductive land.

Understanding the implication of land and spatial changes, and the relation of communities to each other and to key resources such as water, fuel, services and employment, can ensure that changes to local land and the spatial configuration of transport connections and settlements do not have negative health and wellbeing impacts. Lastly, a good closure plan, together with the appropriate financial resources to implement it, is important to have in place from the early design stage of a proposed project to ensure that the project leaves a positive and sustainable legacy. Again, the ICMM Planning for Integrated Mine Closure Toolkit provides useful further information.

Impacts of mining and metals projects on health equity

Health equity, or health inequality, impacts are the avoidable health differences between different groups within a given population. Health inequalities are largely caused by differential exposure to health risks (e.g. pollution, violence, stress) and unequal access to factors that are associated with good health such as good quality housing, supportive social relationships, adequate and stable income, access to health care, clean water, good nutrition and education.

Most industrial projects can result in marked changes in these factors, both positive and negative. Therefore, one of the most important tasks in HIA is to analyze how the positive and negative health impacts are likely to be distributed within and across local communities.

Often the negative effects of a project, e.g. loss of land, air and water pollution and increased food costs, disproportionately affect those on low incomes, women, children, those with existing disease/disability and the elderly; whereas the positive effects, such as profits, employment opportunities, accrue to groups who are already better off. This leads to greater health inequality, and a wider health equity gap between the 'have' and have nots' within and between communities.

On the positive side, small improvements in health determinants can have significant beneficial effects on vulnerable individuals and groups. For example, immunization programs and disease and vector control programs, when applied across a community, will have significantly greater beneficial effects on these vulnerable individuals and groups. Similarly, investment in female literacy can have a positive effect on the health and wellbeing of the whole community and not just the women who become literate. In contrast, small increases in the prices of local goods, for example, can have significant negative health and wellbeing impacts on vulnerable groups because they are less physically and socially resilient i.e. their bodies are less able to adapt and fight off disease and they have fewer social resources to cushion the negative change.

Cumulative impacts of mining and metals projects on health outcomes, determinants and equity

Cumulative impacts result from the additive or synergistic effects of two or more health impacts, from one or more projects in an area, over the short, medium or long term and can occur at the local, regional, national and global level.

These can be very significant impacts and it is important therefore to consider both the cumulative positive impacts and the cumulative negative impacts to gain a more holistic view of the potential impacts of a project (See Table 3).

Table 3: Some examples of cumulative health impacts

Scale	Positive Impacts	Negative Impacts
Local	One or several projects provide jobs, stimulate the creation of new businesses and are customers to other local businesses leading to improved incomes and access to goods and services e.g. food and medicines leading to improved nutrition, alleviation of acute and chronic diseases.	One or several projects in an area each emitting pollutants into the air, water and soil that individually are not significant but cumulatively have the potential to lead to physical illness and chronic disease.
National	Improvements in national air quality in neighbouring countries leads to lower levels of air pollution in your country. A diverse range of industrial projects provide an important source of tax revenue that is used for health, education and social welfare projects leading to improved general health and wellbeing.	Highly polluting industries set up in neighbouring countries leads to reduction in air and water quality in your country. Over-reliance on one extractive industry may undermine other sectors of the local economy leading to an unbalanced economy that is subject to cyclical 'boom and bust' with high levels of cyclical unemployment.
Global	Mining maintains the global supply of minerals, metals and fuels that are required for the production of consumer goods and services. These can provide coal for electricity and heating and metals for domestic utensils and farming equipment. These can lead to improved nutrition, indoor comfort and general wellbeing.	The health implications of potential for food shortages created by global economic conditions or increasing temperatures and extreme weather conditions that could affect local disease vectors or food or water availability, can be considered in conjunction with other potential health risks, such as prevalence of HIV/AIDS, to assess potential cumulative health impacts.

At the local level, cumulative impacts are the collective set of health impacts that arise from the mining and metals project as a whole, over time, and all the other projects located nearby. For a project, the cumulative health impacts might include the impacts on individuals and groups caused from emissions released into the air, water and soil, and an increased prevalence of malaria mosquitoes and tremotode snails due to changes in habitat. While each on their own may pose a low or minor negative health and wellbeing impact together they may have a major adverse effect on individual and community health and wellbeing. Similarly, the provision of local jobs, skills training and improvements to local social infrastructure can have a greater cumulative positive impact than each intervention on its own. The cumulative impacts of a project may be exacerbated by other industrial projects in an area. This can mean, for example, that lorries on roads and road traffic emissions or strains on local goods supply chains from each of the projects give rise to greater traffic injuries, greater malnutrition and greater social unrest than the sum of each of the project on their own.

At the national level, improvements in air quality in one region or country will have positive 'knock on' effects to the air quality of other regions and countries and vice versa. Similarly, the dominance of one industrial sector can cause economic imbalances which can lead to significant cyclical unemployment with consequent effects to nutrition, affordability of good and services e.g. medicines and medical treatment, and supportive social networks.

At the global level, increasing temperatures, changing weather patterns or ocean acidification may have short and long term negative impacts on health and well-being at a local level. For example, an increase in disease borne vectors in a project region, flooding, drought, or the loss of habitat and fish stocks could mean changes in the availability in food, clean water and livelihoods. Global economic conditions can create pressure on food supplies or availability of agricultural lands in a region. The long-term potential for these localized effects might be assessed based on scientific predictions or risk reviews and considered as part of the impact assessment of cumulative health effects.

SECTION 2: Assessment

2.1 What is Health Impact Assessment?

Introduction

The Gothenburg Consensus definition of HIA is *"a combination of procedures, methods and tools by which a policy, program or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population."*[15]

The International Association for Impact Assessment has recently updated this definition and states that HIA is:
"A combination of procedures, methods and tools that systematically judges the potential, sometimes unintended, effects of a policy, plan, program or project on the health of a population, including the distribution of those effects within the population, and identifies appropriate actions to manage those effects."[16]

Purpose of HIA

The purpose of HIA is to support and add value to the decision-making process on whether, and in what way, a policy, plan, program or project goes ahead. It does so by providing a systematic analysis of the potential community health impacts as well as developing options for maximizing the positive health impacts, minimizing the negative impacts and enhancing health equity/reducing health inequalities.[17]

HIA makes a distinction between the potential health impacts of investment in the construction and operation of a mining and metals project and the potential health and wellbeing impacts from social investments and community development programs associated with the project. This is in order to understand the primary positive and negative impacts and the contribution of mitigation and enhancement measures in minimizing the negatives and maximizing the positives.

Principles that underpin HIA

HIA draws on an explicit value framework that:

- Promotes a transparent HIA and decision-making process that involves and informs local communities (Democratic/Participatory).
- Promotes a focus on unequal impacts especially on those individuals and groups who are already vulnerable because of their personal, social, economic and environmental circumstances (Health Equity/Inequalities).
- Promotes the equal consideration of the health needs of future generations, and the long term costs, alongside the needs of current generations and short term benefits (Sustainable Development).
- Promotes the transparent use of qualitative and quantitative evidence that is credible, robust, balanced and based on a range of disciplines (Ethical Use of Evidence).

[15] WHO European Centre for Health Policy. Health impact assessment: main concepts and suggested approach. Gothenburg consensus paper. WHO Regional Office for Europe. 1999.

[16] International Association for Impact Assessment. Health Impact Assessment International Best Practice Principles. Special Publication Series No. 5. Fargo, USA. 2006.

[17] Enhancing health equity/reducing health inequalities is concerned with narrowing health differences between groups within a community by ensuring that positive health impacts are distributed widely across the whole community and negative health impacts are not disproportionately burdening those who are already vulnerable.

Types of HIAs

An HIA is a flexible approach that can be adapted to a wide variety of project types, budgets and timeframes. The types of HIAs described below differ primarily in scale and level of detail though the principles and process remain similar. In-depth HIAs, in this guide and more generally, refer to intermediate and comprehensive HIAs.[18]

Rapid HIAs are desk-based analyses that take hours, days or weeks to carry out. They can be done in-house or be commissioned from an external HIA specialist.

Intermediate in-depth HIAs are more detailed analyses that involve some on-the-ground fieldwork to assess the baseline conditions of local communities, some focused stakeholder involvement – such as stakeholder focus group workshops and interviews – and usually include a relatively systematic rapid literature review. They generally take weeks or months to carry out. They can be done in-house, if there is HIA expertise, or commissioned from an external HIA specialist.

Comprehensive in-depth HIAs are very detailed analyses involving detailed and comprehensive on-the-ground fieldwork, wide-ranging (and often representative) consultation of stakeholders through surveys, workshops and interviews; and a detailed systematic literature review. They generally take months or up to a year to carry out and are usually commissioned from an external HIA specialist.

Integrating HIA with other impact assessments

An HIA can be conducted as a standalone assessment or integrated with other forms of impact assessment (IAs); in particular environmental and social impact assessments (EIA and SIA). Table 7, at the end of this section, compares the underlying frameworks of HIA, EIA and SIA and how these are integrated to form Environmental, Social and Health Impact Assessments (ESHIAs). Sections 2.3, 3.1, 3.2 and 3.3 discuss how to conduct an integrated ESHIA and the HIA element of an ESHIA.

HIA and other forms of health assessment

There are three different but overlapping health assessments that a mining and metals project may need to undertake: occupational health risk assessment (HRA), health impact assessment (HIA), and health needs assessment (HNA). Each is distinct but can provide useful information to the other two and should be consulted as part of the baseline and community profile of an HIA.

Photo courtesy Anglo American/Vismedia

[18] There are some differences in terminology in classifying the types of HIAs that may be carried out and all are useful and valid. The International Finance Corporation's Introduction to Health Impact Assessment classifies HIAs as Rapid Appraisal (divided into Desktop and Limited In-Country) and Comprehensive HIAs. In relation to the terminology used in this guide, Rapid HIAs are equivalent to Desktop Rapid Appraisal and In-depth HIAs (divided into Intermediate and Comprehensive) are equivalent to Limited In-Country Rapid Appraisal and Comprehensive HIAs.

Occupational health risk assessment, also referred to as Hazard Identification and Risk Assessment, is primarily concerned with managing the occupational health and safety of a workforce. HRA is also used more generally to describe an approach to health assessment that focuses on quantifying the potential direct physical health impacts from chemicals emitted into the air, water and soil.

Health impact assessment, as discussed previously, is primarily concerned with predicting and managing changes in the wider determinants of health and in health outcomes attributable to a plan or project. HRAs can be a part of HIA where aspects of the potential health impacts can be quantified (e.g. health impacts of air pollution) or where workers are also affected by community health impacts. Similarly, the community profile and baseline of an HIA can draw from an existing HNA and vice versa.

Health needs assessment is primarily concerned with understanding the existing health needs of a community in order to develop new plans, programs and projects to improve the future health status of a community or to inform a social investment program.

All three assessments can be combined to conduct strategic health planning in relation to the potential health and wellbeing impacts of mining and metals projects.

The HIA Process

There are many models of the HIA process in the published literature and there are now many published guidelines on HIA good practice at regional, national and international levels.[19] [20] [21] [22] [23] [24] Though there are differences between them, the main steps in the HIA process are very similar; even if the terminology used is slightly different. Figure 2 shows the main steps in the HIA process.

The key steps of HIA are separated for clarity and to give a sense of logical progression through the HIA process. However, two things are worth noting:

- Firstly, the HIA process is described as a linear process when in practice it is non-linear and iterative - some elements generally occur throughout the process, e.g. stakeholder consultation and engagement, and others are revisited as new information and new issues come to light, e.g. scoping and evidence gathering and analysis. While the ideal is to have wide community and stakeholder involvement throughout the whole HIA process, in practice the wider community and stakeholder involvement tends to take place at a specific point in time during the HIA process with a more limited set of stakeholders being involved throughout.
- Secondly, though each of the steps described are undertaken in all HIAs, some guides on the HIA process combine the steps shown in this guide, wholly or partly, e.g. evidence gathering and analysis can occur together and elements of scoping can be found in the screening step.

[19] World Health Organization. Guide to health impact assessment. Forthcoming.

[20] International Finance Corporation. Introduction to health impact assessment. 2009.

