University of the West of England

The effectiveness and cost effectiveness of health appraisal processes currently in use to address health and wellbeing during project appraisal

Date: 15 February 2010

Commissioned by:	NICE Centre for Public Health Excellence
Produced by:	Spatial Planning for Health Collaborating Centre University of the West of England, Bristol
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Acknowledgements:

Maggie Black and Ludovik Sebire for library support at the University of the West of England, Bristol

With thanks to the CPHE team at NICE for their support and advice

Sources of funding:

NICE Centre for Public Health Excellence

List of abbreviations

Abbreviation	Meaning
EIA	Environmental impact assessment
EqIA	Equality impact assessment
HIA	Health impact assessment
IA	Integrated appraisal
SA	Sustainability appraisal
SEA	Strategic environmental assessment
SIA	Social impact assessment

Glossary of terms

Term	Definition
Appraisal	Formal processes of assessing plans or projects for their potential positive and negative impacts (e.g. EIA, HIA)
Environmental Impact Assessment	Environmental Impact Assessment is a systematic process to identify, predict and evaluate the environmental effects of proposed actions in order to aid decision making regarding the significant environmental consequences of projects, developments and programmes. It is a statutory requirement in the UK for some proposed development if it is considered that significant effects on the environment are likely. The Environmental Impact Statement (EIS) which results from the EIA normally accompanies the planning application for the project, and is commissioned by the applicant.
Equality Impact Appraisal	A process for identifying the potential impact of a project or land use policy, service and function on a population to ensure it reflects the needs of the whole community and minimise the potential for discrimination.
Health	Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity
Health Impact Assessment	Health Impact Assessment is a non-statutory systematic approach to identifying the differential health and wellbeing impacts of proposed plans and projects with the goal being that positive health impacts are maximised and negative health impacts minimised within affected or potentially affected populations.
Integrated appraisal	The combination of any of the following appraisal processes: environmental impact assessment, social impact assessment, health impact assessment, equality impact appraisal.
Plan	Spatial plan relating to a whole region, city, town or neighbourhood. It can include topic plans (e.g. for transport, housing and air quality)
Project	Specific development proposals requiring determination through a land use (spatial) planning process
Social Impact Assessment	Social Impact Assessment is a methodology to review the social effects of infrastructure projects and other development interventions.
Spatial planning	A process intended to promote sustainable development and is defined as ‘going beyond’ traditional land use planning to bring together and integrate policies for the development and use of land with other policies and programmes which influence the nature of places and how they function.

Strategic environmental assessment	Strategic environmental assessment is required by European and UK law. It is a way of systematically identifying and evaluating the impacts that a plan is likely to have on the environment. The aim is to provide information, in the form of an Environmental Report that
	can be used to enable decision makers to take account of the environment and minimise the risk of the plan causing significant environmental damage. UK government guidance advises that where a plan requires both strategic environmental assessment and sustainability appraisal, that the former process should be integrated into the latter one.
Sustainability Appraisal	The term sustainability appraisal is normally applied to plans rather than projects, and in the UK is a required part of plan making, including social, economic and environmental criteria, and explicitly including SEA (see below). It is not legally required for project appraisal but many local authorities request that some form of sustainability appraisal accompanies major applications.
Sustainable development	Is development that meets the needs of the present generation without compromising the needs of future generations (Brundtland, 1987)

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Summary

This report (R1) is the first of seven on the integration of health into the planning system. R1 is concerned with evidence in relation to the incorporation of health into the appraisal of projects. Utilising the NICE process of systematic review, it has identified 28 citations which pass tests of relevance and quality. All of the citations use evidence from case studies. They are grouped below into three main categories by type of country: first the United Kingdom, then other high income countries, then medium and low income countries (relying on the World Bank classifications). Each of these categories is then divided further into types of appraisal:

- Environmental Impact Assessment (EIA)
- Health Impact Assessment (HIA)
- Integrated appraisals (IA), normally EIA/HIA or EIA/SIA

The following summaries are reproduced from the Evidence Statements.

UK EIA

There were three citations and twelve case studies in this category. The range of cases was limited to energy, transport and waste projects, reflecting statutory obligations, with no normal urban development projects. Overall the evidence is modest, without depth of analysis or external checks on participant views. The evidence demonstrates that in relation to specific and direct environmental health issues the EIA process is generally effective. But other key health issues such as levels of physical activity, mental well-being and health equity are not normally considered at all. The citations do not provide details of implementation or subsequent monitoring of health impacts, though in one case (a new runway) all the recommendations have been acted upon. The author reviewing ten of the twelve examples reaches the conclusion that there are three mutually reinforcing obstacles to incorporating health effectively in EIA: the difficulty of making predictions on impacts, the lack of health expertise, and the lack of an interdisciplinary approach.

UK HIA

Unlike EIA, HIA has no statutory backing in the UK. Six citations and seven case studies are included, some of them at the margins of acceptability, and together providing only a weak basis for generalization. Nevertheless there is reasonably consistent evidence that where they have been employed HIAs can lead to modifications in proposals and their implementation – particularly when started early in the process and benefitting from the willing participation of project initiators and the planning authority. HIAs also help to improve the working relations between planning departments, public health and community stakeholders, and thus may encourage better liaison and collaboration in the future. However, the scope of some of the HIAs reviewed was limited in respect of physical activity, mental well-being, health equity and distributional effects. The most frequent issue reported was environmental pollution – similar to the main health focus of EIAs. One *before-and-after* study (the only such study reviewed) revealed the difficulty of accurate forecasting of health impacts.

UK Integrated

No studies were identified and thus no evidence was found.

Non- UK High income EIA

A single citation, related to the health impact of EIAs conducted in remote areas of Canada, provides only weak evidence that health is being incorporated into EIA in this country. No evidence was identified of the impact of EIA in other non-UK high income countries.

There is also only weak to moderate evidence (just two out of five case studies) that health recommendations were taken into account in the proposals, despite a statutory requirement in Canada for EIA to be reviewed by a panel of independent experts who then go on to make recommendations for impact mitigation, and only weak (and not explicit) evidence that these proposals were implemented.

Non- UK High income HIA

Fifteen case studies indicate the ability of HIA to identify health issues, however there is limited evidence that planning processes are influenced by the health recommendations made.

Non- UK High income Integrated

Two types of integrated appraisal are evident from the eight citations and twelve case studies examined: the combination of EIA and HIA on the one hand, and EIA and SIA on the other. All the studies qualify for only a moderate ranking for internal validity, but there is reasonably consistent evidence that the health agenda is addressed, and the health recommendations are incorporated in the proposals. The nature of impact ranged from simply monitoring possible effects, through mitigation to withdrawal of the application. The involvement of community interests was often an influential factor. In terms of the range of health issues addressed, the least frequently addressed (in only a minority of cases) was physical activity.

Non UK Low/Middle income EIA

There are six citations reporting on ten case studies across eight different countries. The case studies are all concerned with infrastructure and industrial projects in rural areas, and probably have limited relevance to the UK situation. Some of the countries had EIA as a legal obligation at the time of the studies, but others did not. Partly as a result, there is a wide variation in the quality of the EIAs and the degree to which they have influenced decisions. Some (particularly those in Tanzania) had apparently no impact, while in countries such as Peru and Mexico, the scope of the EIA was broader and mitigation was evident. The scope of health concern is not fully reported in some of the citations. Physical activity and accidents are not discussed at all, but mental/social wellbeing and environmental health do feature.

Non UK Low/Middle income HIA

There is very little evidence in relation to HIA in low/middle income countries – one a seaport development in Lithuania, the other a Roma community in Hungary. The former reflects a statutory HIA obligation while in the latter case there is none. However, in both cases there were positive health effects, in terms of noise mitigation of port activities, and the provision of accommodation for a marginalised community on the other. The conclusion of the Hungarian case study was that the

HIA encouraged the proper consideration of equity, mental and social well-being in a way that would not have occurred otherwise.

Non UK Low/Middle income Integrated

There is only case study in this category, a combined EIA/HIA/SIA of oil extraction and pipeline in sub-Saharan Africa - though two citations, with somewhat different perspectives. The general conclusion of both was that despite the requirements of the World Bank the scope of the appraisal was unduly limited and the recommendations by-an-large ignored. The example has little relevance to the UK.

1. Introduction

This is the first of a series of seven reports to NICE concerned with the degree to which the spatial planning system incorporates health and well-being effectively in its processes. Report 1 examines how projects (concerned with land use) are appraised as part of the planning process. It examines how far and in what ways the statutory and non-statutory appraisal of projects account for potential positive and negative impacts on health and the social determinants of health, and what lessons emerge from current practices. R1 will be complemented by R2 which looks at appraisal of spatial plan-making, including geographical areas or functions (for example transportation), and how health objectives and issues are considered. The two reports will feed into further review work, which will take into account a wider range of evidence from a number of sources, aiming to provide a basis for NICE guidance.

Projects are here defined as development proposals that are determined through a spatial (land use) planning system. Appraisal refers to those types of evaluations that are commonly used to aid decision making in the planning process. At the project level the principal tool is Environmental Impact Assessment (EIA). In the UK and the European Union it is a statutory requirement, but only applies to certain categories of major projects, or those deemed to have potential for 'significant impact'. In other high income countries, the requirement for EIA varies, but generally the European system is followed.

The requirement for EIA in low/middle income countries varies from country to country. Outside influences, for example the World Bank, often require some form of environmental assessment procedure before funding is released. The World Bank and other regional development banks now have well-established EIA procedures which apply to their lending activities and the projects undertaken by borrowing countries. Although their operational policies and requirements vary in certain respects, the development banks follow a relatively standard procedure for the preparation and approval of an EIA report.

The World Bank's EIA procedures link to its environmental and social safeguarding policies. In addition, the Bank's broader environmental policy has moved from a 'do no harm' approach in the past, to seeking to minimise the adverse effects of its projects[1].

An important non-statutory tool in the UK is Health Impact Assessment (HIA), applied sometimes to major projects where the health agency/authority has a particular concern about potential impacts. HIA is also sometimes instituted by a developer in order to promote a development. In addition local authorities may require some form of sustainability appraisal (SA) to accompany particular applications for development. It is possible on occasion for all three types of assessment (EIA, HIA and SA) to be undertaken for the same proposal, or more rarely as an Integrated Appraisal (IA). Additionally, health impacts can be analysed in Social Impact Assessment (SIA). In Finland for example, EIA legislation requires incorporation of an SIA which is defined as an assessment of impacts of a project or activity on people's living conditions, health**,** or amenity. Equality Impact Assessment (EqIA) is rare and is likely to be incorporated into IA or SIA, and is more likely to be required for plan/policy making.

Note that this report does not deal with other more specific types of project assessment, such as Design & Access Statements and British Research Establishment Environmental Assessment Method (BREEAM), nor does it identify examples of good practice with respect to appraisal / assessment, or the framework for such.

The assessment techniques relevant to this study conventionally deal with health to different degrees. HIA of course has health as its raison d'etre. SA should, if properly undertaken, include consideration of all the main environmental determinants of health. EIA in the EU ostensibly includes the impact on the human population as one of its criteria.

[1] http://web.worldbank.org

The review is based on the available literature, accessed through systematic search of databases and website searches. The review has not involved carrying out primary research. The literature is subject to critical evaluation as to quality. The key points from papers and reports that satisfy quality criteria are systematically recorded as the basis for the subsequent synthesis of the evidence.

The study starts from the assumption that development projects are likely to influence health in a number of ways. Four health criteria are uppermost in the evaluation: impacts on physical activity, mental well-being, environmental quality (air, water, soils, noise) and traffic accidents. However, if important evidence comes forward in relation to another health impact it is included.