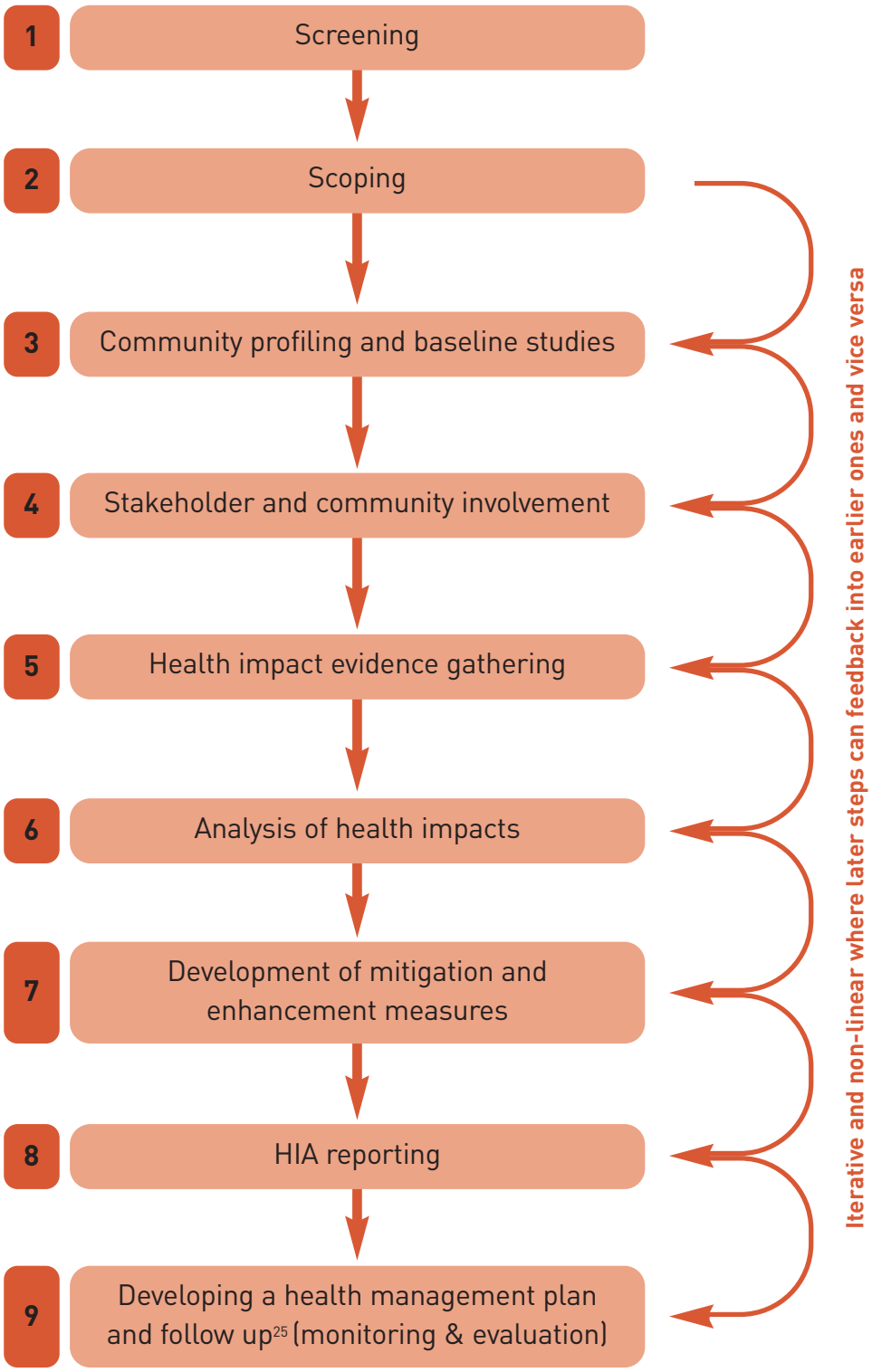
[21] International Petroleum Industry Environmental Conservation Association (IPIECA). 2005.

[22] North American HIA Practice Standards Working Group. Practice standards for health impact assessment. 2009.

[23] Centre for Health Equity Training, Research and Evaluation (CHETRE), University of New South Wales. Health impact assessment: a practical guide. 2007.

[24] International Health IMPACT Assessment Consortium (IMPACT). Merseyside guidelines for health impact assessment. 2001.

Figure 2: Steps in the HIA process



[25] Follow-up is used to signify a more proactive monitoring and evaluation of the impacts of a project or plan. See International Association for Impact Assessment. EIA Follow-Up: international best practice principles. 2007.

Step 1: Screening

The aim of screening is to decide whether an HIA is necessary. It can merge with some elements of scoping and therefore can also help to decide on what level or depth of HIA should be undertaken. Screening involves an initial assessment of the potential health impacts of a project, and the number and range of people likely to be affected. Section 2.2 provides more detail on screening as part of an In-house Rapid HIA.

Step 2: Scoping

Scoping sets the boundaries and terms of reference for the HIA and how detailed it should be. These include the:

- Geographical extent
- Local communities to be considered
- Potential impacts to be assessed
- Key stakeholders to be consulted
- Methods to be used
- Tasks to be undertaken
- Make-up of the HIA team
- Timeline
- What will happen to the findings of the HIA.

The scoping step normally involves senior project staff, Health or HIA specialists (whether consultants or in-house), and key stakeholders such as representatives of local communities, local government and health/public health services.

Scoping decisions are often discussed and agreed upon in an interactive scoping workshop, led by project staff and/or a health/HIA specialist. The output of the scoping exercise can also be used as the basis for developing the terms of reference (TOR) for external HIA specialists. Sections 2.2 and 3.1 provide more details on scoping issues.

Step 3: Community profiling and baseline information

This step involves developing a baseline assessment and community profile with a particular focus on existing health and wellbeing problems and assets.

Initially, a detailed understanding of the project, its aims and objectives is developed. This is followed by a desk-based community health and wellbeing profile using existing national and local demographic, social, economic, environmental and health information where available.

The community profile generally includes:

- Demographic information
- Prevalence and rates of infectious and chronic diseases
- Trends in existing health problems
- Health knowledge, practices and attitudes

- Availability of clean water and sanitation
- Existing levels of environmental pollution
- Housing conditions
- Social problems such as drug use and prostitution
- Health and social care services audit
- Literacy rates and levels of education
- Employment and unemployment rates
- Key industries and their relative economic importance
- Existing community concerns and aspirations

Depending on the findings of the desk-based profiling exercise and the scope of the HIA this can be followed up by a more detailed community profile based on on-the-ground fieldwork, local surveys, focus groups and discussions with key informants such as community health and development workers and local health/public health officials. The key factors that improve the success of community profiling and other baseline study fieldwork are:

- A clear and focused overall aim and set of baseline questions
- An explicit survey plan and methodology
- Generating data and indicators in a format that can be used for the monitoring and evaluation of any Health Management Plan and that are comparable with other health data and reports
- Respect for the local culture, existing social hierarchies and ways of doing things
- Field workers who understand the local culture and customs and can win the trust and cooperation of local people
- Clear communication with local people about the purpose of the survey and how the data will be used
- Ethical procedures for obtaining, storing and using the information gathered
- Support from stakeholders and partners

All the above issues should be considered and discussed during scoping.

This step is the baseline from which the potential positive, negative and equity/inequality impacts are assessed. It helps to focus the literature and evidence review undertaken during the evidence gathering step (Step 5). It also alerts the HIA team to particular vulnerable groups, health assets, or health problems to be cognizant of during the analysis of health impacts (Step 6).

Step 4: Stakeholder and community involvement

Stakeholders are those individuals and groups that are affected by, or express an interest in, the project. Stakeholder and community involvement is concerned with developing two-way dialogue and information/knowledge exchange between the HIA specialist, project team, key stakeholders and local communities.

Often the list of stakeholders that is already known or provided by partners and local agencies may not include all the health relevant stakeholders e.g. community

health workers, public health officials, traditional healers and key informants from other similar projects in the area. Stakeholder and community involvement should therefore start with a stakeholder mapping analysis. This will identify the different groups; their values; the challenges facing them; their power relationships and social status; what they want to get out of the process and any conflicting interests. This knowledge will help to facilitate the consultation and involvement and make it more focused and effective.

Stakeholder and community engagement should begin as early as possible – at the scoping step if not before – and should continue throughout the HIA process. However, stakeholders and communities do not always have the time to be involved throughout the process and are likely to engage to a greater or lesser degree as time and interest permits. Involvement, engagement and consultation processes should be flexible enough to accommodate this. For example, stakeholders could:

- participate in scoping workshops (Step 2);
- be involved in key informant interviews and provide access to locally published reports or (Steps 4 and 5);
- participate in impact analysis workshops (Step 6);
- comment on the mitigation and enhancement measures as well as the draft report (Steps 7 and 8); and
- and support the implementation of the health management plan and follow-up (Step 9).

The stakeholder and community involvement aspect of the HIA can be facilitated by the setting up of a formal Consultation and Involvement Stakeholder Steering or Advisory Group (depending on how much delegated power the group is given to influence the HIA process).

Involving key stakeholders and local communities in the HIA process is important because they can:

- Improve the quality and relevance of the findings of the HIA by providing insights into the likely positive and negative health impacts both from their experience of the locality and their experiences of other past projects.
- Inform the project about what value they, and their communities, place on different potential benefits and harms and thereby help prioritize the findings of the HIA and its recommendations.
- Identify the most acceptable ways of mitigating, enhancing and monitoring the potential health and wellbeing impacts.
- Be proactive partners in implementing the recommendations of the HIA and any additional social investment.
- Build trust, establish the credibility of the HIA, reassure communities and reduce their concerns and perceptions of risk about a project.

There is a range of existing guidance on how to undertake effective community engagement from ICMM, the International Finance Corporation, and others, as well as tools developed by mining companies such as the Socio-Economic Assessment Toolbox (SEAT).[26 27 28]

[26] ICMM Community Development Toolkit. 2005.

[27] International Finance Corporation. Stakeholder Engagement: a good practice handbook for companies doing business in emerging markets. 2007.

[28] Anglo American. Socio-Economic Assessment Toolbox (SEAT). 2007.

Step 5: Health impact evidence gathering

In order to assess the potential health impacts of a proposed project, it is necessary to review the latest scientific and other evidence about the potential health impacts and effective mitigation and enhancement techniques.

This should be undertaken in as systematic a way as possible and limitations of the review must be explicitly stated.[29]

A systematic online search will identify freely available material in the public domain. This can include open access journal articles, review reports, HIA of similar projects elsewhere, industry association briefings, local and national government reports and 'grey literature' or unpublished research. This can then be supplemented by searches in free bibliographic databases such as Pubmed and Highwire for free and paid-for peer-reviewed articles. Finally, bibliographic searches of paid-for databases can be undertaken to ensure a comprehensive review of the literature.

Though the core effort of this evidence gathering will occur at one point in time, the process is iterative and should be repeated throughout the HIA process as new issues and potential impacts are identified.

Often the literature in the public domain is small and may need to be supplemented by in-country searches in national and local languages and direct requests for information from national, regional and local agencies.

Step 6: Analysis of heath impacts

Analysis of health impacts involves systematically determining the range of potential impacts, their relative importance and where, when and how likely they are to occur. Impacts can occur singly or in combination at individual, household, community, population, organizational and institutional levels.

It is important to consider the impacts at all these levels, and at each different phase of the project: design, construction, operation and closure. It is also important to analyze the potential health inequality/equity and cumulative impacts. Equity impacts are analyzed by considering which groups will benefit, which groups will be negatively affected and which groups will be unaffected by the mining or metals project. It is also important to think about which groups might miss out on benefits, since equity gaps are likely to widen as a result, even if such groups do not suffer any directly negative health and wellbeing impacts from the project.

A Health Impact Analysis Table or Matrix is generally used to facilitate a systematic consideration of all the potential impacts. Table 4 shows an illustrative example of one type of Health Impact Analysis Table that an HIA specialist might use. However, it is important to note that there is no one standard approach to analyzing and presenting findings. Generally, HIAs should aim to have a mixture of quantitative and qualitative analysis depending on the availability of data and methods for quantifying the potential health impacts.

[29] London Health Observatory. A guide to reviewing published evidence for use in health impact assessment. 2006.

Table 4: Illustrative example of a health impact analysis table that might be used for an In-depth HIA

Main Health Outcome or Health Determinant	Health Outcome or Health Determinant Sub-category	What is the health impact?	Who benefits? Who is negatively affected? Who is unaffected?	Pathway of health impact	Magnitude / consequence of impact	Likelihood / probability of impact	Significance of impact (Magnitude x Likelihood)	Degree of Confidence of the impact occurring
		Positive, negative, uncertain or no effect	Whole population, vulnerable group Health equity Cumulative impacts	How does the impact occur	Low Medium High	Low (possible) Medium (probable) High (definite)	Low Medium High	Low Medium High
Health Outcome								
Infectious disease								
Chronic disease								
Nutritional disorders								
Injury								
Mental health and wellbeing								
Health Determinant								
Individual/ family	Physiological							
	Behaviour							
	Socio-economic circumstances							
Environmental	Physical							
	Social							
	Economic							
Institutional	Organization of health care							
	Other institutions							
	Policies							

Assessing the public health significance of identified health and wellbeing impacts

When analyzing health impacts, it is important to consider the magnitude, likelihood and public health significance of the potential impacts. This analysis involves expert judgement based on a consideration of the evidence gathered and its applicability to the local context and the specific project.

There is no universally agreed formula for assessing public health significance, although assessments are mostly based on a subjective judgement about the magnitude of the potential health impacts (size of the affected population and scale of the positive or negative health impact); its likelihood of occurrence; and the degree of confidence in the impact actually occurring (based on scientific and other evidence of the health impact occurring in similar circumstances elsewhere). Table 5 shows a Health Impact Significance Rating Table that links to the risk assessment based Health Impact Analysis Table shown in Table 4. Table 6 shows an alternative approach where the magnitude, likelihood and degree of confidence are integrated into a single significance criteria of major, moderate or minor positive or negative health impact and an explicit analysis of magnitude, likelihood and confidence is not provided. Table 6 is particularly useful for rapid in-house HIAs where analyzing magnitude, likelihood and confidence separately might be difficult for non-HIA specialists.

Table 5: Illustrative example of a health impact significance rating table

		Likelihood of Occurrence of a Health Impact		
Magnitude of impact		**Low**	**Medium**	**High**
Health impact rating	Description	Unlikely to occur	Likely to occur sometimes	Likely to occur often
0	None	No significance	No significance	No significance
1	Low	Very low significance	Low significance	Medium significance
2	Medium	Low significance	Medium significance	High significance
3	High	Medium significance	High significance	High significance

Table 6: Illustrative example of an integrated significance scale for the levels of potential impact [30] (These may be modified depending on the project and the affected populations)

Significance Level	Criteria
Neutral / No Effect	No health effect or effects within the bounds of normal/accepted variation.
Minor / Low +/- (positive or negative)	• Health effects are categorized as minor whether, positive or negative, if they are generally low level quality of life or wellbeing impacts. Small increases or reductions in noise, odour, visual amenity etc can be examples of such effects. • The exposures tend to be of low intensity and/or short/intermittent duration and/or over a small area and/or affect a small number of people e.g. less than 100 or so. These effects can be important local considerations. • Mitigation measures and detailed design work can reduce the negative and enhance the positive effects such that there are only some residual effects remaining.
Moderate / Medium ++/-- (positive or negative)	• Health effects are categorized as a moderate positive if they enhance mental wellbeing significantly and/or reduce exacerbations to existing illness and reduce the occurrence of acute or chronic diseases. • Health effects are categorized as a moderate negative if the effects may lead to exacerbations of existing illness, or temporary symptoms or are longer term and/or relatively intense noise, odour or visual amenity impacts. • The exposures tend to be of moderate intensity and/or over a relatively localized area and/or of intermittent duration and/or likely to affect a moderate-large number of people e.g. between 100-500 or so and/or sensitive groups. • The negative impacts may be nuisance/quality of life impacts which may affect physical and mental health either directly or through the wider determinants of health. The cumulative effect of a set of moderate effects can lead to a major effect. These effects can be important local, district and regional considerations.

[30] Vohra S. Centre for Health Impact Assessment. Institute of Occupational Medicine.

Significance Level	Criteria
	• Mitigation measures and detailed design work can reduce and in some/many cases remove the negative and enhance the positive effects though residual effects are likely to remain.
Major/High +++/--- (positive or negative)	• Health effects are categorized as a major positive if they prevent deaths/prolong lives, reduce/prevent the occurrence of acute or chronic diseases or significantly enhance mental wellbeing. • Health effects are categorized as a major negative if they could lead directly to deaths, acute or chronic diseases or mental ill health. • The exposures tend to be of high intensity and/or long duration and/or over a wide geographical area and/or likely to affect a large number of people (e.g. over 500) and/or sensitive groups e.g. children/older people. • They can affect either or both physical and mental health and either directly or through the wider determinants of health and wellbeing. They can be temporary or permanent in nature. These effects can be important local, district, regional and national considerations. • Mitigation measures and detailed design work can reduce the level of negative effect though residual effects are likely to remain.

Analyzing distributional, health equity and inequality impacts

Distributional, health equity and inequality impacts are analyzed by examining how particular sub-groups within a population, particularly vulnerable groups, are likely to be affected by the project. The scoping and community profiling steps are likely to have already identified potentially vulnerable groups through existing local information on these individuals/groups or through community surveys and meetings with key informants e.g. community leader, community health worker or local NGO.

Health equity/inequality impacts occur when the projects benefits and harms are unevenly distributed. This includes where the risk is equally distributed, such as air pollution, but the impact is disproportionate – affecting particularly children, older people and those with existing ill health.

If not carefully managed, mining and metals projects can increase these impacts and widen the health equity/inequality gap between groups within local

communities. Health equity/inequality impacts are not only unfair, but have a negative impact on population health overall. Poor health in disadvantaged groups holds back the 'average' level of health in a population overall and often leads to negative 'spill over' effects such as disease outbreaks, low productivity and social problems that affect the whole community.

Key questions to ask are:

- Which groups are likely to benefit?
- Which groups are not likely to benefit?
- Which groups could be harmed?
- Are the groups that will not benefit, and/or might be harmed, already facing existing health problems and equity/inequality issues?
- What potential risks are evenly distributed but are likely to impact disproportionately on those who are already vulnerable?

Step 7. Development of mitigation and enhancement measures

Positive health and wellbeing impacts can be enhanced and detrimental impacts can be avoided or mitigated through changes to the design, operation, management, maintenance and closure plans of a project. Enhancement measures aim to promote health, prevent disease and address present and future needs of the project and local communities.

Identifying potential enhancements and mitigations is an important part of the HIA process. These should be based on the analysis of the significance of the potential health impacts and the acceptability and wishes of local communities. These changes can include 'hardware' aspects such as location, technology or construction techniques as well as 'software' aspects such as contractual requirements, partnerships and management procedures. Mitigation and enhancement measures should be evidence-based, where possible, and developed in consultation with affected communities, NGOs, local government and local health and social care agencies. Managing community health impacts is discussed in more detail in Section 3.2.

Step 8. Reporting

The findings and recommendations of an HIA should be presented in a written report, a public document that is provided to decision makers and local communities. The key findings should be presented orally to these audiences. It is recommended that the final HIA report is published online.

A draft report should be subject to a consultation with key stakeholders and key informants, and the feedback from them discussed and incorporated into the final report in a transparent way.

The report should describe the HIA methods used, the findings from each step of the HIA, and the recommendations for enhancing and mitigating potential health impacts. There is no set format for the structure and content of an HIA report, although Appendix 5 shows an illustrative example of a Table of Contents.

Step 9. Developing a Health Management Plan (HMP) and Follow-Up

The HMP should be based on the impacts identified, their public health significance and the priority attributed by the affected communities. There should be a formal process for discussing the recommendations of the HIA and deciding if, how and by whom each aspect of the HMP will be implemented. Follow-up activities should be part of an overarching Health Management Plan (HMP) and include the monitoring of the actual health and wellbeing impacts and evaluation of both actual and predicted impacts. The HMP should not only address health outcomes but also health determinants, health equity/inequality and the cumulative impacts of the project.

At what stage in the project is HIA conducted?

There is now international consensus among HIA practitioners that HIAs should be initiated when projects are at the early design stage. Early consideration of potential health impacts provides the best chance of maximizing the potential positive health and wellbeing impacts and minimizing any potential negative impacts.

Project design is an iterative process, and ideally HIA should be undertaken in an iterative manner in parallel with project planning, with HIA results timed to inform key decisions. At the initial concept stages of planning, when details are sketchy, an In-house Rapid HIA can be useful. However, as the project plan is developed in more detail, a more formal Rapid or In-depth HIA should be completed with the help of relevant specialists either as a standalone assessment or as part of an integrated Environmental, Social and Health Impact Assessment (ESHIA).

Figure 3 shows a timeline of when key assessments can be undertaken during the lifecycle of a mining and metals project and how they can feed into each other.

Photo courtesy Anglo American/Vismedia

Figure 3: Project timeline showing when HIA, EIA, SIA, HRA and HNA can be undertaken during a project's lifecycle

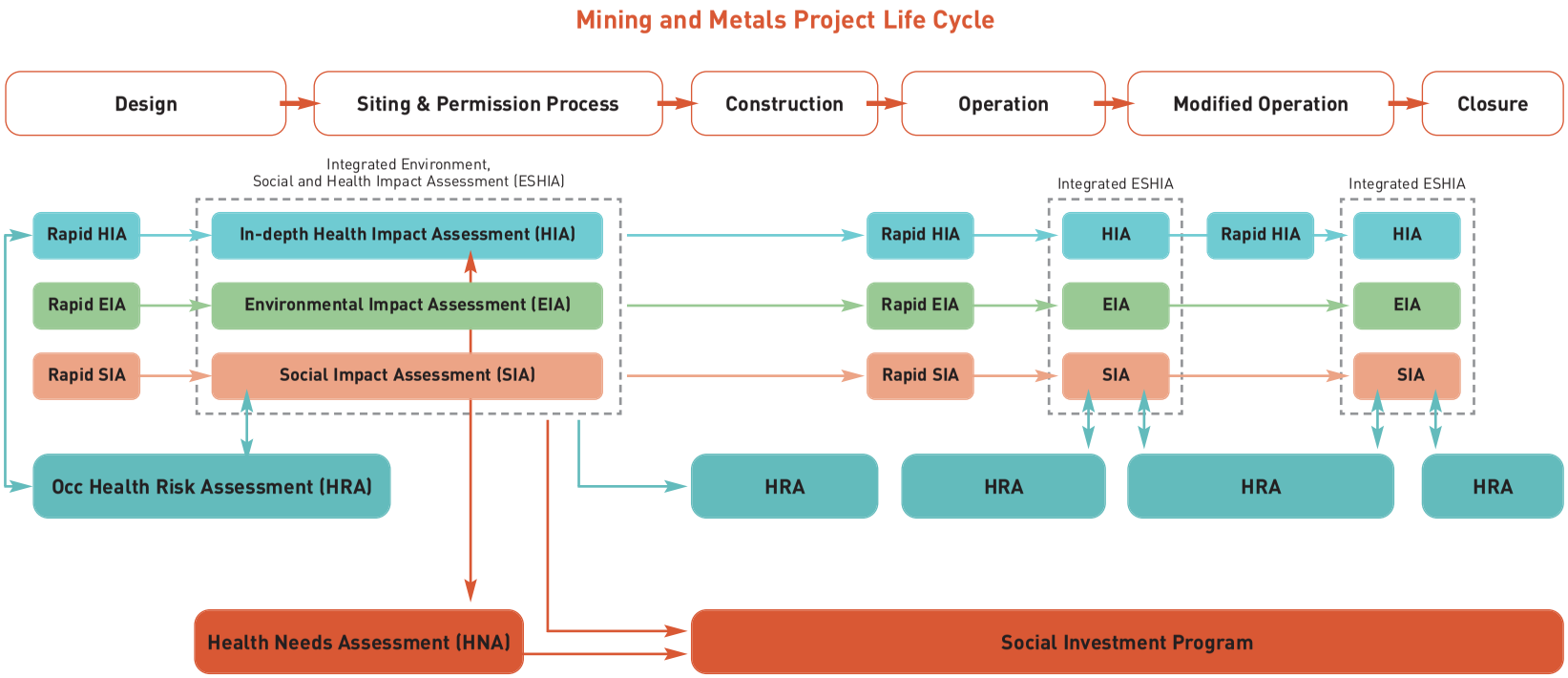


Table 7: Comparison of HIA in relation to other main types of impact assessment relevant to the mining and metals sector

Aspect	Health Impact Assessment (HIA)	Environmental Impact Assessment (EIA)	Social Impact Assessment (SIA)	Environmental and Social Impact Assessment (ESIA)	Environmental, Social and Health Impact Assessment (ESHIA)
Policy context	Voluntary, good practice, recommended by the WHO, EU, WB, UNEP, ILO, FAO, IFC	Often required by in-country legislation	Can be legislatively based but usually carried out voluntarily as part of good practice	Can be legislatively based but usually carried out voluntarily as part of good practice	Can be legislatively based but usually carried out voluntarily as part of good practice
Focus	Human health in its widest sense - transgenerational and health equity/ inequality impacts	Impact on the environment (soil, air, water, flora, fauna and human populations) Health focus generally on pollutants emitted by the project into the air, water and soil	Impact on communities (socio-economic, culture, religion, vulnerable groups, beliefs and values, organization)	Focus on environmental and community impacts. Health focus similar to EIA	As in EIA, SIA and HIA
Health definition	Both biomedical and the wider social and environmental determinants of health. State of complete physical, mental, social and spiritual wellbeing. Health is influenced by the determinants of health (a multiplicity of factors including socio-economic and environmental factors)	Biomedical with a focus on direct biophysical health impacts. Focus on environmental health determinants air, water, soil, noise etc.	Biomedical with a focus on medical care, equity, access, migration, economics	As in EIA and SIA	As in EIA, SIA and HIA

[31] Adapted from IPIECA. A guide to health impact assessments in the oil and gas industry. 2005.

Aspect	Health Impact Assessment (HIA)	Environmental Impact Assessment (EIA)	Social Impact Assessment (SIA)	Environmental and Social Impact Assessment (ESIA)	Environmental, Social and Health Impact Assessment (ESHIA)
Community participation	Community participation important and integral part of the process	Consultation step often legislated	Consultation required all through the process and as a tool to collect baseline information	As in EIA and SIA	As in EIA, SIA and HIA
Values	Explicit, aims promote • A democratic process • Equity/Reducing inequality • Sustainable development • Ethical use of evidence • There are also professional association codes of conduct at national and international levels e.g. International Association for Impact Assessment (IAIA) statement of professional conduct	Implicit • Objectivity • There are also professional association codes of conduct at national and international levels e.g. International Association for Impact Assessment (IAIA) statement of professional conduct	Implicit • Objectivity • There are also professional association codes of conduct at national and international levels e.g. International Association for Impact Assessment (IAIA) statement of professional conduct	As in EIA and SIA	As in EIA, SIA and HIA

2.2 Undertaking an In-house Rapid HIA

Introduction

An In-house Rapid HIA undertaken by non-HIA professionals will provide a good 'first look' at the health and wellbeing issues and will identify the major, relatively obvious, potential positive and negative health and wellbeing impacts. An In-house Rapid HIA is therefore likely to be less structured and less formal approach than an external Rapid or In-depth HIA undertaken by an HIA specialist or team, but provides useful information for determining whether a more detailed assessment is required.

This chapter provides the project team with the steps necessary to undertake an in-house initial assessment.

The greatest benefits of HIA occur when HIAs are initiated early and repeated (or developed further) at key stages of a project's lifecycle. There are three key phases when an In-house Rapid HIA can be undertaken:

a) at the design stage;
b) when a modification to the operation of the project is first proposed; and
c) when plans are being developed to close the project.

Often an In-house Rapid HIA will be followed up with a more formal, externally commissioned, Rapid or In-depth HIA. These can be either standalone assessments or part of an integrated ESHIA that analyze in more detail the potential impacts identified by the In-house Rapid HIA.

Figure 4 shows a decision flow diagram outlining the decision steps from screening to a Rapid In-house HIA and onto a more formal Rapid or In-depth HIA.