It is vital to recognise that in the UK, the appraisal of projects only one element of the decision-making process for a planning application. Appraisal is intended, in good practice guidelines, to be an aid to good decision-making at every stage of a project's (or plan's) evolution. So this research assesses the evidence of appraisal health impact at four stages of the project planning process: initial agenda-setting and scoping; substantive policy or proposal; implementation; and later assessment of actual impact.

1.1 Review questions

The review was designed to identify evidence to identify and examine the evidence that addresses the following research questions:

Appraisal approaches

Q1 How effective are approaches to appraisal in terms of influencing planning decisions at the project level to secure improvements in health and address health inequalities?

Q2 What lessons can be learnt from other countries about the effectiveness of the above approaches?

Equity

Q3 What is the evidence that health equity issues are effectively considered as part of the appraisal of spatial planning decision-making processes?

2. Methods

2.1 Objectives

To locate, review and synthesise studies of the effectiveness and cost effectiveness of health appraisal processes currently in use to address health and wellbeing during project appraisal.

Health appraisal processes included:

- Health impact assessment
- Environmental impact assessment
- Strategic environmental assessment
- Social impact assessment or appraisal
- Integrated assessment or appraisal
- Equity impact assessment or appraisal
- Equality impact assessment or appraisal
- Sustainability appraisal

Four process outcomes were considered important. The report assesses whether there is evidence that:

- Health criteria were included in appraisal
- Health-related recommendations were incorporated into the proposal
- Health-related recommendations were implemented
- Post development health outcomes were evaluated

Four primary health outcomes of interest included:

- Physical activity
- Mental health and wellbeing
- Environmental health factors (air quality, noise pollution)
- Unintentional injury

If other specified health impacts were described these were noted.
In addition a further factor was considered:

- Knowledge and skills of planners of the importance of health outcomes

2.2 Search Protocol

A search protocol was developed and agreed with the NICE project team to establish the process for conducting the search for evidence (Appendix A). The search undertaken was systematic, and used a single search strategy to identify evidence for both Review 1 (Project appraisal) and Review 2 (Plan appraisal). Citations meeting the inclusion criteria for Reviews 1 and 2 were differentiated during the screening of titles and abstracts or full texts, facilitated through the use of a checklist screening tool (see Appendix A: Protocol – 'use of a screening tool' and Appendix D).

2.2.1 Inclusion criteria

1. Population

- The human population affected by the proposed project

2. Intervention

- The appraisal or assessment undertaken as part of a regulatory process to examine the impact of the proposed project.
- Technologies and tools to conduct such appraisals include but are not limited to; Strategic Environmental Assessment (SEA), Sustainability Appraisal (SA), Environmental Impact Assessment (EIA), Health Impact Assessment (HIA), Sustainability Impact Assessment (SIA), Integrated Appraisal, Social Impact Assessment (SIA), Equity Impact Assessment, Inequality Impact Assessment.
- Projects may also be referred to using a variety of other terms including, but not limited to, developments, strategies or frameworks.

3. Comparison

- The study / report includes an objective evaluation of the intervention in time or in setting

4. Outcomes

One or more of the following outcomes was evaluated:

- Health outcomes (including health equity issues) were considered in the appraisal / assessment process
- Specific recommendations about health outcomes were included following appraisal / assessment
- Health / equity recommendations were acted upon / implemented following the assessment / appraisal process
- Health outcomes / equity were discussed as part of participation and engagement of communities / populations / stakeholders
- Evidence of an impact on health were sought for :
    - Levels of physical activity?
    - Mental health and wellbeing?
    - Environmental outcomes affecting health (including air quality, water quality, noise pollution & contaminated land)
    - Unintentional injury
    - Other specified health outcome
- Knowledge and skills of planners of the importance of health outcomes

2.2.2 Exclusion criteria

1. Time period

- Studies conducted before the publication of the Brundtland Report: Our Common Future, by the World Commission on Environment and Development (1987) were excluded

2. Language

- No language restrictions were applied when conducting electronic database searches. This was because of known good practice in other countries (principally European and Scandinavian countries) that may not have been published in English. In order to competently consider lessons learnt from other countries it was considered necessary to search for such evidence even if time restrictions may have prevented inclusion in the final report.

2.3 Search strategy

The search strategy to identify evidence from electronic databases was developed in an iterative manner to explore the concept areas of assessment / appraisal processes, project or plan initiatives and health outcomes. The search strategy was primarily sensitive (to include potentially relevant information) rather than specific (to exclude irrelevant material) due to the limited use of indexing and coding terms for the subject areas of spatial planning and assessment / appraisal within electronic databases. Initial scoping of electronic databases suggested that Embase contained more relevant indexing terms than Medline, and therefore Embase was used to develop the initial search strategy that was subsequently adapted for the other databases. Search strategies used for databases are listed in Appendix B.

2.3.1 Electronic databases searched

Following development of the search strategy in Embase it was adapted and applied to a further 13 electronic databases. Searches took place between November 2009 and January 2010.

- EMBASE
- MEDLINE
- HMIC
- PsycINFO
- Cochrane Database of Systematic Reviews
- Cochrane Central Register of Controlled Trials
- Database of Abstracts of Reviews of Effectiveness (DARE)
- Social Science Citation Index
- GEOBASE
- PLANEX
- Transport
- ICONDA
- URBADOC
- CAB Abstracts

2.3.2 Websites

A list of websites was agreed with the CPHE team at NICE. A website searching protocol was agreed and applied to all websites searched (Appendix C).

- NICE (which includes HDA publications)
- UK and Eire Public Health Observatories – includes the HIA Gateway (APHO)
- Department for Transport (DfT)
- Department of Communities and Local Government (DCLG)
- Department for Environment, Food and Rural Affairs (DEFRA)
- Planning Inspectorate
- Royal Town Planning Institute (RTPI)
- Chartered Institute of Environmental Health (CIEH)
- WHO (Healthy Cities)
- Commission for Architecture and the Built Environment (CABE)
- International Association for Impact Assessment
- Resource for Urban Design Information (RUDI)
- ISURV
- Planning Advisory Service
- VicHealth
- International Health Impact Consortium
- American Planning Association
- Town and Country Planning Association
- ICLEI
- Environment Agency
- Natural England
- Scottish HIA Network

2.3.2 Grey literature

Grey literature sources of evidence included:

- Bibliography lists of included studies
- Bibliography lists of review articles suggested by experts and authors

- Follow up of references that may meet inclusion criteria suggested by experts and authors in the field

2.3.4 Conducting the search strategy

Where possible, results of the electronic database searches were downloaded to a reference management software tool; RefWorks. Duplicate references were identified and excluded. Titles and abstracts of de-duplicated citations were screened independently by two reviewers to determine eligibility where adequate information was available. Differences in opinion regarding the relevance of a study were resolved by discussion. The full text of eligible citations and of citations where it was not possible to determine eligibility, were obtained. A review of the full text was conducted independently by two reviewers using a screening tool which also determined eligibility for either Review 1 or Review 2. Electronic data sources that could not be automatically downloaded were viewed on screen by a single reviewer to identify those that met inclusion criteria and manually entered into RefWorks.

2.4 Assessing the quality of the evidence

To assess study quality each included paper was critically appraised. Critical appraisal tools from the manual of Methods for the development of NICE public health guidance (2009) were used where possible. The majority of the evidence arose from evaluations of case studies. A critical appraisal tool for case studies was not included in the manual of Methods for the development of NICE public health guidance, and was therefore developed from a published checklist and agreed with the CPHE team (Appendix E).

Sample quality appraisal by two reviewers was conducted prior to data extraction. Examples were also discussed by the review team to improve inter-rater reliability. An Internal validity score (to indicate potential sources of bias within the study) and an external validity score (to indicate the extent to which a study's findings may be considered generalisable to a wider population) were provided for each included study.

2.5 Extracting, synthesising and presenting the evidence

A data extraction template was developed from the evidence table proforma provided within the manual of Methods for the development of NICE public health guidance (2009). The template was piloted on two papers and discussed by the review team prior to agreement with the CPHE team. Data extraction was undertaken by a single reviewer who was not blind to the name of the authors, institution or source of the citation. Difficulties in data extraction were resolved through discussion with the review team.

3. Results

3.1 Quantity of research

A flowchart at Appendix F shows that a total of 6,126 citations were identified from the electronic database and website searches. De-duplication, followed by screening of title and abstracts, excluded 5,926 citations. The full text of 200 remaining citations were obtained and screened, or were ordered via inter-library loan, with the following results:

- Full text copies of 6 studies that had been ordered, either did not arrive, arrived too late to be reviewed or could not be obtained (either due to a copy not being available through an Inter Library Loan, or because the citation found did not give sufficient detail to be identified). These are listed at Appendix K;
- Despite the abstracts being in English, the full text of 4 studies was found not to be in the English language (see copy of abstracts at Appendix J);
- 21 studies were excluded because they did not review a project appraisal process so were thus identified for Review 2 - Plan/Policy rather for Review 1.
- A further 141 citations did not meet the inclusion criteria and were therefore excluded from Review 1.

Twenty-eight studies met the inclusion criteria and quality checks.

Please note that because some citations include case studies that are relevant for Reviews 1 and 2 it is therefore not possible to disaggregate some of the figures.

3.2 Quality of the research

No studies were excluded on the basis of quality. A summary of all included studies and the quality grading is shown below, and a more detailed summary of the quality appraisal of each included paper is shown in Appendix G. All included papers (bar two) were graded as + for internal validity with the exception being the papers by

Mwalyosi (1998) and Utzinger, J (2005) which were highly graded ++ for their internal validity. Ten of the 28 papers were considered to be ++ for external validity.

3.3 Summary of included studies

A list of the included studies, together with their internal quality and external validity scores can be found below. Because of the differing regulatory frameworks within developed and less developed countries, the studies have been grouped by high income, and lower and middle income countries, using the World Bank Classification.

Table 1. Summary of all included studies (Alphabetical order by first named author)

High Income Countries (World Bank Country Classification as at February 2010)

Study identification Author, year of publication	Country	Internal validity score ++/+/-	External validity score ++/+/-	Appraisal type	Subject of Appraisal
Bekker, M., *et al* (2005)	Netherlands	+	++	HIA	Municipal reconstruction programme
Bendel, N & Owen-Smith, V. (2005)	UK	+	+	HIA	Hospital trust re-development plans
Bhatia, R., & Wernham, A. (2008)	USA	+	++	IA	1. Urban re-zoning San Fransico 2. Alaskan oil & gas development
BMA (1999)	UK	+	++	EIA	2nd Runway Manchester airport
Corburn, J. & Bhatia, R. (2007)	USA	+	++	IA	Urban housing redevopment
Dannenberg, A., *et al* (2008)	USA	+	+	HIA	1, 2. 3.Urban housing / mixed use redevopment 4 &7. Non-motorised transport infrastructure. 5. Highway re-development. 6. Public square 8. Coal fired power station 9. Oil & gas exploration
Frannsen, E.,*et al* (2002)	Netherlands	+	+	IA	5th new runway & terminal Schipol
Hay, L., & Kitcher, C. (2004)	UK	+	+	HIA	Container port construction
Kjellstrom, T., *et al* (2003)	Australia	+	+	IA	Road construction
Kwiatkowski, R., & Ooi, M. (2003)	Canada	+	++	IA	Diamond mine
Lester, C., & Temple, M. (2006)	UK	+	+	HIA	Brownfield land remediation
Manning, K., &	UK	+	+	EIA	New sewage primary