Who should undertake the HIA?

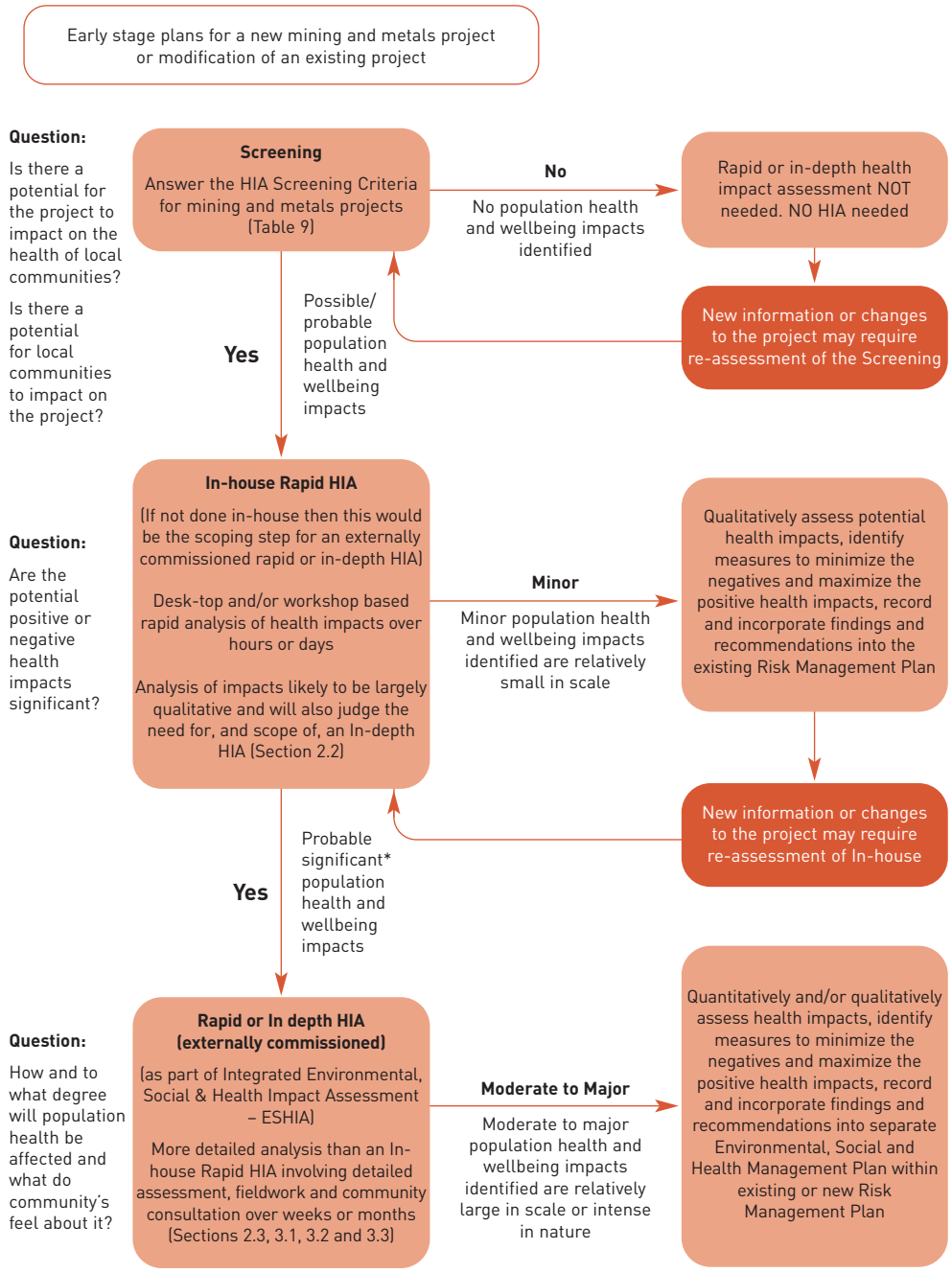
In-house Rapid HIAs can be undertaken by a single individual but are best done by a group of project staff, and other stakeholders, with a range of project and population health related skills and experience. An In-house Rapid HIA team of four or five people with different areas of expertise is ideal. Where possible at least one team member should have some understanding of population health, the wider determinants of health and equity/inequality issues. Having a team member who has visited the proposed site, and/or has knowledge of the area and its people, as part of the In-house Rapid HIA team is also very useful.

The In-house Rapid HIA team could, and ideally should, involve:

- project planners,
- managers,
- engineers,
- health and safety advisors,
- community health and development workers,
- public health officials and/or community representatives.

Photo courtesy Anglo American/Vismedia

Figure 4: Decision Tree for Health Impact Assessment



* Significant is defined as affecting a large number of people; causing death or serious ill health in a small number of people; and/or disproportionately affecting already vulnerable groups e.g. children and young people, women, older people, those with existing disease/disabilities and those on low incomes.

Steps of a Rapid HIA

A Rapid HIA (in-house or externally commissioned) differs from an In-depth HIA in that there tends to be little or no stakeholder and community involvement and a rapid, less systematic collation of scientific and other evidence on the potential health impacts. This is generally because the Rapid HIA:

a) feeds in at a very early stage when details about the project, or modification of a project, are limited or uncertain;

b) the timescales are short; and/or

c) resources are limited.

Table 8 shows how the steps in Rapid HIA differ from the general and In-Depth HIA process.

Table 8: Steps in the In-house Rapid HIA process

Steps	In-Depth HIA Process	Steps	Rapid HIA Process
1	Screening	1	Rapid Screening
2	Scoping	2	Rapid Scoping
3	Community profiling and baseline information	3	Rapid Community profiling and baseline information
4	Stakeholder and community engagement		Not done, existing community feedback
5	Health impact evidence gathering		Rapid, less systematic
6	Analysis of health impacts	4	Rapid analysis of health impacts
7	Developing of recommendations for mitigation and enhancement	5	Rapid recommendations which can include whether or not a more formal Rapid or In-Depth HIA (either standalone or as an integrated ESHIA)
8	Reporting	6	Rapid reporting
9	Developing a Health Management Plan and follow up		Not done, though simple recommendations may feed into existing risk management processes or lead to the external commissioning of a Rapid or In-Depth HIA

Step 1 : Rapid screening

The aim of rapid screening is to judge whether an HIA – rapid or in-depth is worthwhile. However, because the screening process itself involves an initial high level consideration of the potential health impacts of a project, screening in itself is a useful in-house first step to considering community health and wellbeing particularly during the early project feasibility and design stages. Ideas and suggestions may come out of the screening process that can immediately be fed into the projects design.

Table 9 provides a set of screening questions that can help an individual or group think through the potential community health impacts. It is important to think very broadly about potential impacts on health determinants and a community representative and/or a public health expert may contribute valuable insights. Note that it may be possible to combine the screening and scoping steps of the HIA.

At the end of the screening process, the projects in-house team is likely to have an idea of the potential positive and negative health and wellbeing impacts of the proposed project and what the current uncertainties and information gaps are.

Table 9 HIA Screening criteria to decide whether to conduct an HIA (in-house or externally commissioned) for new or modified mining and metals projects[32]

Screening questions	Yes/No	Notes
1 Do existing local, national or international regulations require an HIA? Does a funding agency require an HIA?		Some jurisdictions have guidelines they expect mining and other industries to follow. If there are funding agencies involved in the project they may have requirements for HIA to be undertaken.
2 Do existing local, national or international regulations require an EIA or SIA?		If so, this may mean that the project is considered to have the potential to cause significant impacts.
3 Is the project planned for a new a site?		A new project is likely to generate additional impacts
4 Is there potential for positive impacts on the determinants of health as a result of the proposed project?		Review Section 1.2 Determinants include economy, employment, food supply, access to health services, for example.
5 Is there potential for negative impacts on the determinants of health as a result of the proposed project?		Review Section 1.2 Determinants include food supply, exposure to toxins, exposure to noise & vibration, use of tobacco & alcohol, and social cohesion, for example.

[32] Source: Adapted from Birley M.

Screening questions	Yes/No	Notes
6 Is there uncertainty about what the impacts might be?		The more uncertainty about the likely impacts, the more useful and important an HIA will be.
7 Could vulnerable, marginalized and socially excluded groups within nearby communities be affected?		E.g. indigenous peoples, low income households, women & children, older people, those with disabilities and existing health conditions
8 Is any involuntary resettlement required?		Resettlement, particularly if it is involuntary, is likely to affect many determinants of health.
9 Will the project involve the employment of temporary workers and temporary housing arrangements that may lead to temporary or permanent population influx?		Temporary immigration of large groups can have significant impacts. Temporary housing can also place strains on local markets and services.
8 Will there be a substantial demand on utilities and public services to meet project needs e.g. domestic water supply, sewerage, health care, public safety, emergency services, social services, education or transportation systems?		The demands of the project during construction and/or operation may strain or render inadequate existing public infrastructure and services.
9 Is there any potential that the project may generate community concerns or unrealistic expectations?		Community concerns may be based on misconceptions which good and ongoing community engagement can reduce.
10 Has there been a previous similar project or project phase, in your own or other companies, where negative community health or social impacts have been reported?		One of the best sources of evidence for likely future impacts is what has happened on similar projects in similar locations elsewhere.
Total number of Yes answers (These answers could be weighted depending on the project and country context)	/10	Where there are some 'yes' or 'don't know' answers it is advisable to conduct a Rapid In-house HIA. Where there are a majority of 'yes' or 'don't know' answers it is advisable to conduct/ commission a Rapid or In-depth HIA from an HIA specialist. For some issues, such as involuntary resettlement, an In-depth HIA is advisable regardless of the number of 'yes' or 'don't know' answers.

Step 2 : Rapid scoping

Scoping sets the boundaries and objectives for the HIA. Scoping is particularly important in a Rapid HIA (in-house or externally commissioned) because time and resources are limited. Scoping normally involves background work to collate available information followed by a meeting of senior project staff and the In-house Rapid HIA team to discuss key issues and decisions. It is useful to invite a community representative and/or a local health/public health official to the scoping meeting whenever feasible.

It is vital that those involved in the scoping step have some understanding of the project and the environment within which it operates. It is advisable to prepare a project summary sheet that answers the following questions.

- What is the nature and extent of the proposal being assessed?
- What are the overall aim and objectives of the proposal?
- What spatial and land use changes are likely to be needed?
- Might it involve the need to move local communities and settlements?
- What is the nature and extent of the key phases of the project e.g. design, construction, operation, extension, closure and remediation?

Step 3 : Rapid community profiling and baseline information

As described in Section 2.1, in this step a rapid understanding is developed of the social, economic, environmental and health aspects of the local communities that might be affected by the project. This will help to assess the likely health impacts and their significance.

The specific profiling issues to consider are the:

- Geographical area that is likely to affect, and be affected by, the project
- Demographic mix of the local population
- Health and wellbeing status of the local population and current health problems
- Existing health equity/inequality issues, literacy levels, employment/unemployment rates, average household income etc.
- Existing health, social care and public service provision
- Other existing or proposed projects that may affect local communities or the project being considered

In a rapid HIA, existing information is collated from national and local sources; where feasible local government or NGOs may be a good source of information and advice. In addition, consultation findings from previous projects as well as ESHIAs of other projects already operating in the area or similar projects in similar country contexts are useful. However, the availability and quality of data may be patchy, and, if so, the limitations of the baseline information and community profile should be clearly noted.

Step 4 : Rapid analysis of health impacts

The time or skills are generally not available within a rapid HIA in-house team to conduct extensive, stakeholder and community engagement, nor a detailed systematic collation of scientific and other evidence on health impacts. Information from the community and scientific evidence that is readily available in the public domain is used to help inform this step.

Step 4 of a Rapid HIA, therefore, moves straight to the analysis of health impacts. This is best done through an interactive workshop where ideas may be shared about potential health impacts, based on the project team's knowledge and experience and any literature that is identified during the course of developing the rapid scope and community profile.

The aim is to be systematic, open and transparent about how impacts are identified and considered, in order to capture any unintended consequences. It is important to think broadly, as impacts often arise in an indirect way and can occur at different stages of a project's lifecycle.

Some key questions to ask when identifying and assessing the potential health impacts are:

- Are the overall aims and objectives of the project likely to promote community health and wellbeing?
- How might the project affect the wider determinants of health e.g. employment, education, access to services and amenities, social capital and community cohesion etc?
- During what phases of the project would these impacts on the wider determinants of health occur?
- What is the research evidence on the community health and wellbeing impacts of the project?
- What industry evidence is there on the community health and wellbeing impacts of the project?
- Through which pathways are the potential positive and negative health impacts likely to act? Which are likely to be the most important pathways of impact?
- What population groups are likely to be affected by the potential changes?
  - o Are there any vulnerable population groups affected?
  - o For each impact identified, who will be affected positively?
  - o For each impact identified, who will be affected negatively?
- What are the fairly certain impacts and what are the uncertain impacts?
- Will the impacts be distributed equally on different socio-economic groups? By gender? By ethnic background? If not, this could have implications for health equity/inequalities.
- How does this relate to those impacts the affected communities/community groups consider to be likely and important?

It can be helpful to map the causal pathway by which impacts are expected to occur. This can be achieved by using a diagram or outlining in words the links between a project and its potential health and wellbeing impacts. Mapping the causal pathways can help to ensure that the analysis can be linked to scientific evidence and considers interactions between various impacts. It can also inform the recommendations by helping to identify points along the causal pathways where interventions could maximize the potential positive impacts and minimize the potential negative impacts. Figure 5 shows a simplified causal pathway for a generic mining and metals project.

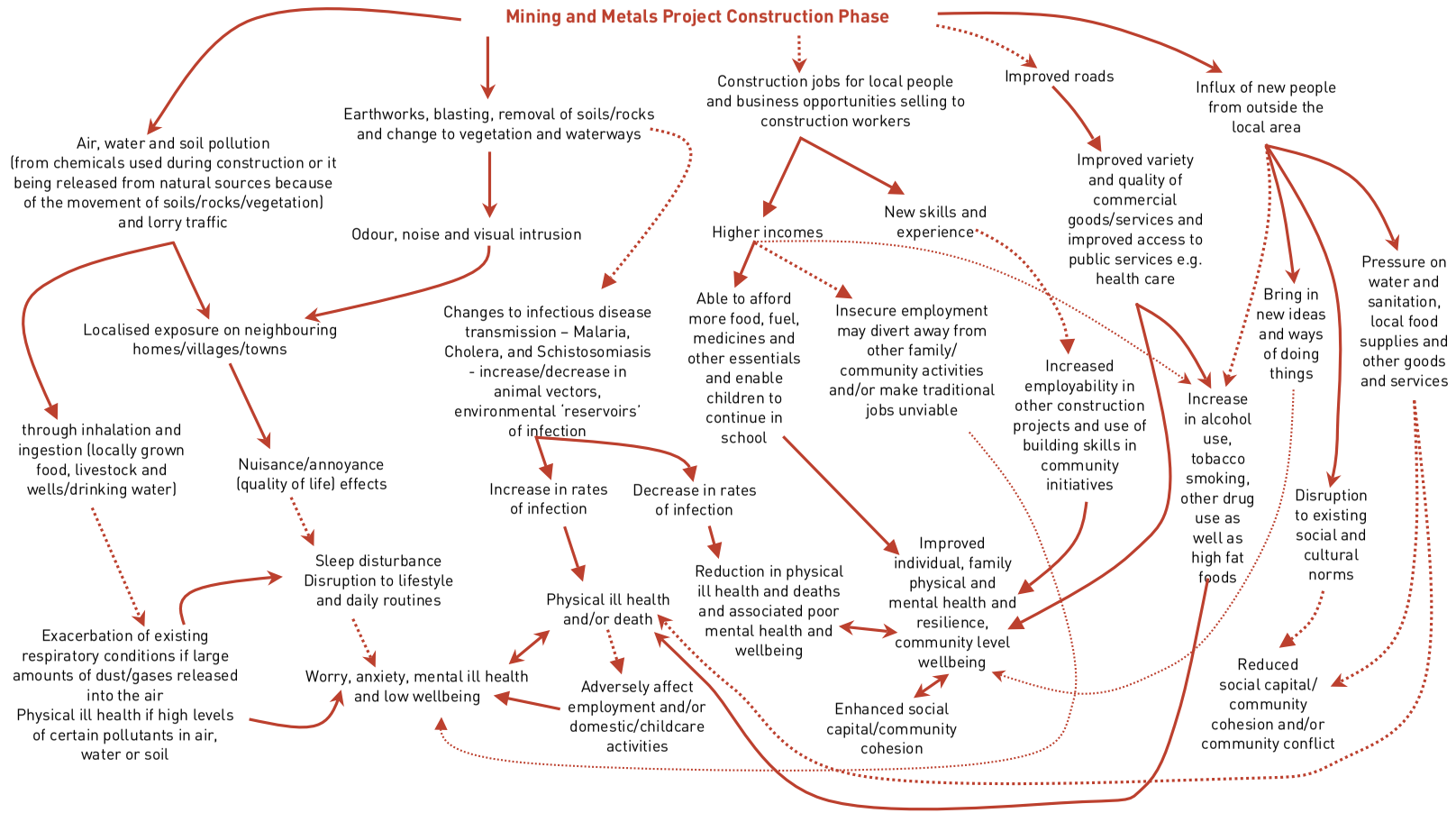
Whilst significance criteria, such as those described in Section 2.1, can help to ensure rigor, transparency and consistency, they can be complicated to apply in a rapid analysis. Key issues to consider when assessing significance in a rapid HIA are:

- What are the positive community health impacts with the potential for greatest health gains?
- What are the potentially severe or irreversible negative impacts?
- What positive or negative community health impacts affect a large number of people?
- What positive or negative community health impacts affect people who already suffer poor health, are on low incomes or are socially excluded i.e. the equity/inequality impacts?
- What are the cumulative positive and negative health and wellbeing impacts of the project?

Using a simplified Health Impact Analysis Table can support the analysis by enabling a systematic consideration of the potential impacts and vulnerable community groups. Table 10 shows a simplified Rapid Health Impact Analysis Table (See also *Appendix 4 Rapid Health Impact Analysis Table Blank Template*).

Photo courtesy Barrick Gold

Figure 5: Simplified causal diagram of the potential health and wellbeing impacts during the construction phase of a mining and metals project



show where there is good scientific/other evidence for an event, situation or impact happening

show where the causal link is unclear or debatable

Thin lines, continuous or dotted, show where evidence is weak

Table 10: Illustrative example of Rapid HIA Analysis Table (See Appendix for a blank template)

Health Outcome/ Determinant	Sub-category	What are the current health needs of local communities?	In what way may community health need negatively impact on the success of the project?	In what way may the project impact on the health and wellbeing of local communities? Positive (+), negative (-), no effect (~), uncertain (?)	What can be done to maximize the positives and minimize the negatives?	Is an in-depth HIA necessary that examines this area in more detail? Yes, No, Maybe, Not sure
What evidence is there to support your analysis? (Uncertain and maybe/not sure answers will require further discussion with the wider project team)						
Health Outcome						
Infectious disease		Currently know that there are high levels of malaria and schistosomiasis	Malaria and schistosomiasis can/are likely to affect project workers (construction and operation phases, local and non-local)	Potential increase or decrease in malaria and schistosomiasis as breeding grounds for mosquitoes/snails are created/removed by construction work and environmental landscaping. (?/+/-) Potential for the influx of new people to lead to sex workers/increase in sex workers in the area leading to more sexually transmitted infections	Review design for the project and assess whether there is a potential for new stagnant pools to be created and ensure environmental landscaping reduces the potential for mosquito/snail breeding. Ensure environmental and chemical controls during construction and operation phases where appropriate/necessary. Provide impregnated bed nets and malaria prophylaxis to workers and the community in dialogue/partnership with local public health services and health NGOs where likely to be most effective. Develop a local worker recruitment plan and build in an outside worker management plan to manage their housing, health and social welfare needs.	Yes. Because need to understand the cause for the high levels of malaria and schistosomiasis and what other infectious diseases are prevalent Yes. Should be linked to Social Impact Assessment studies.
Chronic disease		Not sure	May reduce the pool of local workers if local communities have long term illnesses/ disabilities May also make them small scale (minor to moderate) negative health impacts from the project more significant effects	Increased air pollution through dust from construction and operation may lead to respiratory problems particularly in people already with existing respiratory problems. (?/-)	Difficult to judge as need to understand what specific chronic diseases are present in the local community. Review the potential for dust and other air pollutants during the construction and operation phases and assess the proximity of local people to the project site	Yes. Because may need an Air Quality Assessment as part of an Environmental Impact Assessment to model likely air emissions.

Health Outcome/ Determinant	Sub-category	What are the current health needs of local communities?	In what way may community health need negatively impact on the success of the project?	In what way may the project impact on the health and wellbeing of local communities? Positive (+), negative (-), no effect (~), uncertain (?)	What can be done to maximize the positives and minimize the negatives?	Is an in-depth HIA necessary that examines this area in more detail? Yes, No, Maybe, Not sure
What evidence is there to support your analysis? (Uncertain and maybe/not sure answers will require further discussion with the wider project team)						
Nutritional disorders		Some under-nutrition in children, some obesity in older men	Lack of stable local food supplies for construction and operation phase workers	Influx of new people may/are likely to strain local agricultural supply and increase the price of local foods leading to further potential under-nutrition for some groups. (-)	Identify ways of supporting local agriculture e.g. incentives for local farmers to increase food supply as well as ensure external sources of food supply that do not overwhelm and make less viable local production by being too cheaply priced	Not sure
Injury		Not sure Low levels of motor vehicle traffic currently	Uncertain, possibly similar to Chronic disease above	Increase in lorry traffic in the area may/is likely to increase the chances of sustaining traffic related injuries. (-)	Develop a traffic management plan and ensure lorry drivers are trained to give way to those on foot, bicycle or driving carts and to drive at appropriately slow speeds near residential areas. Build safe crossing points along busy parts of the road where people are likely to cross, consider reviewing this both during construction and operation	Maybe. May need a Traffic/Transport Assessment as part of an Environmental Impact Assessment to modelling likely traffic flows.
Mental health and wellbeing		Not sure. Fairly homogeneous community with strong spiritual beliefs	Worry and concern about the project and its impact may generate opposition and conflict	Potential for positive and negative effects e.g. jobs, improved roads, etc versus more noise, disruption and new people coming into the community	Early community consultation and engagement with dialogue/partnership working with local public and NGO agencies can help to health and other concerns	Maybe.

Health Outcome/ Determinant	Sub-category	What are the current health needs of local communities?	In what way may community health need negatively impact on the success of the project?	In what way may the project impact on the health and wellbeing of local communities? Positive (+), negative (-), no effect (~), uncertain (?)	What can be done to maximize the positives and minimize the negatives?	Is an in-depth HIA necessary that examines this area in more detail? Yes, No, Maybe, Not sure
What evidence is there to support your analysis? (Uncertain and maybe/not sure answers will require further discussion with the wider project team)						
Health Determinant						
Individual/ family	Physiological	No local data on the health status of local people and the range of ill health present	Not sure	Air, water and soil pollution has the potential to cause ill health depending on the levels. (?/-)	Not sure	Maybe. Should be linked to Environmental Impact Assessment studies.
	Behaviour	High levels of smoking local tobacco, local people brew a local alcohol based drink, no other drugs used	Local workers smoking in inappropriate places e.g. where there are volatile compounds and/or drinking during work time or lunchtime injuring themselves and their co-workers	The influx of new people and improved roads may/is likely to bring in new goods and services and increase levels of industrially manufactured alcoholic drinks. This linked to the potential increase in incomes for local people as well as the influx of new people into the area may lead to an increase in alcoholism or alcohol related injury/anti-social behaviour	Work in partnership with local agencies (health care and police) to monitor and constrain the supply of alcohol and other harmful drugs as well as develop education/information on the harms for workers and the local community. Support the provision of other recreational and leisure activities for workers and the local community	Maybe/Yes
	Socio-economic circumstances	Majority of people are involved in subsistence agriculture/ export led farming though the local young people are moving to work in bigger towns and cities and in other industrial facilities. Low levels of literacy and educational attainment	Not sure	The construction and operation phases could provide an additional employment opportunity or an additional source of income alongside exiting employment activities. (+) However, the new jobs may take people away from their existing jobs, making them less viable, take them away from their community and family activities and lead to a decline in traditional skills. (-)	Understand the local economic context and develop measures to ensure that local communities do not become reliant on the project as their only source of income. Ensure that local people get priority in taking up jobs in the construction and operation phase. Partner with existing schools to provide education and training on the project and it opportunities	Maybe. Should be linked to the Environmental and Social Impact Assessment studies

Health Outcome/ Determinant	Sub-category	What are the current health needs of local communities?	In what way may community health need negatively impact on the success of the project?	In what way may the project impact on the health and wellbeing of local communities? Positive (+), negative (-), no effect (~), uncertain (?)	What can be done to maximize the positives and minimize the negatives?	Is an in-depth HIA necessary that examines this area in more detail? Yes, No, Maybe, Not sure
What evidence is there to support your analysis? (Uncertain and maybe/not sure answers will require further discussion with the wider project team)						
Environmental	Physical	Low levels of good housing and lack of a rental market	No additional housing for construction and operation phase workers coming from outside the area	Need to build a hostel or worker compound for workers coming from outside the area. May lead to an increase in local land prices which may price out local residents. May take away land for other uses. The physical separation of the workers from outside the area and the local community may lead to a social separation. It may also lead to overcrowding (-)] May create opportunities for developing a rental market. (+)	Need to identify likely housing needs and ensure flexibility so that local communities can develop rental opportunities e.g. Have a worker rent a room in their home. Ensure that local communities are aware of when workers from outside are likely to come and ensure that there is enough housing capacity through purpose-built hostels, rental properties/rooms in the local communities	Yes. Could be linked to the Environmental and Social Impact Assessment studies
	Social	Currently a close-knit community	Not sure May be wary of outsiders and not want to support or work in the project	May reduce under-employment in local communities. (+) Increase in access to a wider range of goods and services (+) There may be some disruption to lifestyles, daily routines and key cultural and spiritual practices. (-)	Ensure consultation and engagement with community representatives and local NGOs to develop a plan to minimize any potential negative social impacts	Maybe Could be linked to Social Impact Assessment studies

Health Outcome/ Determinant	Sub-category	What are the current health needs of local communities?	In what way may community health need negatively impact on the success of the project?	In what way may the project impact on the health and wellbeing of local communities? Positive (+), negative (-), no effect (~), uncertain (?)	What can be done to maximize the positives and minimize the negatives?	Is an in-depth HIA necessary that examines this area in more detail? Yes, No, Maybe, Not sure
What evidence is there to support your analysis? (Uncertain and maybe/not sure answers will require further discussion with the wider project team)						
	Economic	Very low levels of literacy and educational attainment	Limited choice of local workers	There may also be some wider economic stimulus and business opportunities that emerge. (+) Improve skill sets of local workers		Partner with existing schools to provide training Construct and support more schools within the community Ensure that local workers get priority to take up employment
Institutional (Local and National Government, NGOs, Community Groups)	Organization of health care/ Other institutions/ Policies	Access to health care is poor and there are a limited number of services. Access to other public services is also poor	Limited emergency healthcare for construction and operation phase workers. Unlikely for local health services to be able to cope with the potential influx of new workers and their routine medical needs	Pressure on existing limited health and social care services leading to reduced accessibility and quality of service for local communities	Develop additional capacity in partnership with local health and social public agencies and NGOs to ensure that project workers needs as well as likely local community needs which may increase because of the project can be met	Yes

Step 5 : Rapid recommendations

In-house Rapid HIAs aim to identify 'quick wins' in implementing mitigation and enhancement measures for key types of health and wellbeing impacts on local communities. They also consider whether there is a need to undertake a more formal Rapid or In-depth HIA, the scope of this further HIA and whether it should be a standalone assessment or part of an ESHIA.