Jeavons, J. (2000)					settlement tanks
Noble, B. F. & Bronson, J. E. (2005)	Canada	+	+	EIA	1. Uranium mine location 2. Diamond mine 3. Mineral concentrates mine/ mill
Petticrew, M., *et al* (2007)	UK	+	+	HIA	New hypermarket in deprived Glasgow area
Planning Advisory Service (PAS). (2008)	UK	+	+	HIA	Urban extension-Sherford
Sutcliffe, J. (1995)	UK	+	+	EIA	1.Gas turbine 2.Flue de-sulphurisation 3.Coal-fired power station 4.Nuclear power station 5.New harbour 6. Gypsum waste disposal 7. Asbestos works 8.Oil refinery 9.Wind park 10. Trunk road
Taylor, N., *et al* (2003)	New Zealand	+	+	SIA	New retail centre
Viinikainen, T., & Kaehoe, T. (2007)	Finland	+	+	IA	Road bypass & realingment
Wismar, M., *et al* (2007)	UK, Italy, Sweden, Germany	+	++	HIA	1. King's cross 2. Wet zone creation 3. Road –realignment 4.Landfill remediation 5.New airport

Low, Lower Middle and Upper Middle Income Countries (World Bank Country Classification as at February 2010)

Bond, R., *et al* (2001)	Mali, Senegal & Mauritania	+	+	EIA	Manantali Energy Project: Retrofitting of hydropower facility at existing dam.
Gomez-Balandra, M. (2002)	Mexico	+	+	EIA	Dam and reservoir construction
Jobin, W. (2003)	Chad & Cameroon	+	+	IA	Oil well and pipeline
Kosa, K., *et al* (2007)	Hungary	+	+	HIA	Resettlement options for a squat
Mwalyosi, R. & Hughes, R. (1998)	Tanzania	++	+	EIA	1. Pesticide plant 2. Graphite & tanzanite mining
Pena Alid, A. (2002)	Chile	+	+	EIA	Pulp mill on river & sensitive wetland site
Shoobridge, D., & Kapila, S. (2002)	Peru	+	+	EIA	Gas plant & pipeline
Tullos, D. (2009)	China	+	++	EIA	3 Gorges dam
Utzinger, J., *et al* (2005)	Chad & Cameroon	++	++	IA	Oil well and pipeline
Wismar, M., *et al* (2007)	Lithuania	+	++	HIA	New seaport & related infrastructure

Note: Wismar (2007) appears in both sections, as the case studies relate to both High and Middle income countries.

3.4 Evidence tables

The findings are summarised in evidence tables and related evidence statements. Because of the differing regulatory frameworks within developed and less developed countries, the studies have been grouped by high income, and lower and middle income countries, using the World Bank Classification, and then grouped by type of appraisal as shown below.

UK	EIA
	HIA
	Integrated
Non- UK High income	EIA
	HIA
	Integrated
Non-UK Low / Middle income	EIA
	HIA
	Integrated

‘Integrated’ is considered to be any combination of EIA, HIA, SIA, SA, IA and EqIA and is taken to mean an appraisal that specifically includes environmental, social, health, economic and equity appraisal methods.

The summary evidence tables indicate the findings of the data extraction (full details are in Appendix H) with respect to the objectives in 3.1, namely:
Whether:

- Health outcomes were considered
- Health outcomes were incorporated into the proposal
- There is evidence of the health recommendations being implemented
- There is evidence of post development evaluation of health outcomes

Whether the four primary health outcomes of interest included:

- Physical activity
- Mental health and wellbeing

- Environmental health factors (air quality, noise pollution)
- Unintentional injury

If other specified health impacts were described these were noted.

In addition a further factor was considered:

- Knowledge and skills of planners of the importance of health outcomes

3.4.1 Outcome summary table: EIA of projects in the UK

- Evidence of inclusion O NO evidence of inclusion NR Not reported NA Not applicable UC Unclear

		Process outcomes				Specific health outcomes considered							Significant finding comments
Author, Year	Topic	Health outcomes considered	Health recommendations incorporated	Evidence of implementation	Post development evidence	PA[2]	MW[3]	EHI[4]	UI[5]	O[6]	Quality score	External validity score	
BMA (1999)	EIA -2nd runway, Manchester Airport	●	●	o	o	NR	NR	NR	NR	NR	+	++	Recommendations for health accepted by the airport planners.
Manning (2000)	New Primary Settlement Tank & storm tanks etc at established Sewage Treatment Works. EIA formed part of planning application	●	●	o	NR	o	o	●	o	o	+	+	The EIA provided the vehicle to demonstrate mitigation of any potential odour impacts and thus the design of the replacement STW.
Sutcliffe (1995)	EIA 10 case study reviews. 1. Combined cycle gas turbine, Didcot, Oxon	●	o	o	o	o	o	●	o	o	+	+	Relevant H&S legislation mentioned and consultation with HSE. Statutory reference to noise. No specific mention of health
Sutcliffe (1995)	2. Flue gas desulphurisation,	o	o	o	o	o	o	o	o	o	+	+	No specific health effects addressed. Statutory environmental health issues

[2] PA-Physical Activity
[3] MW- Mental Wellbeing
[4] EHI- Environmental health impact
[5] UI- Unintentional Injury
[6] O- Other

	Drax, Yorks.												considered but no health consequences. Standards are considered for health but specific impacts are not specified.
Sutcliffe (1995)	3. Coal-fired power station, Fawley, Hamps.	●	●	o	o	o	o	●	o	●	+	+	Reference to additional employees leading to increase for health services (on site medical centre). Statutory EHI considered.
Sutcliffe (1995),	4. Nuclear power station, Hinckley Point, Somerset.	●	●	o	o	o	o	●	●	●	+	+	H&S section refers to public enquiry at Sizewell, on radiation exposure on the public and radiological impacts. Includes some accidents. Health services requirements mentioned: GPs health visitors, facilities on-and-off-site. Excludes consideration of supporting activities; uranium mining & mills, tailings, enrichment, hexafluoride process & their waste streams. Does not include alternatives and health impacts. Does not list chemicals nor cumulative implications.
Sutcliffe (1995)	5. Hayle Harbour, Hayle, Cornwall	●	●	o	o	o	o	o	●	●	+	+	Accidents on sand bar at harbour mouth, closure to large boats because unsafe. Transport in separate report.
Sutcliffe (1995)	6. Waste disposal gypsum, Barlow, Yorkshire	●	o	o	o	o	o	●	o	o	+	+	Materials assessed (COPA Special waste) Regs 1980. Special license not required. Good housekeeping practices. Chapters on noise, dust & water quality.
Sutcliffe (1995)	7. Asbestos works, Avonglen landfill site, Polmont, Scotland	●	o	o	o	o	●	●	o	o	+	+	Examines landscape, traffic, noise pollution. Extremely limitd even on well known health risks linked to lung cancer, mesothelioma, and asbestosis.

Sutcliffe (1995)	8. Oil refinery, Shell Haven refinery, Essex.	●	●	o	o	o	o	●	●	●	+	+	H&S in design, noise, Control of Industrial Major Accident Hazards (CIMAH), Control of Substances Hazardous to Health (COSHH) regs 1989- aims to reduce workplace occupational ill health.
Sutcliffe (1995)	9. Wind Park, Capel Cynon, Wales. .	●	o	o	o	o	o	●	o	o	+	+	Chapters on visual, noise, construction, flicker
Sutcliffe (1995)	10. Road, A50 Trunk Blythe Bridge to Queensway, Staffs.	●	o	o	o	o	o	●	●	o	+	+	Statutory EHI considered & accidents for local population and users.

3.4.1 Evidence Statement 1: EIA of projects in the UK

The studies and their context

The review identified three citations, reporting on a total of twelve case studies, three of which are concerned with transport (airport, harbour and road); three with waste (landfill, sewage) and six with energy (coal, oil, gas, wind, nuclear). All the case studies are from before 2000AD.

- BMA (1999) – new runway, Manchester airport
- Manning (2000) – new tanks at a sewage plant
- Sutcliffe (1995) – review of ten case studies
    - Combined cycle gas turbine, Didcot
    - Flue gas desulphurization, Drax, Yorkshire
    - Coal-fired power station, Fawley Hampshire
    - Nuclear power station, Hinckley, Somerset
    - New harbour at Hayle, Cornwall
    - Waste disposal of gypsum, Barlow, Yorkshire
    - Asbestos works, Avonglen landfill site, Scotland
    - Oil refinery, Shell Haven, Essex
    - Wind park, Capel Cynon, Wales
    - A50 trunk road, Staffordshire

Environmental Impact Analysis (EIA) is a statutory requirement in the UK for infrastructure and industrial projects. Local authorities have the discretion to require an EIA for major urban development projects (housing, retail, commercial, leisure, mixed use). The Environmental Impact Statement (EIS) which results from the EIA normally accompanies the planning application for the project, and is commissioned by the applicant.

Strength of evidence

There was evidence of moderate quality from three citations; BMA (1999) [+], Manning (2000) [+] and Sutcliffe (1995) [+].

None of the studies merits a high quality score: while the facts and outcomes are considered reliable, the judgements in all three depend on the authors, without any apparent external check, triangulation or methodological reflection. All three citations use case studies from a decade or more ago. It is generally recognized that the quality of EIAs has improved since then, but the review can provide no evidence of this in relation to health, one way or the other.

Urban development projects, which have very diverse impacts on health, are conspicuous by their absence.

Impacts

Process outcomes

Health was considered in all cases (this of course reflects the selection criteria) – though not always identified explicitly as such. There is limited evidence about the degree to which health-related recommendations of EIAs have been incorporated in the formal proposals. In one case – Manchester Airport runway (BMA, 1999) – the writer states that the recommendations were influential and accepted by the airport planners, but provides no detail. In five other cases there is also some evidence, but again a lack of detail to evaluate this fully (Manning (2000), Sutcliffe (1995) [case studies 3, 4, 5 and 6]. The expectation would be that where environmental pollution standards (enshrined in legislation) have been breached, then the recommendation in all cases would have been accepted and mitigation (i.e. compensatory changes to the proposal so as bring it up to minimum requirements) would have been required. However, the studies themselves provide no evidence of implementation or subsequent monitoring.

Health outcomes

By far the most common health issues on the agenda were those concerned with environmental pollution. Depending on the project these included air and water quality, soil contamination, noise, odour and hazardous substances. Physical activity was not considered by any study; mental well-being by only one, and that obliquely (Sutcliffe, 1995 [case study 7; asbestos works]); unintended injuries by four, health service requirements by two. None examined health inequality, or highlighted the

distributional issues which might impact on it. The conclusion, on this small selection of papers, is that EIA does not treat the health of the population very fully, generally ignoring some key issues.

Applicability

The degree to which it is possible to generalize from the evidence is therefore rather limited (although directly applicable to the UK population and setting). Each case study is unique, and taken together they cannot be considered a representative sample. Nevertheless, with all the reservations in mind, there are some shared and some consistent findings.

The three citations give different perspectives on the incorporation of health in EIA. One, concerned with the new runway at Manchester airport (BMA 1999), suggests the EIA health-related recommendations were influential and accepted by the airport planners. Another, involving new tanks at a sewage works (Manning 2000), claims that EIA provides an effective vehicle for examining issues of odour (and by implication other environmental quality issues which affect health) for identifying mitigation needed and influencing the design outcome. The third, which reviewed ten varied EIAs (Sutcliffe 1995), is much less positive.

On the limited evidence here, it appears that the specific environmental health issues raised by EIAs (such as noise at the airport and odour at the sewage works) are effectively managed by the EIA process, but broader health concerns, such as physical activity, mental well-being, are not.

Summary

There were three citations and twelve case studies in this category. The range of cases was limited to energy, transport and waste projects, reflecting statutory obligations, with no normal urban development projects. Overall the evidence is modest, without depth of analysis or external checks on participant views. The evidence demonstrates that in relation to specific and direct environmental health issues the EIA process is generally effective. But other key health issues such as levels of physical activity, mental well-being

and health equity are not normally considered at all. The citations do not provide details of implementation or subsequent monitoring of health impacts, though in one case (a new runway) all the recommendations have been acted upon. The author reviewing ten of the twelve examples reaches the conclusion that there are three mutually reinforcing obstacles to incorporating health effectively in EIA: the difficulty of making predictions on impacts, the lack of health expertise, and the lack of an interdisciplinary approach.