Key questions to consider when developing recommendations from a rapid HIA are:

- What elements of the project could be most easily redesigned or modified to minimize the potential health negatives and maximize the potential health positives?
- What control measures and health programs could be most easily implemented to reduce or eliminate the potential negative health impacts?
- What health programs and social investment could enhance the potential positive health impacts?
- What indicators (of health outcomes and health determinants) could be monitored as the project goes forward?
- What further information gathering or technical expertise is needed to clarify uncertainties?
- Would it be useful to undertake a formal Rapid or In-depth HIA?
- Is there capacity to do this further HIA in-house or will external HIA specialists need to be commissioned?
- Is there an environmental or social impact assessment being planned? How can the HIA be integrated with these?

Step 6 : Rapid reporting

The findings and recommendations of a rapid HIA should be written up in summary form so that there is an audit trail showing how decisions were made. This, at its simplest, can be a formal 3-5 page briefing paper report with the handwritten notes of the discussions that took place at workshops and meetings. A more formal written paper of the In-house Rapid HIA is important where it is decided that a more formal Rapid or In-depth HIA is not necessary. The In-house Rapid HIA should feed into and inform the project's risk management process. Where feasible the findings from the In-house Rapid HIA should form part of the project information that is made public.

Photo courtesy Newmont

2.3 Integrating Health, Environment and Social Impact Assessments

Introduction

There are important overlaps between health, environmental and social issues as shown earlier in Figure 1. It is often difficult to identify a clear demarcation between where environmental or social issues end and health issues begin. This overlap emerges because many health determinants are also recognized components of environmental and social impact assessment (EIA and SIA).

It therefore makes sense to undertake environmental, social and health impact assessments together as integrated Environmental, Social and Health Impact Assessments (ESHIAs).

This Section describes the key issues to consider when conducting and commissioning ESHIAs. All the questions that were asked in the Section 2.2 are relevant here.

Standalone HIAs or integrated ESHIAs?

The benefits of undertaking an integrated ESHIA are:

- A more holistic and comprehensive overall impact assessment
- Better consideration of cumulative and health equity/inequality impacts
- Integrated consultation and communication with affected communities
- Fewer inconsistencies and potential conflicts in findings between the individual assessments
- Better integration of recommendations resulting in an integrated Environmental Social and Health Management Plan (ESHMP)
- Less duplication of effort in terms of repeating similar types of field studies
- Less time needed to complete the overall assessment
- More cost-effective than separate assessments
- Improves the credibility and robustness of the overall assessment process
- Reduced duplication of effort in relation to community profiling and baseline studies.

However, there are some common pitfalls associated with undertaking ESHIAs. The key ones are:

- Domination of the EIA or SIA at the expense of the HIA leading to a shallow assessment of community health impacts
- Poor communication, information sharing and partnership working between the various impact assessment teams leading to a poorly integrated report, set of recommendations and final ESHMP
- Lack of understanding of the similarities and differences between the different impact assessment approaches
- Lack of experience of working in a multidisciplinary team setting
- Large size and complexity of the resulting report

Good planning and careful impact assessment management can help to avoid these pitfalls.

How does HIA integrate with EIA and SIA?

Integration of HIA within an ESHIA should occur at all the key steps of the individual HIA, SIA and EIA. Table 11 describes the integration steps to be undertaken.

Table 11: Integrating steps during the ESHIA Process

Step	ESHIA Process	Integration Tasks
1	Screening	This will be undertaken in-house by the mining and metals project usually through a rapid assessment or because of national or local requirements
2	Scoping	Develop a joint scope of work Identify similar tasks that could be integrated and decide who will take lead responsibility for these elements of work e.g. plant and animal surveys could also include mosquito surveys. Discussion and development of report format and reporting structure. Review the scope of the integrated assessment at key points to ensure that key and emerging issues are adequately considered.
3	Community profiling and baseline information	Jointly develop an integrated community profile and gather baseline information.
4	Stakeholder and community engagement	Undertake an integrated community consultation and engagement process
5	Environmental, social and health impact evidence gathering	Discuss the sources of evidence being used and develop a consensus for the acceptability and value of the sources of evidence e.g. scientific, community, key informant, etc.
6	Analysis of environmental, social and health impacts	Discuss the draft analysis of the health, social and environmental impacts emerging from the EIA, SIA and HIA streams of work and develop a consistent ranking methodology and consensus on the significant positive and negative health and wellbeing impacts
7	Development of environmental, social and health recommendations for mitigation and enhancement	Discuss the draft analysis of the health and social impacts emerging from the EIA, SIA and HIA streams of work and develop a consensus on the significant positive and negative health and wellbeing impacts
8	ESHIA reporting	Develop an integrated report and plain language summary

Step	ESHIA Process	Integration Tasks
9	Development of an Environmental, Social and Health Management Plan and follow up	Develop an integrated Impact Management Plan.
10	Review of the ESHIA process	Review of the whole process by the integrated impact assessment team and the client/ commissioner and other stakeholders where feasible and appropriate.

Tendering for an ESHIA

It is worthwhile tendering for an integrated environmental, social and health impact assessment so that consultants provide an integrated proposal that already considers issues of joint working and subcontracting, assigns lead responsibility for the different aspects and considers how the various community profiling and baseline tasks can be divided.

Quality standards and guidance for an ESHIA

Alongside this guidance, and any internal corporate standards, an ESHIA should meet the quality standards of, and guidance from, key international bodies such as:

- International Finance Corporation and World Bank Performance standards and guidance on environmental, social and health impact assessment, stakeholder engagement, resettlement, influx of migrants and disclosure relevant to the mining and metals sector.
- World Health Organization guidance on health impact assessment and the management of community health impacts.
- Other relevant international and national guidance on environmental, social and health impact assessment.

External peer review

It is also worthwhile to have the ESHIA peer reviewed by independent EIA, SIA and HIA specialists to ensure that all the key issues have been considered and that the recommendations are robust, credible and evidence-based.

Cost issues

The costs of an HIA and the time required are a function of the scope, schedule and reporting requirements. An explicit terms of reference is a key tool for managing both internal staff and external consultant costs. In many areas of the world community surveys and health data collection can be difficult and slow. Large, long term and complex community consultation and engagement processes can also be time and resource intensive.

Overall, there is a tendency to under-budget the HIA in relation to the EIA (and to a lesser extent the SIA). Therefore, it is important at the scoping step to assess what needs to be done particularly in relation to community profiling and baseline studies, and how much time will be needed to analyze the potential health and wellbeing impacts and develop effective mitigation and enhancement measures.

Photo courtesy Anglo American

SECTION 3: Management

3.1 Commissioning and Managing an HIA within an ESHIA

Introduction

As external HIA consultants are generally commissioned to undertake Rapid and In-depth HIAs within an ESHIA it is useful to be aware of the key issues for effectively project managing the HIA and the types of skills and experience that good HIA specialists should have.

Project staff should retain oversight of the HIA through the project's risk management process.

The Environmental and Social Impact Assessment elements of an ESHIA will follow similar processes and raise similar issues to those described below.

HIA Steering or Advisory Group

When undertaking – and particularly when an external HIA has been commissioned - it is advisable to set up a Steering or Advisory Group to coordinate the process and/or to provide specific expert advice. This should be developed at the scoping step, and may be a sub-group of a wider ESHIA Steering or Advisory Group.

The group should include local community, local government, NGOs, and health service/public health representatives, e.g. local public health officer/doctor, community health worker, community representatives and/or village elder, as well as project staff and specialists; and may include a representative from the earlier In-house Rapid HIA. Community representatives should be supported through the process so that they have a full and equal voice on the steering or advisory group.

The HIA Steering or Advisory Group plays an important part in detailing the scope of an externally commissioned Rapid or In-depth HIA - assessing the feasibility of key aspects of information gathering and fieldwork and ensuring that the HIA has 'buy-in' from key external and internal stakeholders. This group will also review the findings and quality of the final HIA or ESHIA report.

In-depth scoping

The early deliberations of an HIA Steering or Advisory Group should focus on in-depth scoping, and the key issues to be considered are outlined in Table 12. The scoping step should be revisited when the HIA specialist is appointed, as well as when new information or issues emerge.

Table 12: Scoping questions for an In-depth HIA

	Question	Notes
Governance & management of the HIA		
1	Which decision(s) will the HIA inform? Who will receive the recommendations when the HIA is complete? Who has the authority to implement them?	The primary aim of HIA is to inform decision making, so the answer to these questions will help to clarify the purpose, scope and priority areas for the HIA.
2	What is the timeframe and budget?	It is vital that the scope of the HIA matches the resources available.
3	Will there be an HIA Steering or Advisory Group, and, if so, what will be its make up and role?	Steering and advisory groups can greatly assist the HIA process; however problems can arise if members are uncertain of their role.
4	How will the HIA process be managed?	It is useful to have an explicit statement about the roles and responsibilities of project staff, the ESHIA team and the HIA specialist and how disagreements will be resolved.
5	What part of the HIA process can be undertaken in-house and what will be conducted by an external HIA consultancy?	
6	How will the HIA be commissioned?	
7	How will the findings and recommendations of the HIA be incorporated into project planning and implementation?	So that HIA helps rather than hinders the project planning process, there needs to be a mechanism for smoothly incorporating the HIA's findings and recommendations.
8	Is there a clearly identified budget for the HIA and the implementation of the recommendations of the HIA?	
Scope and content of the HIA		
8	What are the aims of the HIA?	
9	Which project options will the HIA assess?	An HIA generally compares project alternatives (e.g. different project sites) or compares the preferred option against the 'do nothing' option. To keep the scope manageable, the HIA may be focused on a limited number of options, or on certain components of the project.

	Question	Notes
10	What form will the stakeholder and community engagement take?	
11	What geographical area will be covered?	The geographical area considered by an HIA generally extends beyond the project site to include communities living adjacent to the proposed site, often termed the primary zone of influence of the project. However there will also be secondary zones of influence represented by all the places that people come from or go to. For example, construction workers may be recruited from distant places and are likely to send money home to support their families. They may also acquire infectious diseases (e.g. HIV, influenza), which they may pass on to others locally and take back home. In addition the movement of lorries going to and from major urban settlements can affect the villages and towns along the route. Thus it can be important to include both primary and secondary zones of influence in the scope of the HIA.
12	What communities/populations/ vulnerable groups will be considered?	The different population groups that may be considered within an HIA include children and young people, older people, people with disabilities or existing health conditions, women, minority groups, groups, those of low socio-economic status, those who might be resettled, project workers, public service staff and local business people/traders. There may be overlap between these groups. The scoping step will determine what groups the HIA should focus on.
13	Which health outcomes and health determinants are of particular interest/concern?	
14	What project phases (construction/ operation/closure) are being assessed?	
15	What information is available about existing community health issues?	
16	What will be included and excluded from the analysis?	

	Question	Notes
Audience for the HIA		
17	Which organizations/groups will the recommendations be directed at?	When considering mitigation and enhancement measures, will the scope be limited to measures that the project can implement or will recommendations for other organizations (e.g. local government, health services) also be included in the HIA?

Developing Terms of Reference

The decisions made at the scoping step are generally written up as a 'scoping report' or 'terms of reference' (TOR) for the HIA. The TOR should state what needs to be achieved, by whom and when. They should also document a common understanding of the scope among stakeholders and provides a description of the final scope and how it was arrived at.

TORs should include:

- Vision, objectives, scope and deliverables (i.e. what has to be achieved)
- Stakeholders, roles and responsibilities (i.e. who will take part in it)
- Resource, financial and quality plans (i.e. how it will be achieved)
- Work breakdown structure and schedule (i.e. when it will be achieved)
- Success factors/risks and constraints.

If external consultants are commissioned, the initial terms of reference will form the brief for the tender document and will form the core of any contract.

Choosing an HIA specialist

Project managers and health and safety advisors who are commissioning an HIA or ESHIA team should have an understanding of the qualities and competencies that are needed to conduct a good HIA and, in turn, a good ESHIA. Table 13 describes four levels of HIA capability. An HIA team leader or single HIA specialist needs to be skilled in HIA whilst a team member needs, as a minimum, to be knowledgeable about HIA. Where the team leader is only project managing the HIA, and there are one or more HIA specialists on the team who are skilled in HIA, then the project managing HIA team leader need only be knowledgeable about HIA.

Table 14 provides an illustrative example of a personal specification for a lead HIA specialist, and the evidence that could be used to demonstrate whether they met the specification.