3.4.2 Outcome summary table: HIA of projects in the UK

- Evidence of inclusion O NO evidence of inclusion NR Not reported NA Not applicable UC Unclear

		Process outcomes				Specific health outcomes considered							Significant finding comments
Author, Year	Topic	Health outcomes considered	Health recommendations incorporated	Evidence of implementation	Post development evidence	PA[7]	MW[8]	EHI[9]	UI[10]	O[11]	Quality score	External validity score	
Bendel, (2005)	Cross trust hospital re-development plans	●	●	●	o	o	o	●	o	●	+	+	Health indicators assessed, and recommendations proposed, and then monitored, although specific outcomes were unreported. Also a lack of adequate time provision for the HIA led to objections for its conclusions by the private finance initiative, and a downgrading of the community involvement.
Hay, (2004)	Container port construction	●	●	o	o	●	●	●	●	●	+	+	Impact of increased population on health services considered. Collaboration between health & planning professionals facilitated through joint approach
Lester, (2006)	Contaminated land remediation	●	●	●	NR	●	●	●	●	NR	+	+	Link between perception of contaminated land risk, and reported ill-health established. Public demand for remediation to go ahead, despite risk of health impacts increased during the short term.

[7] PA-Physical Activity
[8] MW- Mental Wellbeing
[9] EHI- Environmental health impact
[10] UI- Unintentional Injury
[11] O- Other

Petticrew, (2006)	Post evaluation HIA of a food store.	●	NR	NR	●	NR	NR	NR	NR	●	+	+	No actual HIA undertaken, outcomes evaluated retrospectively comparing diet and self reported health data with a similar area which had been evaluated with a similar intervention.
Planning Advisory Service, (2008)	Urban extension	●	●	●	o	●	o	o	o	o	+	+	Other health outcomes - community development workers Fresh food retailing Planning knowledge was improved and collaboration between health & planning professionals was established.
Wismar, (2007)	6 HIAs undertaken at King's Cross.	●	●	●	o	o	●	●	●	●	+	++	HIA resulted in a reduction in construction operating hours. However, aims of the HIA and evaluation process were not the same. Planners knowledge was improved, equity issues ineffectively addressed.
Wismar, (2007)	HIA undertaken on brown field land remediation, S. Wales.	●	●	●	o	o	o	●	●	o	+	++	A participative approach was established to ensure that the HIA process was participative and inclusive. Equity issues through public engagement addressed.

3.4.2 Evidence Statement 2: HIA of projects in the UK

The studies and their context

The review identified six citations reporting seven case studies. The range of projects is more representative of normal planning situations than the EIA set, including four urban development projects. The decision-making context of these projects varies widely - in terms of the perspective of the investors, the stage in the process and the politics of the situation.

- Bendel (2005) – hospitals redevelopment, Manchester
- Hay (2004) – container port, Harwich, Essex
- Lester (2006) – options for coal spoil site, Cynon Valley, Wales
- Pettigrew (2006) – food store, Glasgow
- PAS (2008) – urban extension 'Sherford', Plymouth
- Wismar (2007) – study of HIA across the EU
    - Mixed use developments, Kings Cross, London
    - Landfill remediation, Rhondda Valley, Wales

Unlike EIA, Health Impact Assessment (HIA) is non-statutory in the UK. The HIA process is also much more varied than EIA, ranging from 'rapid appraisal' to in-depth studies. It normally involves extensive stakeholder consultation and workshops. While EIA is normally funded by the project promoter, HIA is most often carried out by Primary Care Trusts or Health Authorities, and only for a small minority of cases.

Strength of evidence

None of the studies included merit a high quality score, and two of them are on the margins of inclusion: one because the case study material, though apparently reliable within its limits, is set within the context of advocacy documents (PAS 2008 [+]); the other because it reports a retrospective health impact study, after implementation (Petticrew 2006 [+]). Taken together the seven case studies make only a weak evidence base.

Impacts

Process outcomes

In relation to the stages of the planning process, all the pre-development HIAs resulted, according to the authors of the papers, in some of the health recommendations being incorporated in the proposal. In five out of six (Bendel 2005, Lester 2006, PAS 2008, Wismar 2007 (Kings Cross), Wismar 2007 (South Wales)) there was also evidence of subsequent implementation, including an effect on the legal agreement between the developer and the planning authority (resources for health facilities). However, in certain cases the claims were more like hopeful expectation than proven, and others reflected that – in the context of complex decision-making arenas – it is difficult to determine exactly how much influence the HIA had.

There is a general consensus amongst the researchers about the longer term awareness and bridge-building benefits of HIAs. These manifested in a number of ways: developing partnerships between the local planning authority and the PCT; developing a positive working relationship between planning and health professionals; the involvement of residents actively in the process, contributing local knowledge and experience; the opportunity for resolving long-term community conflicts; generally awareness-raising and knowledge exchange.

One study identifies the challenge of the final stage of validating the accuracy of health impact predictions through post-development evidence. In this case there was not a formal HIA, but a *before and after* study of the impact of an intervention (a new foodstore) in a 'food desert' in Glasgow. The results were far from those predicted – the food store did not affect the eating habits of locals, but did impact on physical activity - and this highlight the importance of learning from experience – monitoring and review (Pettigrew 2006).

Health outcomes

As might be expected, health was much more explicitly considered than in the EIAs. Two studies (the container port (Hay, 2004), the land remediation (Lester, 2006)) examined all four specific health outcomes listed in the table. Each of the others

dealt with some specific aspects, as reported. Environmental health issues were most frequently mentioned, in five out of seven case studies (all but Pettigrew 2006 and PAS 2008). Physical activity and mental well-being were the least mentioned, in three out of six (Hay 2004, Lester 2006 and PAS 2008). The apparent absence of physical activity and mental well-being/social networks from HIAs where we would clearly expect it (major development, redevelopment and improvement projects) is worth noting.

Health equity was explicitly tackled in the two case studies reported by Wismar (2007): at Kings Cross it was both an explicit concern and implicit in other topics such as housing; at the Rhondda the central issue was impact on vulnerable groups.

Applicability

This review does provide some directly applicable evidence, but given limited numbers, and the modest sophistication of the studies, that evidence is relatively weak. It suggests that HIA can be a factor (amongst many) helping to shape development proposals, subject to the conditions that it has active participation from the project sponsors and the local planning authority and is started before key decisions are taken. The current range of health issues considered is much broader than for EIA, but still (from our limited evidence) sometimes excludes relevant health determinants, particularly physical activity, mental well-being, health equity and distributional effects.

Summary

Unlike EIA, HIA has no statutory backing in the UK. Six citations and seven case studies are included, some of them at the margins of acceptability, and together providing only a weak basis for generalization. Nevertheless there is reasonably consistent evidence that where they have been employed HIAs can lead to modifications in proposals and their implementation – particularly when started early in the process and benefitting from the willing participation of project initiators and the planning authority. HIAs also help to improve the working relations between planning departments, public health and community stakeholders, and thus may encourage better liaison and

collaboration in the future. However, the scope of some of the HIAs reviewed was limited in respect of physical activity, mental well-being, health equity and distributional effects. The most frequent issue reported was environmental pollution – similar to the main health focus of EIAs. One before-and-after study (the only such study reviewed) revealed the difficulty of accurate forecasting of health impacts.

3.4.3 Outcome summary table: Integrated appraisal of UK projects

No table required – no studies identified

3.4.3 Evidence Statement 3: Integrated appraisal of projects in the UK

Studies and context

Anecdotal evidence from professional contacts suggests that many local authorities are requiring some form of sustainability appraisal of projects above a certain size. This requirement is not part of the statutory system but can be written into development plans. Despite this, however, this review did not identify any citations that report these appraisals.

There are also no relevant evaluations of other forms of health-related assessments such as social impact assessment, equality impact assessment, or integrated assessment.

Summary

There are no studies of sustainability appraisal of projects nor of social impact appraisal, equality impact or integrated assessment.

3.4.4 Outcome summary table: EIA of Non-UK projects in High Income Countries

- Evidence of inclusion O NO evidence of inclusion NR Not reported NA Not applicable UC Unclear

		Process outcomes				Specific health outcomes considered							Significant finding comments
Author, Year, Country	Topic	Health outcomes considered	Health recommendations incorporated	Evidence of implementation	Post development evidence	PA [12]	MW [13]	EHI [14]	UI [15]	O [16]	Quality score	External validity score	
Noble, (2005). Canada	EIA undertaken on 3 proposed locations for a uranium mine, in northern Saskatchwan - 1**)** Rabbit Lake Eagle Point extension	●	NR	NR	●	O	O	●	NR	NR	+	+	EIA focused mainly on physical health and health risks from radiation exposure. Health and Safety monitoring found to be inadequate.
Noble, (2005). Canada	EIA undertaken on 3 proposed locations for a uranium	●	NR	NR	UC	O	●	●	NR	●	+	+	Difficulties were identified in establishing a causal link between the project and social and health impacts.

[12] PA-Physical Activity
[13] MW- Mental Wellbeing
[14] EHI- Environmental health impact
[15] UI- Unintentional Injury
[16] O- Other

	mine, in northern Saskatchwan 2) Cluff Lake												
Noble, (2005). Canada	EIA undertaken on 3 proposed locations for a uranium mine, in northern Saskatchwan 3) McArthur river	●	NR	NR	O	O	●	●	O	●	+	+	EIS included broad determinants of health, and a health based monitoring and assessment programme was established.
Noble, (2005). Canada	Northwest territories diamond mine	●	●	NR	O	O	●	UC	●	●	+	+	Monitoring partnership established between project proponents & government. Assessed the effects of health & safety of the population, and on social indicators of deprivation.
Noble, (2005). Canada	Voisey's mine/mill for production of mineral concentrates	●	O	NR	O	O	●	●	NR	●	+	+	A comprehensive EIA, including health impacts on native North American populations. The outcomes focused on potential improvements as a result of the development. No serious impacts identified, and no remedial action. Incorporated consideration of gender issues.

3.4.4 Evidence Statement 4: EIA of Non-UK projects in High Income countries

Studies and their context

One citation was identified that reported five case studies from a single country: Canada (Nobel, 2005). The case studies examine EIAs related to the following proposals and are all in northern Canada (north of the southern limit of the discontinuous permafrost):

- Extension of a uranium mine at Rabbit Lake – Eagle Point Extension
- Uranium mine at Cluff Lake
- Uranium mine at McArthur River
- Diamond mine at Northwest Territories
- Nickel mine and mill at Voisey's Bay.

EIA in Canada was formally enacted in 1973 by the federal Environmental Assessment Review Process, which was replaced by the Canadian Environmental Assessment Act (as revised) in 2003. Responsibility for EIA is shared between the federal government and each of the provinces and territories. The federal EIA process is triggered when a proposed project will potentially affect an area of federal responsibility, or involves federal support, or is likely to cause trans-boundary impacts. EIA north of 60° latitude is under federal jurisdiction but in concert with various laws and regulations of the territorial governments (Nobel, 2005).

The case study proposals are all high profile large projects (described as 'mega-projects' by the author), and the populations affected are hunter-gathering communities living in remote, sparsely populated areas that have had significant mining activity allowed in the last 50 years, often it would appear, to the detriment of the indigenous people, such that social order and physical health are affected. The five case studies relate to projects and appraisals undertaken between approximately 1993 and 2004.

Strength of the evidence

There is moderate evidence of the impact of EIA on health issues in the planning process from five case studies (Nobel, 2005 [+]).

The citation did not clearly report whether incorporation of health into the EIA process made a difference to the outcome of the appraisal in the individual case studies

Impacts

Process outcomes

All five case studies considered health outcomes. Only one (Northwest Territories Diamond mine) was reported to have incorporated EIA health recommendations (physical health, social and cultural traditions and land use patterns) into the case study proposal.

None of the case studies reported evidence that the EIA health recommendations had been implemented, although the report of the Northwest Territories Diamond mine stated that the developer was committed to responding to the recommendations.

Two case studies reported the use of monitoring programmes following the EIA:

- Rabbit Lake mine extension project: continuation of an existing monitoring programme by the owner of the mine was heavily criticised by the EIA panel for poor quality data collection regarding radio-nuclides and trace elements in fish, a major dietary component of the indigenous community.

- Northwest Territories: health recommendations incorporated in commitments to a raft of community training, programmes and liaison groups, together with setting up a monitoring partnership for data collection for a number of social health and wellness indicators; there is no indication given however whether that monitoring led to mitigation, even if it was deemed to be necessary.

Health outcomes

The health outcomes explored in the case studies generally focused on physical health related directly to the mining activity, and also to social concerns related to influx of population (disease, drugs and alcohol misuse, and cultural change) on a population with existing social problems:

- 2 case studies (Rabbit Lake, Cluff Lake) identified the adverse environmental health implications of radiation and other contaminants on the human and animal health (of hunting and fishing stocks);
- 4 case studies (all but Rabbit Lake) identified the mental wellbeing issues related to new population influx and cultural change;
- 1 case study expressly examined impacts on women's inequalities (Voisey's Bay), including, disruption to marriage, increased responsibility in the home, employment opportunities, sexual harassment in the workplace;
- 1 case study EIA also examined broader social determinants of health (McArthur River) and included employment, income, education, housing, environment, lifestyle and traditional land use activities.
- 1 case study (Northwest Territories' diamond mine) used public statistics on injuries and suicide rates to monitor the effects of the mine development.
- None of the case studies reported consideration of physical activity as a health outcome

Applicability

The evidence from these case studies is only partially applicable to a UK population. The ability to generalise is limited because, whilst some health issues might be shared (e.g. contamination or population influx) the impacts on remote, sparsely populated areas inhabited by hunter gathering communities will not be.

Each of the five case studies is similar and whilst they can be considered a representative sample of their type when taken together, it is unlikely that they are representative of Canadian or high income countries' EIA in general. Nevertheless, with these reservations in mind, they do provide some limited examples of good practice for future reviews.

Summary

This single citation, related to the health impact of EIAs conducted in remote areas of Canada, provides only weak evidence that health is being incorporated into EIA in this country. No evidence was identified of the impact of EIA in other non-UK high income countries.

There is also only weak to moderate evidence (just two out of five case studies) that health recommendations were taken into account in the proposals, despite a statutory requirement in Canada for EIA to be reviewed by a panel of independent experts who then go on to make recommendations for impact mitigation, and only weak (and not explicit) evidence that these proposals were implemented.

3.4.5 Outcome summary table: HIA of Non-UK projects in High Income Countries

- Evidence of inclusion O NO evidence of inclusion NR Not reported NA Not applicable UC Unclear

		Process outcomes				Specific health outcomes considered							Significant finding comments
Author, Year, Country	Topic	Health outcomes considered	Health recommendations incorporated	Evidence of implementation	Post development evidence	PA [17]	MW [18]	EHI [19]	UI [20]	O [21]	Quality score	External validity score	
Bekker, (2005). Netherlands	Municipal reconstruction project	●	●	NR	NR	●	●	●	●	●	+	++	Recommendations informed the optimisation of the project: specifically: Relocation of housing
	1) Trinity Plaza Housing Redevelopment. San Francisco	●	●	●	NR	O	●	O	O	●	+	+	Developer required to provide replacement rent controlled housing
Dannenberg, (2008). USA	2). Executive Park, San Francisco	●	UC	O	NR	O	O	O	O	●	+	+	HIA recommendations to improve, transport, access and goods and services recommended. At 2007, under review.
Dannenberg, (2008).	OAK TO 9TH Avenue, Oakland	●	O	O	NR	●	●	●	●	●	+	+	Recommendations to implement traffic calming, speed limits & air quality improvement. Project approved without consideration or mitigation

[17] PA-Physical Activity
[18] MW- Mental Wellbeing
[19] EHI- Environmental health impact
[20] UI- Unintentional Injury
[21] O- Other

USA	California. Mixed use development on former industrial site												of health impacts.
Dannenberg, (2008). USA	MacArthur BART Transit Village, Oakland California	●	O (project on hold)	O	UC	●	●	●	●	●	+	+	Health outcomes related to affordable housing, social capacity & cohesion, open space, and sustainable transport & storage considered. No outcome reported.
Dannenberg, (2008). USA	Jack London Gateway senior housing project. New housing & retail.	●	●	NR	NR	●	O	●	●	●	+	+	Recommendations for improved internal & external air & noise quality. Pedestrian friendly environment & improved transport. HIA team & stakeholder group engaged. Final decisions pending.
Dannenberg, (2008). USA	East Bay Greenway- 12 miles of cycle/pedestrian walkways.	●	NR	NR	NR	●	O	●	●	O	+	+	Design optimized to reduce injury risk, and incorporate public safety measures to reduce crime.
Dannenberg, (2008). USA	Greyfield highway redevelopment.	●	NR	NR	NR	●	O	O	●	●	+	+	Recommendations- made but unknown outcome, other than establishment of cross governmental dialogue on health issues.
Dannenberg, (2008). USA	Farmers market & public space, Trenton.	●	O	O	NR	●	●	O	O	●	+	+	Decision makers showed minimal interest in findings and recommendations.
Dannenberg, (2008). USA	Beltline transit trails and parks project. Brown/grey field redevelopment.	●	NR	NR	NR	●	●	●	●	O	+	+	Demand for faster implementation of health benefits. Add health expert to advisory board. More recreational space and affordable housing.
Dannenberg, (2008). USA	Taylor Energy Centre- New coal fired power plant.	●	●	NR	NR	O	O	●	●	●	+	+	Development authority accepted HIA recommendations, project suspended due to co2 emissions

Dannenberg, (2008). USA	Artic outer continental shelf oil & gas leasing program	●	NR	NR	NR	O	●	●	O	●	+	+	Commitment to develop mew health-related mitigation measures at the lease sale stage.
Dannenberg, (2008). USA	Chukcho sea oil and gas lease sale & seismic surveying.	●	NR	NR	NR	O	O	●	O	●	+	+	Anticipated health mitigation measures at the project permitting stage.
Dannenberg, (2008). USA	Lowry Corridor Project, redevelopment of run down urban corridor with mixed use development	●	●	●	NR	●	O	O	●	O	+	+	HIA enabled funding for countdown timers on roads, bike racks & features to encourage pedestrian traffic
Dannenberg, (2008). USA	Derby redevelopment - master plan, zoning cordinance & design guidelines.	●	●	NR	NR	●	●	O	O	●	+	+	City council approved Derby sub-area master plan, re-zoning ordinance & design guidelines.

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3.4.5 Evidence Statement 5: HIA of Non-UK projects in High Income countries

Studies and their context

Two citations were identified that report 15 relevant case studies in two countries:

Dannenberg, 2008 (USA)

- Trinity Plaza, San Francisco, replacement of rent controlled with market condominiums, California
- Executive Park, San Francisco, 2,800 neighbourhood with mixed use waterfront development, California
- Oak to 9th Avenue, project for mixed use neighbourhood on previously developed land, California
- MacArthur BART, mixed use project on transit parking area, California
- Jack London Gateway, 54 units of senior, low income housing and retail, California
- East bay, a greenway of 12 miles of walking/cycling paths under elevated rail tracks, California
- Greyfield redevelopment and changed priority uses for road corridor, Atlanta
- Farmers market renovation and public open space, New Jersey
- Beltline transit, trails and parks project, Atlanta
- Taylor Energy Centre, coal fired power plant, Florida
- Arctic Outer Continental Shelf leasing programme, Alaska
- Chukchi Sea Oil & Gas Lease sale & surveying activity, Alaska
- Lowry project for redevelopment of blighted urban corridor into mixed use, pedestrian friendly area, Minnesota
- Derby redevelopment, including community redevelopment project, Connecticut

Bekker, 2005 (Netherlands):

- Major municipal reconstruction into mixed use development.

The case studies were completed between 1999 and 2007.

Strength of the Evidence

The evidence from both papers is moderate [+]; both used independent sources and new primary data (e.g. interviews) and general conclusions were reached.

The case studies reported by Dannenberg (2008) are frequently incomplete; lacking adequate reporting of the outcomes of the HIA process.

Both papers evaluated the effectiveness of the HIA process, but neither found strong evidence of it, with one (Dannenberg, 2008) finding partial evidence, and the other (Bekker, 2005) finding no real evidence at all.

Impacts

Process outcomes

Six out of 15 case studies reported that health recommendations were incorporated into proposals (Trinity Plaza, Jack London Gateway, Taylor energy centre, Lowry Corridor project, Derby redevelopment (Dannenberg 2008) and Netherlands municipal reconstruction (Bekker, 2005). Two of the USA projects resulted in recommendations being implemented into the developments; Trinity Plaza (Dannenberg 2008) where replacement affordable housing was provided, and Lowry Corridor project (Dannenberg 2008) where the HIA resulted in funding for countdown timers at key road intersections, bike racks at key public buildings and markers(e.g. signage) to encourage pedestrian traffic. The recommendations from the Netherlands reconstruction project (Bekker, 2005) resulted in relocation of the housing element of the proposal to an area where the “environmental burden” was reduced.

The Oak to 9th Avenue project in California is reported to have been approved without consideration or mitigation of health impacts identified through the HIA (Dannenberg, 2008)

Bekker (2005) suggest that the HIA as it was used in the Netherlands' situation, was unwieldy in that major mixed use development context, was not supported by health professionals and only focused on negative environmental health impacts.

Health outcomes

The case studies covered all the four specific health outcomes (10 covered physical activity; 8 covered mental wellbeing; 9 covered environmental issues; 12 covered unintentional injury; and 12 covered other health outcomes), with Oak to 9th Avenue, and MacArthur BART Transit Village, both in Oakland, California, and the Netherlands project HIAs dealing with all the four specified issues, plus others. Other case studies had more discrete health concerns, for example Trinity Plaza (housing adequacy, affordability, social cohesion, residential displacement and segregation) and Executive Park (improving transport accessibility, access to goods and services), both San Francisco.

The types of physical activity outcomes reported in 10 HIA case studies included, for example, public walking routes, access to parks and green space, cycle parking and cycle route integration). Eight case studies reported incorporation of mental wellbeing factors, for example, social cohesion and social capital. Environmental health issues were considered in 9 HIA case studies and included, for example, air and water quality in Alaskan oil and gas developments, or environmental noise in a mixed use urban development. Unintentional injury was considered in 12 case studies, for example road design changes to promote pedestrian and cyclist safety, pedestrian level lighting, and driver speed feedback signs and increased security to reduce community violence. Other health considerations included, for example, food insecurity due to increased rents, access to goods and services, open spaces, sociocultural disturbances and access to alcohol and drugs.

It is reported by Dannenberg (2008) that HIA raised awareness of health issues amongst decision-makers and that important relationships between HIA practitioners and decision-makers may be the most important outcomes from most of the case studies reviewed.

There is evidence that health outcomes are being considered at the appraisal stage which appear to relate well to the effected populations' characteristics in these case studies, however there is weaker evidence that HIA is influencing planning process outcomes.

Applicability

This evidence is directly applicable to the UK both in population, and setting. The process of conducting HIA in these settings appears to have some similarities with the current UK processes.