Table 13: HIA competency, learning and capability levels[33]

Competency Level	Learning Level Achieved	Capability Level
A Aware	• Has successfully completed an introductory HIA training course (i.e. 1 day or equivalent)	• Understands the value and purpose of HIA • Knows what needs to be done
K Knowledgeable	• Has successfully completed an introductory HIA training course • Has successfully completed an advanced HIA training course (3-5 days or equivalent)	• Has Aware Level capability • Can support the HIA process • Can screen projects • Can contribute to an HIA as a team member • Can liaise with members of the social and environmental teams • Can explain and advocate HIA to project managers, communities and other stakeholders • Can commission HIAs
S Skilled	• Has successfully completed an introductory and advanced HIA training course • Has participated in at least 3 HIAs under supervision of a Skilled leader • Has degree in health related field and/ or • 2-5 years experience of doing HIA	• Has Knowledgeable Level capabilities • Can lead an HIA and manage the HIA process • Can review and audit an HIA • Is able to adapt HIA to new situations
P Proficient	• Has the Skilled Level of learning, training and experience • Familiar with state-of-the-art • Professional qualification in public health and/ or • 5+ years experience of doing HIA	• Can teach HIA • Can improve the HIA process and training at a global level • Can provide back-up expertise • Can provide authoritative advice to governments, multinational corporations and multilateral organizations

[33] Vohra S. Adapted from Birley M. Birley HIA. 2009.

Table 14: Illustrative example of a person specification for a lead HIA specialist[34]

	Necessary	Desirable	Evidence
Education	• Degree in a public or environmental health related subject	• Postgraduate degree in public or environmental health	• Degree certificates
Training	• Training in public or environmental health • Training in HIA	• Training in company Health, Safety and Environment (HSE) management processes	• Certificates of attendance, name of teacher, syllabus
Experience	• Consultancy • Impact assessment • Participating, leading and/or managing an HIA	• Leading an HIA on a project of similar scale to that under consideration • Undertaking an ESHIA	• List of HIA projects completed
Interests	• Membership of professional bodies active in impact assessment such as International Association for Impact Assessment (IAIA) • Has attended HIA conferences	• Knowledge of social, health and environment issues • International development	• Activities and affiliations listed in CV • List of HIA conferences and workshops attended
Skills	• Skilled or Proficient in HIA (using criteria set out in Table 13) • Can review reports, weigh evidence, produce logical arguments, interview key informants, be impartial, be diplomatic	• Community profiling and baseline fieldwork • Stakeholder involvement • Reviewing literature/evidence • Leading and managing the HIA process	• Copy of previous HIA reports highlighting own contributions or anonymised versions or sections of previous HIA reports
Other	• Familiarity with the project region	• Has worked in project locality	• List of projects undertaken there

[34] Vohra S. Adapted from Birley M. Birley HIA. 2009.

3.2 Managing Community Health and Wellbeing Impacts

Introduction

The aim of HIA is to inform decision-makers about the potential impacts of a project, and to recommend measures that will mitigate or eliminate potential harms and enhance the potential benefits of the project through the development of a Health management Plan (HMP) or Environmental, Social and Health Management plan (ESHMP).

Developing mitigation and enhancement measures

Mitigation and enhancement measures are best identified and developed in partnership with local stakeholders, including local community representatives, government officials, health service/public health officials and community health and development workers. Ideally, a wider group of local people would also be involved through public meetings or workshops where the potential health impacts of the project, as well as ways to minimize the negatives and maximize the positives, are discussed. This would also provide an opportunity to identify the measures that are most socially acceptable to local communities, and that experience in the locality suggests are likely to be most effective.

Before discussing measures with local communities and other stakeholders, it is useful to develop draft mitigation and enhancement measures from previous HIAs (where possible), industry best practice and research evidence on the effectiveness of risk control and public health interventions. Table 15 provides some illustrative examples of mitigation and enhancement measures relevant to mining and metals projects.

Mitigations and enhancements should be chosen on the basis that they are:

- Implementable
- Proven to work
- Socially and culturally acceptable to the affected community
- Cost effective.

Photo courtesy Anglo American/Vismedia

Table 15: Illustrative examples of some key mitigation and enhancement measures

Potential health impact	Mitigation	Enhancement
Increase in malaria	Ensure that there are no stagnant pools of water during the construction and operation phase. Where this is unavoidable ensure that these are covered. See ICMM *Good Practice Guidance on HIV/AIDS, TB & Malaria*.	Drain existing stagnant pools of water where possible. Provide local people with impregnated bednets and/or better access to malaria prophylaxis and treatment.
Reduced wellbeing through noise and dust nuisance	Ensure that noise and dust mitigation measures are in place e.g. use of low noise equipment/ shielding, bunds, screens, regular wetting of dusty areas. Ensure prompt attention to complaints. Ensure that loud noises occur at predictable times of the day and not at night or during community rest days.	Support art and cultural activities e.g. outdoor cinema and drama. Provide community visits for people to see the various operations of the project and understand where and why there is noise and dust nuisance.
Migrant workers introduce infectious diseases and social problems	Pre employment health checks & treatment. Implement HIV and TB control program. See ICMM *Good Practice Guidance on HIV/AIDS, TB & Malaria*. Partner with government and NGO services to prevent social problems.	Ensure pro-social leisure opportunities are readily available e.g. football league, volunteer programs Invest in community events and festivals to promote cultural exchange, celebration of diversity etc.
Loss of land leads to food insecurity and/or loss of income/ livelihood	Follow World Bank guidelines on involuntary resettlement	Provide support to enable local people to develop new skills and harness new employment opportunities
Malnutrition associated with loss of fishing area due to surface water contamination	Improve chemical drainage and spillage management. Monitor pollutants in fish stocks from the local market.	Skills training in aquaculture and in maintaining wild fish stocks.

In public health the aim is to prevent harm from occurring in the first place and to influence the source of the problem by minimizing the potential risks and exposures, and maximizing the potential benefits and protective factors.

Mitigation measures are therefore prioritized in a similar way to how they are in occupational health risk assessment and other impact assessments (See Table 16). The Mitigation Hierarchy for negative health and wellbeing impacts from a project is to **Avoid, Reduce, Remedy and Compensate**. This hierarchy emphasises the importance of preventative measures that prevent ill health and adverse health effects, before reactive measures that manage and treat ill health are considered. Therefore, recommendations that focus on medical treatment and changes in individual behaviour only should have a lower priority than those that prevent harmful exposures in the first place. Table 16 shows the mitigation hierarchy and the types of mitigation measures that would be considered at each level.

Table 16: The hierarchy of mitigation measures

AVOID	Design the project so that a feature that may cause a potential negative health impact is designed out e.g. reroute a road and provide a footpath for pedestrians and safe places to cross; provide safe sex options and education; and prevent stagnant pools of water forming on the site in which mosquitoes can breed.
REDUCE	**At project site (source):** This involves adding something to the basic design to abate the impact. Pollution controls fall within this category, often called "end-of-pipe" e.g. reduce emissions from chimney stacks with air filters. **In community (receptor):** Some impacts cannot be avoided or reduced at the project site. In this case, measures can be implemented off-site in the community e.g. provide safe crossing points on busy roads and reduce traffic speeds near settlements.
REMEDY	Some impacts involve unavoidable damage to a resource which needs repair or remedial treatment e.g. provide medical treatment for a chemical spillage, a water well lost during construction will need to be replaced and contaminated land will need to be remediated.
COMPENSATE	Where other mitigation approaches are not possible or fully effective, then compensation for loss, damage, and general intrusion might be appropriate. This could be 'in kind', such as planting new food crops elsewhere to replace what has been lost, or some other means such as financial payments for loss of productive farming land, or providing community facilities for loss of recreation and amenity space.

Note that this Mitigation Hierarchy is less relevant for mitigating impacts on the determinants of health, or impacts on health equity/inequality. However, the principle of prioritizing upstream measures remains the same, regardless of the type of impact.

A similar hierarchy can be developed for health opportunities and enhancement measures. The *Enhancement Hierarchy* is **Build in Benefits for All; Affirmative Action for Equity; Make Healthy Choices the Easy Choice; Proactive Education and Information**. Table 17 shows the Enhancement Hierarchy and the types of enhancement measures that would be considered at each level.

Table 17: The hierarchy of enhancement measures/health opportunities[35]

Build in benefits for all	Design the project so features of the physical, social and economic environment that enhance or lead to a positive health impact for affected communities as a whole are included from the start e.g. health promotion programs, access to green space, hygienic and well ventilated worker accommodation, training and development for employees, minimum incomes, and social investment program for affected communities.
Affirmative action for equity	Put in place measures to ensure that disadvantaged groups reap the benefits of the project e.g. targeted health education and disease prevention programs, policies or quotas that ensure employment of local people, profit sharing with local community.
Make healthy choices the easy choice	This involves adding something to the basic design or operational policies to encourage and reward health promoting behaviour (e.g. physical activity, hand washing). Examples include subsidizing healthy food options in the canteen, providing leisure facilities that promote active recreation, providing secure bike-parking facilities etc. Reminders such as 'now wash your hands' stickers in the toilets or 'take the stairs' suggestions also serve to make the healthy choice the easy choice.
Proactive education & information	Utilize opportunities to provide information and education to enable people to make informed choices about nutrition, safe sex, etc.

Developing a Health Management Plan

The recommendations generated in an HIA or ESHIA report should be reviewed by the project team, the HIA Steering or Advisory Group, local government, health and social care agencies and community representatives. Each recommendation should be reviewed and the implications assessed in terms of impact ranking, agreed priorities, feasibility, project design, operation and closure; and the financial and human resource needed to implement them. The HIA or ESHIA report can also be peer-reviewed by independent EIA, SIA and HIA specialists.

The final agreed recommendations should then be incorporated into an HMP, or ESHMP, to ensure that the accepted recommendations are implemented (See Table 18). The HMP should identify each mitigation or enhancement measure, the project stage at which the action is required, how the action will be monitored and the person responsible for implementation. These individuals may need Awareness or Knowledge level training in HIA (See Table 13), and as a minimum, understand the rationale behind the measures they are implementing.

[35] Developed by Ball J and Vohra S. Institute of Occupational Medicine. 2009.

Table 18: Illustrative examples of some health recommendations from an ESHMP

Health Issue	Project stage	Responsibility	Action	Action Stage	Monitoring
Mental health and wellbeing	Siting and Permission	Project proponents	Dialogue and communication on the project and its potential benefits as well as potential negatives and how these will be managed	Siting and design of the project	Management of planning and consent process
HIV control	Construction and Operation	Procurement team Local health service Local communities	Contract clauses delegate responsibility for reproductive health	Before construction contracts are tendered	Contents of contract and HIV monitoring of workers and local health agencies monitoring of local community
Traffic injury	Construction and Operation	Infrastructure design team Local Highways Agency	Access roads to have aprons	Detailed project design	Inspection of road plans and monitoring of speeds, community complaints and incidents on roads
Food supply and price inflation	Construction and Operation	Procurement team Local Authority	Contract clauses delegate responsibility for local procurement	Before construction contracts are tendered	Contents of contract
Domestic water pollution control	Construction and Operation	HSE management team Local government Local health service	Use of best available technology	Detailed project design and operation stage	Sampling from end of pipe and monitoring of control measures
Particulate air emissions	Construction and Operation	Project proponents	Use of best available technology	Detailed project design and operation stage	Sampling of ambient air quality and monitoring of control measures

Health Issue	Project stage	Responsibility	Action	Action Stage	Monitoring
Social capital and community cohesion	Construction and Operation	Social investment team NGOs Local communities	Ensure that disruption of exiting lifestyles and community routines are minimized and social investment made for safe crossing points along roads, education facilities and local jobs	Construction and operation stages	Degree of community acceptance and support for the project
Heavy metal ingestion	Closure	Remediation Team Local government	Removal of chemical, heavy metal and other contamination from the project site and enhancement of the site back so that it can be used productively by local communities	End of the operational stage	Soil sampling and remediation works carried out

Linking into Social Investment and Community Development Plans

The HMP or ESHMP is generally concerned with the management of project related impacts. There is therefore likely to be a separate and parallel process of social investment with its own budget and time frames. This is generally part of the social responsibility objectives of the project and parent company.

The Social Investment Plan (SIP) should be informed by the ESHIA, HIA, HNA and any other assessments that have been undertaken. Some of the enhancement measures identified in the HIA or ESHIA are likely to involve direct changes to the project while others may require social programs that are best undertaken as part of the SIP.

Social investment plans should focus on projects that are healthy, sustainable and develop the whole community's potential to benefit from the proposed project.

3.3 Following Up Community Health and Wellbeing Impacts

Introduction

No impact assessment can expect to be completely accurate and no HMP or ESHMP, is likely to be fully effective. Therefore, community health monitoring, also referred to as surveillance, is an important component of implementation.

Monitoring is an iterative and cyclical process that leads to a reassessment of the HMP or ESHMP and an adjustment to the overall operational and risk management of the project. This process can be referred to as adaptive management.

Any monitoring program should monitor both the positive and negative community health impacts and provide an early warning system that health problems are occurring at community level. Some changes such as the prevalence of infectious diseases can be easier to monitor than project-related chronic disease and the economic and social benefits of the project that lead to positive health and wellbeing impacts.

An in-depth baseline assessment of a community's health and wellbeing that may be conducted as part of an HIA, or a separate HNA, will provide an effective baseline from which a monitoring program can judge whether it is the project or other factors that are causing beneficial or harmful effects on local communities.