Summary

These 15 case studies indicate the ability of HIA to identify health issues, however there is limited evidence that planning processes are influenced by the health recommendations made.

3.4.6 Outcome summary table: Integrated appraisal of Non-UK projects in High Income countries

- Evidence of inclusion O NO evidence of inclusion NR Not reported NA Not applicable UC Unclear

		Process outcomes				Specific health outcomes considered							
Author, Year, Country	Topic	Health outcomes considered	Health recommendations incorporated	Evidence of implementation	Post development evidence	PA [22]	MW [23]	EHI [24]	UI [25]	O [26]	Quality score	External validity score	Significant finding comments
Bhatia, (2008) USA	Urban rezoning affordabke housing, San Francisco, HIA to influence EIA.	●	●	●	●	O	●	O	O	●	+	++	Officials revised the project scope to include impacts of displacement on health. Impacts were mitigated in the revisions. Affordable housing proportion of new development agreed.
Bhatia, (2008) USA	A series of oil & gas developments , North Slope Inupiat communities,	●	●	●	●	O	●	O	O	●	+	++	Agreement to address new health-focused mitigation at lease-sale stage. EIS to include mitigation measures, plus monitoring of health indicators and mitigate where needed.

[22] PA-Physical Activity
[23] MW- Mental Wellbeing
[24] EHI- Environmental health impact
[25] UI- Unintentional Injury
[26] O- Other

	Alaska. HIA to influence EIA												
Corburn (2007). USA	Redevelopment of apartments- with associated eviction of low income families, and the loss of affordable housing	●	●	●	NR	NR	●	NR	NR	●	+	++	Developers modified the final project, to guarantee tenants could remain in the new building, in rent-controlled units.
Corburn (2007). USA	Rincon Hill condominium- new development	●	●	●	NR	NR	●	NR	NR	●	+	++	Developers increased proportion of affordable housing.
Frannsen, (2002). Netherlands	5th new runway and terminal proposal, Schipol Airport.	●	UC	UC	UC	UC	●	●	UC	O	+	+	Overseeing committee endorsed the HIA recommendations. Evidence of their implementation not reported.
Kjellstrom, (2003) Australia	HIA and EIA undertaken on new road project Australia	●	●	O	●	O	O	O	●	O	+	+	HIA concluded the construction of the motorway would have a net benefit for health, due to reduced traffic crash injuries, and reduction in environmental health impacts on existing routes. No data available to support a comparative study.
Kwiatkowski (2003). Canada.	EIA and HIA, undertaken as an integrated appraisal on the development of a diamond mine	●	●	●	●	O	●	●	●	●	+	++	29 recommendations were accepted and implemented. Health effects were recognized as being largely predictable, and thus easily mitigated. Less predictable impacts were monitored under an Environmental Management Plan.
Taylor, (2003). New Zealand	SIA with included HIA, undertaken on planned out of	●	●	●	O	●	●	●	NR	●	+	+	Planning decision consented with an EIA, overturned due to negative social and health impacts highlighted by community led SIA/HIA investigation.

	town shopping centre.												
Viinikainen, (2007). Finland	Bypass to enable the upgrade if an existing European route to St. Petersburg.	●	●	●	O	●	O	●	●	●	+	+	Irreplaceable local knowledge gained and people affected numerous decisions.
Wismar, (2007). Sweden	Stockholm to port of Nynashamn road upgrade/ realignment	●	●	●	●	●	●	●	●	●	+	++	Complementary HIA health issues influenced decision on options, and changes were made to the overall proposal. Equity issues acknowledged.
Wismar, (2007). Germany	New airport, Berlin.	●	●	●	●	●	●	●	●	●	+	++	Change in air traffic restrictions to benefit health. Enables mobilization of community bodies.

3.4.6 Evidence Statement 6: Integrated appraisal of Non-UK projects in High Income countries

Studies identified

The review level evidence presented here consists of 8 citations reporting 11 case studies:

- Franssen (2002) 5th runway at Schipol airport, Netherlands
- Kjellstrom (2003) Road construction, Australia
- Kwiatkowski (2003) Diamond mine development, Canada
- Taylor (2003) Retail centre development, New Zealand
- Corburn (2007)
    - Urban housing redevelopment, USA
    - New housing development, USA
- Viikainen (2007) Road bypass and realignment, Finland
- Wismar (2007)
    - Upgrade and realignment of road, Sweden
    - Airport development, Germany
- Bhatia (2008)
    - Urban rezoning project, San Francisco, USA
    - Oil and gas development, Alaska, USA

These 11 case studies include the following appraisal types;

HIAs undertaken in conjunction with, or to inform an EIA either as a mandatory requirement or local agreement (n=8); Franssen (2002), Kjellstrom (2003), Corburn (2007) (2 case studies), Bhatia (2008) (2 case studies) and Wismar (Sweden and Germany case studies)

SIA undertaken in conjunction with an EIA (n=2); Taylor (2003) and Viikainen (2007)

IA within an EIA (n=1); Kwiatkowski (2003)

The breadth of studies included in this evidence does elude to a greater use of complementary health and social based appraisal systems being adopted outside of the UK, in developed countries.

Strength of evidence

All of the citations were given an internal validity score of [+] suggesting moderate level evidence. There were limitations and potential bias in all of the included studies. This reflected the lack of unbiased sampling of case studies, and self reported case study reviews, without external validation.

Impacts

Process outcomes

All the case studies considered health outcomes as part of the appraisal process. All but one (Frannsen, 2002) reported that health recommendations were incorporated into plans following the appraisal process.

Ten of the case studies reported some evidence that health recommendations had been implemented (Frannsen 2002 and Kjellstrom 2003 being the exceptions). The ability to influence the planning process appears to have been largely mediated through an increase in public awareness through improved public engagement. Examples included:

- Public influence on mitigation measures, such as location of pedestrian walkways, road crossing locations, and noise barrier locations, but not on the actual location of the realigned road (Viikainen, 2007).
- Re-alignment of a main arterial route in Sweden, plus specific action to address equity issues (Wismar, 2007).
- Significant changes to air traffic operational hours following public engagement regarding a proposal for a new airport in Berlin, Germany (Wismar, 2007).
- Overturning of a planning application following a community initiated SIA on a proposed out of town shopping centre in New Zealand, that highlighted the intrinsic health benefits of protecting social capital, accessibility and viability of the existing town centre (Taylor, 2003)

- The inclusion of a large proportion of ‘rent controlled’ properties plus monitoring of health indicators and mitigation where needed in housing redevelopment projects (Bhatia 2008, Corborn 2007)

HIA and SIA offer the opportunity to integrate health considerations into planning processes, not usually assessed through traditional EIA (Taylor, 2003). The reported impacts were often easy to predict and thus mitigate, but where this was not feasible, proposals to closely monitor the impacts were incorporated into the project and scheme management under an environmental management plan (Kwiatkowski, 2003).

Frannsen (2002), noted that an overseeing committee had endorsed the HIA recommendations, but that there was no evidence of implementation.

Health outcomes

The specified health outcomes of physical activity, mental well being, environmental health impacts and unintentional injury were all reported to have been considered in two of the case studies reported by Wismar (2007) (Sweden and Germany). In addition:

- Physical activity health outcomes were also considered in case studies by Taylor (2003) and Viikainen (2007)
- Mental wellbeing health outcomes were also considered in case studies by Bhatia (2008) (both the urban rezoning project and the oil and gas development), by Corborn (2007) (both housing developments), Frannsen (2002), Kwiatkowski (2003) and Taylor (2003).
- Environmental health outcomes were also considered by Frannsen (2002), Kwiatkowski (2003), Taylor (2003), Viikainen (2007) and Kjellstrom (2003)
- Unintentional injury outcomes were also considered by Kwiatkowski (2003), Viikainen (2007) and Kjellstrom (2003)

Applicability

Two of the citations were given an external validity score of ++ (Wismar (2007), Corburn (2007), and Bhatia (2008) as being directly applicable to the UK population and setting. The remainder of the studies were considered partially applicable, except for Kwiatowski (2003) which was the least applicable as it related to rural, isolated aboriginal communities affected by a mine proposal.

The applicability of the use of the methods to the UK context can be summarised as being valuable, as many of the case studies, with the exception of a few, were extracted from similar project types to those likely to be found in the UK context.

Summary

Two types of integrated appraisal are evident from the eight citations and twelve case studies examined: the combination of EIA and HIA on the one hand, and EIA and SIA on the other. All the studies qualify for only a moderate ranking for internal validity, but there is reasonably consistent evidence that the health agenda is addressed, and the health recommendations are incorporated in the proposals. The nature of impact ranged from simply monitoring possible effects, through mitigation to withdrawal of the application. The involvement of community interests was often an influential factor. In terms of the range of health issues addressed, the least frequently addressed (in only a minority of cases) was physical activity.

3.4.7 Outcome summary table: EIA of Non-UK projects in Low / Middle Income countries

• Evidence of inclusion O NO evidence of inclusion NR Not reported NA Not applicable UC Unclear

		Process outcomes				Specific health outcomes considered							Significant finding comments
Author, Year, Country	Topic	Health outcomes considered	Health recommendations incorporated	Evidence of implementation	Post development evidence	PA [27]	MW [28]	EHI [29]	UI [30]	O [31]	Quality score	External validity score	
Bond, (2001). Mali, Senegal & Mauritania	Retrofitting of hydropower facility at an existing dam	●	●	●	O	O	●	O	O	●	+	+	Some health impacts retrospectively compensated for under the new proposal, such as increased disease. Social benefits of the project on the whole were deemed higher than the loss of agriculture to flooding.
Gomez-Balandra, (2002), Mexico.	EIA for a dam and subsequent reservoir construction.	●	●	●	●	O	●	O	O	●	+	+	Public consultation established early. Mitigation measures = 9.8% of the budget. Significant compensation & mitigation awarded, whole community relocated which would have clear health consequences as well.
Mwalyosi, (1998). Tanzania	Construction of the Moshi Pesticide plant producing	●	O	O	O	O	O	O	O	O	++	+	No recommendation because of lack of funds. EIA process did not involve significant levels of stakeholder involvement.

[27] PA-Physical Activity
[28] MW- Mental Wellbeing
[29] EHI- Environmental health impact
[30] UI- Unintentional Injury
[31] O- Other

	3000 tonnes of fungicide												
Mwalyosi, (1998). Tanzania	Commercial graphite and tanzanite mining operation and processing plant	●	NR	O	O	O	O	●	O	O	++	+	EIA met African Development Bank requirements to release financing. EIA had no impact on siting, design and operation of project Some non-health recommendations implemented: but others not and no monitoring
Mwalyosi, (1998). Tanzania	Pangani Falls development of hydropower station	●	NR	NR	●	NR	NR	NR	NR	NR	++	+	EIA recommended some mitigation measures but no significant influence of EIA on decision-making because: -EIA carried out too late -No integration between project design and EIA
Mwalyosi, (1998). Tanzania	Tourist development including an incinerator	●	●	O	NR	NR	NR	●	NR	O	++	+	Key EIS recommendation of integration of adequate liquid waste treatment facilities into project design had not been implemented at time of evaluation.
Mwalyosi, (1998). Tanzania	Tourist development including siting the generator and incinerator close to staff and visitor accommodation	●	O	O	●	NR	NR	●	NR	O	++	+	EIA effect on project planning was marginal Compliance with recommendations: poor
Pena Alid, (2002). Chile	EIA undertaken in a pulp mill adjacent to an environmentally wetland and river.	●	●	●	●	O	O	O	O	O	+	+	The applicant set up a sulphur dioxide monitoring system. Specific detail of the beneficiaries (human or RAMSAR wetland site) is unreported.
Shoobridge, (2002), Peru	EIA on Camisea gas plant and pipeline, to the coast and	●	●	O	O	O	●	●	O	●	+	+	Significant public consultation achieved. HIA recommendations on 8 key areas implemented into the plan

	fractioning plant and marine terminal.												
Tullos, (2009). China	EIA, on the damning of the 3 gorges to develop hydro power	●	NR	NR	NR	NR	NR	NR	NR	●	+	++	The impact of pollution on fish stock was considered. However, the actual consequences of ingestion by humans were not. The EIA project gained approval, as “environmental issues do not affect the feasibility of the project”

3.4.7 Evidence Statement 7: EIA of Non-UK projects in Low and Middle Income countries

Studies and their context

This review identified 6 citations reporting 10 case studies across 8 countries;

- Mwalyosi (1998)
    - Construction of a pesticide plant (Tanzania)
    - Graphite and tanzanite mine (Tanzania)
    - Hydropower station at Pangani Falls (Tanzania)
    - Tourist development 1 including incinerator (Tanzania)
    - Tourist development 2 including generator and incinerator (Tanzania)
- Bond (2001) Retrofitting of hydroelectric dam (Mali / Senegal / Mauritania)
- Gomez-Balandra (2002) Dam development for irrigation project (Mexico)
- Pena Alid (2002) Pulp mill development on Cruces river (Chile)
- Shoobridge (2002) Gas plant with pipeline and marine terminal (Peru)
- Tullos (2009) Three Gorges Dam Project (China)

All the projects covered commercial activities (mining, tourism, pesticides production, milling) and energy production and supply (hydroelectricity and gas) and there was no study reporting on projects linked to urban development. All projects were in rural settings. The scale of the projects varied greatly (from construction of a plant (Mwalyosi, 1998) to damming of 3 Gorges (Tullos, 2009). The populations covered and potentially affected by the projects were very varied both in size (from 25,000 (Mwalyosi, 1998) to 1.2 million (Tullos, 2009)) and characteristics (workers (plants, tourism industry), tourists, local communities / villages and indigenous groups).

The use of EIA in these countries varied, both in the duration of time that EIA processes had been in place and by the national regulatory framework supporting them. The five projects in Tanzania were developed before the national framework and legislation for EIA was adopted, and consequently varied in duration (e.g. one was conducted in 21 days) and content (e.g. one included no scoping). Similarly,

Chile lacked regulations for consistent EIA procedures at the time of the pulp mill development project and only a narrow assessment was undertaken. In contrast Mali, Peru, Mexico and China had some degree of EIA process and regulation in place at the time of project development. Regulation varied in strength (e.g. Chinese law did not require completion of EIA prior to project construction).

Strength of evidence

All citations used case study designs to evaluate the impact of EIA on the planning process. There was strong evidence from one citation (Mwalyosi, 1998 [++]) that the EIA had made no impact on the planning decision making process itself, despite making recommendations for mitigation measures in 4 of the 5 case studies. There was evidence that the EIA had a significant effect on decision making in 5 citations (Bond, 2001 [+]; Gomez-Blandra, 2002 [+]; Pena Alid, 2002 [+]; Shoobridge, 2002 [+]; Tullos, 2009 [+]), most notably the Mexico Dam project (Gomez-Blandra, 2002 [+]), but marginal or nil impact in most cases. There is no evidence post development of actual health impact.

Impacts

Process outcomes

Reporting of process outcomes was variable across the 9 case studies and frequently incomplete. All 9 reported that health outcomes were considered in the EIA process, though only five resulted in health recommendations being incorporated into the project plan (Mwalyosi 1998 (tourist development plus incinerator project only), Bond 2001, Gomez-Balandra 2002, Pena Alid 2002 and Shoobridge 2002). Two case studies reported that the health recommendations resulted in changes to the project or its delivery; In Mali health impacts of a hydroelectric dam project were retrospectively compensated for after the EIA (Bond, 2001); in Mexico, the EIA resulted in 9.8% of the budget being identified for mitigation measures (Gomez-Balandra, 2002).

None of the case studies reported that a project was rejected following the EIA because of the level of impact on environment and human health. The effect of the

health recommendations made following the EIA on the gas plant project in Peru (Shoobridge, 2002) are not known due the project being deemed unviable prior to construction. Community participation in the EIA to discuss health impacts varied considerably between projects between minimal consultation (Mwalyosi, 1998) to comprehensive engagement with indigenous communities (Shoobridge, 2002)

Health outcomes

None of the case studies reported outcomes specifically related to physical activity or unintentional injury. Three case studies considered the aspects of mental health and wellbeing of the communities affected by the projects including positive benefits to socio-economic wellbeing (Bond, 2001), negative effects due to loss of community values and customs (Gomez-Balandra, 2002) and mixed effects on community wellbeing (Shoobridge, 2001). Three case studies considered negative impacts of environmental changes, relating to land contamination due to graphite mining (Mwalyosi, 1998), air pollution from a generator (Mwalyosi, 1998) and noise impacts of a generator in a further project (Mwalyosi, 1998)

The scope of the EIAs varied between case studies. Some were very narrow in scope, focussing only on the direct impact at the project site (e.g. Pangani Falls project, Mwalyosi, 1998) or offered no analysis of impacts of alternative options (e.g. Tourist development 2, Mwalyosi, 1998). Two EIAs were broad in scope (Gomez-Balandra, 2002 and Shoobridge, 2002) considering many potential environmental and health impacts. This breadth may have been prompted by the legal requirements as both Peru and Mexico had already a EIA regulation at the time of project development. However, the broad scope for EIAs does not ensure that the EIA will have any impact on the actual outcomes of the planning process, nor on the actual health outcomes.

Applicability

The evidence is largely not applicable to the UK setting. The case studies identified report projects in low and middle income countries, often in rural and quite isolated areas and with highly disadvantaged communities. The potential benefit for such highly disadvantaged populations from such projects may be greater than for

populations in the UK. The projects cover developments in the heavy industrial / extraction / energy sources sectors, i.e. sectors less frequently developed in the post-industrial English setting. From a political perspective, it is difficult to draw lessons from countries where the regime might be far from the Parliamentary democracy of the UK and where good governance might still not necessarily include clear equity and environmental standards in view of the more urgent needs for economic growth. The UK has an established framework for EIA in contrast to some countries reported here where EIA was non-statuary at the time of the project development. The cases highlight the importance of starting the EIA process early, in parallel with project planning.

Summary

There are six citations reporting on ten case studies across eight different countries. The case studies are all concerned with infrastructure and industrial projects in rural areas, and probably have limited relevance to the UK situation. Some of the countries had EIA as a legal obligation at the time of the studies, but others did not. Partly as a result, there is a wide variation in the quality of the EIAs and the degree to which they have influenced decisions. Some (particularly those in Tanzania) had apparently no impact, while in countries such as Peru and Mexico, the scope of the EIA was broader and mitigation was evident. The scope of health concern is not fully reported in some of the citations. Physical activity and accidents are not discussed at all, but mental/social wellbeing and environmental health do feature.

3.4.8 Outcome summary table: HIA of Non-UK projects in Low / Middle Income countries

- Evidence of inclusion O NO evidence of inclusion NR Not reported NA Not applicable UC Unclear

		Process outcomes				Specific health outcomes considered							
Author, Year, Country	Topic	Health outcomes considered	Health recommendations incorporated	Evidence of implementation	Post development evidence	PA [32]	MW [33]	EHI [34]	UI [35]	O [36]	Quality score	External validity score	Significant finding comments
Kosa, (2007). Hungary.	HIA undertaken on two options to resettle a Roma community inhabiting a squat.	●	●	●	O	NR	●	●	●	●	+	+	HIA facilitated the delay of the community's eviction, and allowed the establishment of a consortium with this hard to reach group, to address serious housing issues facing the community. Under ordinary EIA, the community would have been evicted to the greater detriment of their health.
Wismar, (2007). Lithuania	Klaipeda national Seaport, Lithuania. Railway extension, ne road & buildings for seaport expansion,	●	●	●	O	O	O	●	O	O	+	++	HIA in Lithuania is statutory. Here it was implemented too late to affect reconstruction decisions. Mitigation measures were established for noise impacts. Limited community participation.

[32] PA-Physical Activity
[33] MW- Mental Wellbeing
[34] EHI- Environmental health impact
[35] UI- Unintentional Injury
[36] O- Other

3.4.8 Evidence Statement 8: HIA of Non-UK projects in Low and Middle Income countries

Studies and their context

This review identified 2 citations each reporting a two case studies from Non-UK European middle income countries;

- Kosa (1998) – housing options for a Roma community squatting in a government building (eviction versus designing a housing development for the community) (Hungary)
- Wismar (2007 – Seaport development with associated road and rail infrastructure expansion (Lithuania)

The case studies therefore differed significantly in scale, setting and scope.

Strength of evidence

Both citations were considered to provide moderate level evidence, having been given internal validity scores [+].

In Lithuania there has been an obligatory requirement for HIA since 2004 for planned economic developments where there is a significant potential for negative impacts. The strategic plan for such developments is required to consider environmental, economic, health, social and cultural impacts.
In Hungary, at the time of the case study, there was a statutory requirement for EIA, but none for HIA.

Impacts

Process outcomes

Both of the case studies reported that the HIA made recommendations relating to health and that these were implemented following the appraisal process. For the Roma community in Hungary, the HIA recommended that the community should not be evicted as this would only exacerbate their existing poor health. The community

have been allowed to stay in their existing accommodation whilst a consortium to address the housing needs of the consortium identifies viable alternative accommodation. The undertaking of an the HIA ensured that the communities welfare, including their mental and social wellbeing was set above that based on the more measureable impacts such as water, air quality and sanitation. Had an EIA appraisal only been undertaken, the result was reported to have been the likely eviction of the community (Kosa, 1998). In Lithuania the HIA resulted in the building of acoustic shields and road redesign away from housing (Wismar, 2007).

Health outcomes

The Roma Community housing HIA identified multiple health outcomes, specifically; deterioration of mental health and increased injury risk with eviction, plus improved nutrition, and reduced respiratory and gastrointestinal illness with appropriate rehousing. Re-housing would also result in improved indoor air quality and reduced damp accommodation (Kosa, 1998). In Lithuania the health issue specifically considered related to noise pollution and the detrimental effects of noise on the local community (Wismar, 2007).

Equity issues were implicit in the study by Kosa, recognising the potential disadvantages of eviction that would compound the existing impoverished circumstances of the community (Kosa 1998). The study by Wismar (2007) reported not to have considered equity issues.

Applicability

The study by Kosa (1998) was given an external validity score [+], whilst that of Wismar (2007) [++]. Appraisal of housing options for travelling communities and of seaport developments are likely in the UK and therefore these case studies could be considered partially applicable to the UK setting.

Summary

There is very little evidence in relation to HIA in low/middle income countries – one a seaport development in Lithuania, the other a Roma community in

Hungary. The former reflects a statutory HIA obligation while in the latter case there is none. However, in both cases there were positive health effects, in terms of noise mitigation of port activities, and the provision of accommodation for a marginalised community on the other. The conclusion of the Hungarian case study was that the HIA encouraged the proper consideration of equity, mental and social well-being in a way that would not have occurred otherwise.

3.4.9: Outcome summary table: Integrated appraisal of Non-UK projects in Low / Middle Income countries

- Evidence of inclusion O NO evidence of inclusion NR Not reported NA Not applicable UC Unclear

		Process outcomes				Specific health outcomes considered							
Author, Year, Country	Topic	Health outcomes considered	Health recommendations incorporated	Evidence of implementation	Post development evidence	PA [37]	MW [38]	EHI [39]	UI [40]	O [41]	Quality score	External validity score	Significant finding comments
Jobin, (2003). Chad and Cameroon	Oil well, and pipeline development	●	●	●(partly)	●	O	O	O	●	●	+	+	H&S recommendations implemented for workers, malaria prevention programme, and increased sexual health education. Change of overnight policy (to reduce STI) for drivers abandoned on economic grounds.
Utzinger, (2005). Chad and Cameroon	Oil well, and pipeline development	●	●	●	●	NR	●	NR	●	●	++	++	Health & safety recommendations for the workers , were implemented. In addition to an extensive malaria protection programme, and education on sexual health. Industry wide recommendations were adopted as a result of the HIA.