Often, the project needs to simply identify the stakeholders, service providers and NGOs that are already collecting local data and to set up and support a system of information and data sharing. Where this is not possible a specific demographic health surveillance system may need to be developed in partnership with local government and health care/public health services to track key agreed indicators.[36]

Monitoring

Health impact monitoring should be undertaken on both the health outcomes and health determinants.

Key health outcome indicators include:

- Incidence of infectious and chronic diseases and mental ill health
- Incidence of physical injury and poisoning
- Incidence of malnutrition, micronutrient deficiency diseases and obesity
- Workers days off sick due to community related ill health.

Key health determinant indicators include:

- Levels of long term air, water and soil pollution
- Number of local people who get long term jobs in the project
- Children's educational achievement in local schools
- Range, quality and affordability of local food
- Effects on local health and social care services
- Quality of local drinking water
- Number of overflows from local sanitation systems.

[36] Indicators are measurable variables (quantitative and qualitative) that can show directly the actual health and wellbeing status of individuals and groups in local communities or is a good 'proxy' for the actual health and wellbeing status of local communities.

It is very worthwhile involving community representatives and health service/public health officials in the identification of suitable indicators because it can help improve the effectiveness and credibility of the monitoring program.

In general, monitoring should be the overall responsibility of the project. However, aspects of the monitoring program may be commissioned through independent agencies to maintain the trust of local communities. The independence of the monitoring program can be further enhanced by creating a HMP or ESHMP Steering or Advisory Group with a range of stakeholders to help oversee its effectiveness and transparency.

Evaluation

A public health evaluation of a project involves asking whether the project achieved its overall aims and objectives in a way that protected and enhanced the health and wellbeing of local communities. For mining and metals projects this means asking whether the project has been both a commercial success (made profits) as well as a community success (improved health, wealth, education levels and social relationships in local communities).

An evaluation[37] of the project and its potential impacts on local communities' health and wellbeing should be undertaken at regular intervals, e.g. every three years, by an independent agency or consultancy as part of an adaptive project management process. As with the monitoring program, a steering or advisory group made up of a range of stakeholders can enhance the credibility, effectiveness and value of the evaluation.

There are three aspects of a project that can be evaluated: its process, its impact (short term impacts) and its outcomes (long term impacts).[38]

Process evaluation is concerned with evaluating how a project was designed and implemented and whether the process followed key values: transparency, democracy, equity inclusivity and concern for community health and wellbeing. By showing that a project was designed, implemented and operated as planned and in keeping with these values we can say that the outcomes are also likely to be transparent, democratic, equitable and inclusive and therefore likely to be positive for health and wellbeing.

Impact evaluation is concerned with evaluating the implementation stage of a project and the immediate effects/impacts of the project over the early months and years. It examines whether a project improved health and wellbeing in the construction and early operation stages and whether recommendations from an HIA and feedback from affected communities were used to modify and enhance the projects impacts on local communities.

Outcome evaluation is concerned with evaluating the longer term effects/impacts of a project and whether it has achieved its long term objectives (and outcomes) and protected and enhanced the health and wellbeing of local communities over many years and decades. Measuring health outcomes directly usually involves setting up wide ranging demographic surveillance systems and/or conducting long term epidemiological studies.

[37] An evaluation of an HIA involves asking whether the predictions and recommendations made by the HIA or ESHIA turn out to be accurate and whether the implementation of the HMP or ESHMP recommendations led to improvements in health outcomes.

[38] Northern Territory Government. Northern Territory Public Health Bush Book. 2007.

Appendices

Appendices

Appendix 1: Sources of Further Information

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Appendix 3: Key Definitions and Concepts used in HIA

Appendix 4: Rapid Health Impact Analysis Table Blank Template

Appendix 5: Illustrative Table of Contents for an in-depth HIA Report

Appendix 1: Sources of Further Information

Anglo American
Socio-Economic Assessment Toolbox. Anglo American. 2007.

Asian Development Bank
Primer on Health Impacts of Development Programs. Asian Development Bank. 2003.

International Association for Impact Assessment
Health Impact Assessment: International Best Practice Principles. IAIA. 2006.

International Council on Mining and Metals
Good Practice Guidance on HIV/AIDS, Tuberculosis and Malaria. ICMM. 2008.
Planning for Integrated Mine Closure: Toolkit.
HERAG: Health Risk Assessment Guidance for Metals.

International Finance Corporation
Introduction to Health Impact Assessment. IFC. 2009.
Environmental, Health and Safety Guidelines for Mining. IFC. 2007.
Guidance Notes Performance Standard 4: Community health, safety and security. IFC. 2006.
Guidance Notes 4: Community health, safety and security. IFC. 2006.
Stakeholder Engagement: a good practice handbook for companies doing business in emerging markets. 2007.

International Institute of Environment and Development
Worker and Community Health Impacts Related to Mining Operations Internationally: rapid review of the literature. LSHTM, IIED and WBCSD. 2001

International Petroleum Industry Environmental Conservation Association
Guide to Health Impact Assessment in the Oil and Gas Industry. IPIECA. 2005.

Liverpool School of Tropical Medicine
Health Impacts of Peri-Urban Natural Resource Development. LSTM. 1999.

North American HIA Practice Standards Working Group
Practice standards for health impact assessment. North American HIA PSWG. 2009.

World Health Organization
Environmental Health Impact Assessment of Development Projects. WHO Europe, LSTM, AGFUND and IDB. 2005.

World Bank
Resettlement sourcebook: comprehensive guidelines for the resettlement and rehabilitation of project-displaced people. World Bank. Forthcoming.
Involuntary resettlement in development projects: policy guidelines in World Bank-financed projects. World Bank. 1988.

Appendix 2: Useful HIA Websites

World Health Organization HIA Portal

www.who.int/hia/en

WHO website bringing an international perspective to HIA policy and practice with some very useful resources on HIA – tools, evidence and past reports.

HIA Gateway

www.hiagateway.org.uk

HIA website, with a strong focus on the UK but used internationally, that provides HIA related resources - tools, evidence and past reports – as well as a professional networking forum and contact list.

HIA Community Knowledge Wiki

www.healthimpactassessment.info

International HIA website that promotes user contributions from the HIA community to add and update HIA resources.

International Association for Impact Assessment

www.iaia.org

International Association for Impact Assessment that brings together international specialists in environmental, social, health and other impact assessment.

Appendix 3: Key Definitions and Concepts Used in HIA

For a full glossary of terms used in HIA see: A glossary of health impact assessment by Mindell J et al in the Journal of Epidemiology and Community Health, 2003.

Health and wellbeing

HIA practitioners regard health as a state of complete physical, social, mental and spiritual wellbeing and not merely the absence of disease and ill health. Health is the extent to which an individual or group is able to realise aspirations and satisfy needs, and to change or cope with the environment. It is a resource for everyday life that encompasses social and personal resources as well as physical capacities.[39] [40]

There is less consensus currently on how wellbeing is defined internationally. But wellbeing is generally seen as a positive physical, social, mental and emotional state where an individual or community's basic needs are met and individuals and communities are able to achieve personal fulfilment and be an active and respected part of a society.[41]

Health equity

Health equity, or health inequalities, refer to the avoidable health differences between different groups within a given population. A focus on health equity highlights how differences in income, education, status, housing, culture, gender, age and ethnicity affect the levels of health enjoyed by different individuals and groups. Individuals and groups that are seen to suffer from health inequity are often described as vulnerable or sensitive groups e.g. older people; children and young people; women, people with disabilities; people on low incomes or unemployed, people from minority ethnic backgrounds, those with a different sexual orientation or social excluded groups.

Health hazards

Health hazards are substances, agents, processes, activities or situations with the potential to adversely affect the health of an individual or group. Health hazards, such as release of a dangerous chemical, are an important subset of the full range of determinants of health. Hence, all health hazards are health determinants, but not all determinants are health hazards. For example, we do not normally refer to changes in the price of market foods or poverty as a health hazard, but they are both important determinants of health.

Health risk

A health risk is the likelihood, or probability, that a particular set of health determinants will cause harm to an individual when they are exposed to that hazard for a given period of time. Therefore, the heath risk posed by a severe hazard for a short duration can be equal to the health risk posed by a mild hazard over a long period of time.

[39] Adapted from the World Health Organization. Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June 1946, and entered into force on 7 April 1948.

[40] Adapted from the World Health Organization. Health Promotion: a discussion document on the concepts and principles. WHO Regional Office for Europe. Copenhagen. 1984.

[41] Greenspace Scotland, Health Scotland, Scottish Natural Heritage, Institute of Occupational Medicine. Health impact assessment of greenspace: a guide. 2008.

Appendix 4: Rapid Health Impact Analysis Table Blank Template

Appendix 4: Rapid Health Impact Analysis Table Blank Template

Health Outcome/ Determinant	Sub-category	What are the current health needs of local communities?	In what way may community health need negatively impact on the success of the project?	In what way may the project impact on the health and wellbeing of local communities? Positive (+), negative (-), no effect (~) or uncertain (?)	What can be done to maximize the positives and minimize the negatives?	Is an in-depth HIA necessary that examines this area in more detail? Yes, No, Maybe, Not sure	Degree of Confidence of the impact occurring
What evidence is there to support your analysis?							
Health Outcome							
Infectious disease							
Chronic disease							
Nutritional disorders							
Injury							
Mental health and wellbeing							
Health Determinant							
Individual/ family	Physiological						
	Behaviour						
	Socio-economic circumstances						
Environmental	Physical						
	Social						
	Economic						
Institutional	Organization of health care						
	Other institutions						
	Policies						

Appendix 5: Illustrative Example of a Table of Contents for an In-depth HIA Report

There are many approaches to writing and structuring an HIA report and some aspects may be covered in a Social Impact Assessment. The following example is to illustrate to those new to the HIA of mining and metals project what the structure of an In-depth HIA might be.

1. Executive summary

1.1 Introduction

1.2 Summary of existing health needs

1.4 Summary of potential impacts

1.3 Summary of recommendations

2. Legal requirement

2.1 Country

2.2 International/Financial

2.3 Company

3. HIA methodology

3.1 Introduction and definitions

3.2 HIA process for the project

- 3.2.1 Objectives
- 3.2.2 Methodology
- 3.2.3 Scope of survey

3.3 Community profiling and baseline studies

- 3.3.1 Census and routine data sources
- 3.3.2 Literature review
- 3.3.3 Baseline health survey

3.4 Health and social care services and facilities assessment

3.5 Analysis of health impacts, their significance and prioritization

4. Project description

4.1 Project locations

4.2 Project lifecycle

4.3 Geographical boundaries

4.4 Type of project and operational activities

4.5 Human resources

5. Stakeholder involvement and consultation

5.1 Methodology and selection

5.2 Key informant interviews

5.3 Focus groups

5.4 Workshops

5.5 Community public meetings

5.6 Analysis of responses

5.7 Implications of responses

6. Community profile and baseline

6.1 National profile
6.2 District profile
6.3 Local community profile
- 6.3.1 Demography
- 6.3.2 Employment and economy
- 6.3.3 Housing and shelter
- 6.4.4 Water supply and sanitation
- 6.3.5 Transport and connectivity
- 6.3.6 Learning and education
- 6.3.7 Crime and safety
- 6.3.8 Health, social care and public service provision
- 6.3.9 Commercial goods and services provision
- 6.3.10 Social capital and community cohesion
- 6.3.11 Spirituality, faith and traditions
- 6.3.12 Arts and cultural activities
- 6.3.13 Leisure and recreation
- 6.3.14 Lifestyle and daily routines
- 6.3.15 Governance and public policy
- 6.3.16 Energy and waste
- 6.3.17 Land and spatial

6.4 Summary community profile and baseline

7. Health and wellbeing profile

7.1 Communicable diseases
- 7.1.1 STI and HIV/AIDS
- 7.1.2 Faecal-oral diseases
- 7.1.3 Other diseases associated with poor sanitation and overcrowding
- 7.1.4 Hepatitis
- 7.1.5 Respiratory diseases
- 7.1.6 Viral Hemorrhagic fevers
- 7.1.7 Vector borne diseases
- 7.1.8 Zoonotic diseases

7.2 Non-communicable diseases
- 7.2.1 Risk factors
- 7.2.2 Cardiovascular disease
- 7.2.3 Diabetes
- 7.2.4 Cancer
- 7.2.5 Chronic respiratory disease

7.3 Mental health and wellbeing
- 7.3.1 Suicide
- 7.3.2 Depression and other psychiatric disorders
- 7.3.3 Alcohol, tobacco and other intoxicant consumption

7.4 Mother and child health
7.5 Food and nutrition
7.6 Accidents and injuries
7.7 Chemical exposures – air, water and soil
7.8 Health seeking behaviours
7.9 Health systems infrastructure and capacity
7.10 Summary health and wellbeing profile

8. Analysis of health and wellbeing impacts

8.1 Identification and prioritization of health and wellbeing impacts by health outcome
8.2. Identification and prioritization of health and wellbeing impacts by health determinant
8.3 Identification and prioritization of health and wellbeing impacts by population sub-group
8.4 Summary of health and wellbeing impacts

9. Mitigation and enhancement measures

9.1 Mitigation and enhancement measures by health outcome
9.2 Mitigation and enhancement measures by health determinant
9.3 Mitigation and enhancement measures by population sub-group
9.4 Summary of mitigation and enhancement measures

10. Health management plan

10.1 HMP program
10.2 Resettlement HMP program
10.3 Resources needed
10.4 Health program organization
10.5 Follow-Up
    10.5.1 Monitoring indicators
    10.5.2 Approaches to evaluating the project impacts and HIA

11. Links between the HIA and the ESHIA as a whole

12. Conclusions

13. Appendices

14. References/ Bibliography

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