[37] PA-Physical Activity
[38] MW- Mental Wellbeing
[39] EHI- Environmental health impact
[40] UI- Unintentional Injury
[41] O- Other

3.4.9 Evidence Statement 9: Integrated appraisal of Non-UK projects in Low and Middle Income countries

Studies and their context

This review identified 2 citations; Jobin (2003) and Utzinger (2005). Both papers appraise the same project; a large oil extraction and pipeline project spanning the sub-Saharan countries of Chad and Cameroon, and funded by the World Bank. The populations considered in the appraisal, were both the workers and the neighbouring settlements.

- Jobin (2003) reported an Environmental, Health and Social impact assessment.
- Utzinger (2005) conducted an EIA plus an HIA explored through a human environment, socioeconomic and public health survey.

Strength of evidence

There was moderate evidence from the Chad-Cameroon case studies of the impact of integrated assessment on health issues in the planning and project implementation process;

- Jobin, (2003) [+] The lead author was one of the World Bank nominated health experts responsible for the recommendations in the HIA and reported the limitations of the process stating '*the international panel of experts appointed by the World Bank Group was largely ignored by the project proponents, and had little success in minimizing the most serious impacts or in improving the social equity of the project'.* Without further qualification of this statement by other objective perspectives, the risk of bias in opinion and subjective reporting of the facts is acknowledged.
- Utzinger, (2005) [++] Interpretation of the impacts of the HIA were based on secondary data, including reports produced by the proponents, therefore risking bias towards the reporting of the more positive aspects of the HIA implementation. The author does report however that *'Health impacts among*

surrounding communities, and cumulative health impacts in the larger region were not considered in a comprehensive way'

Impacts

Process outcomes

The studies reported that the HIA process was effective in making health related recommendations some of which were implemented by the pipeline consortium and subcontractors. The project also put in place measures to collect health information post-development, to monitor progress against predicted health outcomes. For example, Jobin (2003) reported that despite prevention measures, two deaths per year were expected amongst project workers from traffic incidents and three per year from malaria. Surveillance over the first two years of the project reported one traffic accident death and two deaths from malaria.

The project operator (World Bank) articulated the role of social responsibility and accountability as a condition of the corporate licence to operate in the developing world as a result of this project (Utzinger, 2005). This move indicates a direct benefit to the wider implementation of HIA in large infrastructure projects undertaken with corporate funding in less developed countries

Health outcomes

Health outcomes considered in the case study reports included social wellbeing (Utzinger, 2005), environmental health issues (noise) (Jobin, 2003) and unintentional injuries (traffic incidents and occupational injuries) (Jobin 2003 and Utzinger 2005). Neither report stated that physical activity was considered as a health outcome. Both reports highlighted two other health outcomes that were particularly important for the health of the workforce; sexually transmitted diseases (particularly HIV) and malaria (the entire project area was heavily infested with malaria mosquitoes, and the risk of transmission particularly high, especially after the annual rains). Extensive recommendations were made to tackle these issues (e.g. shifts designed to enable workers to return to own homes at night reducing likelihood of use of brothels, implementation of a comprehensive malaria control programme etc). Only some of these recommendations were implemented, e.g. the programme to stop drivers

working shifts with several overnight stopovers being abandoned due to lack of funds and support from the trucking contractors.

The HIA process was heavily criticised in both reports for the focus on the health impacts on the workforce and inadequate consideration of the health of the communities affected by the development. Significant inequity arose as a result of the development (e.g. the workforce had access to modern healthcare facilities which were denied to the local community). A programme of education of the local community on sexual health was proposed, but the papers did not report whether this intervention was implemented.

Applicability

The evidence is not applicable to the UK setting, because the countries in question were particularly poor, and Chad is politically instable. The populations affected by the proposals had particularly low educational attainment, and were susceptible to health impacts such as malaria, which are not prevalent in the UK. Also the health and safety recommendations implemented through this programme would be considered to be standard in the UK.

Summary

There is only case study in this category, a combined EIA/HIA/SIA of oil extraction and pipeline in sub-Saharan Africa - though two citations, with somewhat different perspectives. The general conclusion of both was that despite the requirements of the World Bank the scope of the appraisal was unduly limited and the recommendations by-an-large ignored. The example has little relevance to the UK.

References of included studies in Review 1

(Note: some of the 28 citations are relevant for both Review1 and 2)

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Appendix A: Protocol

Search Protocol

The effectiveness of appraisal processes used in spatial planning to address health issues

PH Programme Guidance	Spatial planning for health
CPHE Collaborating Centre	Spatial Planning for Health Collaborating Centre University of the West of England, Bristol
Collaborating Centre Project manager	Selena Gray Selena.Gray@uwe.ac.uk
CPHE Technical Lead	Amanda Killoran
CPHE Associate Director	Jane Huntley
Collaborating Centre Contact	Helen Lease Helen.Lease@uwe.ac.uk

This search protocol outlines the proposed work to complete reviews 1 and 2 of the Spatial planning for health work programme:

Review 1:

The effectiveness of appraisal processes currently in use to address health and wellbeing during project appraisal

Review 2:

The effectiveness of appraisal processes currently in use to address health and wellbeing during plan appraisal.

Review Team

The reviews covered by this search protocol will be conducted by a team from the Spatial Planning for Health Collaborating Centre, University of the West of England, Bristol. Team members and roles will be:

Selena Gray	Key contact and overall responsibility for delivery of reviews 1 & 2 to NICE
Hugh Barton	Technical lead: Spatial planning for health expertise for reviews 1 & 2
Julie Mytton	Overview of systematic review processes and contributing to conduct of reviews 1 & 2
Jennifer Joynt	Lead researcher for review 1 (Project appraisal)
Helen Lease	Day to day contact and lead researcher for review 2 (Plan appraisal)
Laurence Carmichael	Researcher for reviews 1 and 2
Maggie Black	Information specialist support for reviews 1 & 2

Key deliverables and dates

Draft protocol for reviews 1 & 2	20th November 2009
Final protocol for reviews 1.& 2 agreed	24th November 2009
Draft search strategy for reviews 1 & 2	25th November 2009
Final search strategy for reviews 1 & 2 agreed	1st December 2009
Draft report review 1	28th January 2010
Management meeting review 1	4th February 2010
Final report review 1	15th February 2010
PDG meeting review 1	4th March 2010
Draft report review 2	8th March 2010
Management meeting review 2	18th March 2010
Final report review 2	1st April 2010
PDG meeting review 2	22nd April 2010

Glossary of terms and concepts used in reviews 1 and 2

Spatial planning	For the purposes of this review spatial planning is a process intended to promote sustainable development and is defined as 'going beyond' traditional land use planning to bring together and integrate policies for the development and use of land with other policies and programs which influence the nature of places and how they function
Sustainable development	Is development that meets the needs of the present generation without compromising the needs of future generations (Brundtland, 1987)
Appraisal	Formal processes of assessing plans or projects for their potential positive and negative impacts (e.g. EIA, HIA)
Health	Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity
Project	Specific development proposals requiring spatial planning
Plan	Spatial plan relating to a whole region, city, town or neighbourhood. It can include topic plans (e.g. for transport, housing and air quality)

Questions that will be addressed

Appraisal approaches

Q1 How effective are approaches to appraisal in terms of influencing planning decisions (at the plan and project level) to secure improvements in health and address health inequalities?

Q2 What lessons can be learnt from other countries about the effectiveness of the above approaches?

Equity

Q3 What is the evidence that health equity issues are effectively considered as part of the appraisal of spatial planning decision-making processes?

Search approach and rationale

The search approach taken will be systematic, but the review team acknowledge that the ability to apply the standard methods for the development of NICE public health guidance to a distal determinant of health such as spatial planning may be constrained. Limitations may arise due to the bringing together of two disciplines (spatial planning and health) with differing definitions, evaluative methodologies and levels of evidence of effectiveness available.

The review team propose that the search strategy undertaken for reviews 1 and 2 will be identical and that identification of studies meeting the inclusion criteria for review 1 (project appraisal) and those meeting the inclusion criteria for review 2 (plan appraisal) will be differentiated during the screening of titles and abstracts, and will be facilitated through the use of a screening tool, as recommended by the NICE Technical Lead. The screening tool will be a checklist for the reviewer screening the titles and abstracts to confirm whether the paper does, or does not, meet the inclusion criteria for review 1 (project appraisal) or review 2 (plan appraisal).

Scoping of databases and search terms indicate that searches will need to be primarily sensitive (to identify relevant information) rather than specific (exclusion of irrelevant material) due to the limited use of indexing and coding terms for the subject areas of spatial planning and assessment / appraisal. The review team propose that EMBASE be used to develop the initial search strategy because the early scoping of the databases suggested that although neither Medline nor Embase contains particularly helpful indexing terms for spatial planning, Embase contained more relevant subject headings than Medline. This search strategy will then be adapted for each of the other databases listed, as appropriate. The clinical databases are much more limited in the availability of relevant subject headings than the non-clinical databases, and the latter are likely to allow a greater degree of precision within the search history than in the clinical databases.

Key words and concepts

We anticipate that the search strategy will focus on 2 main concepts:

Concept 1: Appraisal and assessment processes

To include key words / subject headings that cover

Tools: 'Impact assessment' (all types)

'Appraisal' (all types)

Specific policies: Regional spatial strategy

Local development frameworks

Local transport plans

Regeneration strategies

Concept 2: Health outcomes

To include key words / subject headings that cover

Health (broadest definition)

Specific outcomes: Physical Activity

Mental health and wellbeing

Healthy environment (e.g. air quality)

Unintentional injury

Practitioners and communities engagement with health issues

Electronic sources that will be searched

1. Core databases

- EMBASE
- MEDLINE
- HMIC
- PsycINFO
- Cochrane Database of Systematic Reviews
- Cochrane Central Register of Controlled Trials
- Database of Abstracts of Reviews of Effectiveness (DARE)
- Social Science Citation Index

2. Additional databases

- GEOBASE
- PLANEX

- Transport Research Information Systems (TRIS) and / or Transport
- ICONDA
- URBADOC
- CAB Abstracts

3. Websites

We suggest focusing on those websites that directly consider impact assessment. Websites under consideration to search for reports and documents that meet our inclusion criteria include:

- NICE
- HDA publications (via www.nice.org.uk/page.aspx?o=hda.publications)
- UK and Eire Public Health Observatories
- Department for Transport
- Department of Communities and Local Government
- Department for Environment, Food and Rural Affairs (DEFRA)
- Planning Inspectorate
- Royal Town Planning Institute (RTPI)
- Chartered Institute of Environmental Health (CIEH)
- WHO (Healthy Cities)
- Commission for Architecture and the Built Environment (CABE)
- International Association for Impact Assessment
- Resource for Urban Design Information (RUDI)
- ISURV
- Planning Advisory Service
- VicHealth
- International Health Impact Consortium
- American Planning Association
- Town and Country Planning Association
- ICLEI
- Environment Agency
- Natural England
- Scottish HIA Network

Grey literature

Grey literature sources are likely to be particularly valuable as the limited coding and indexing terms for spatial planning and appraisal / assessment may restrict the number of studies identified from electronic databases. Expert and author contacts will be made requesting both (i) articles known to meet our inclusion criteria and (ii) review articles on the value of appraisal / assessment of plans and projects in health improvement. Bibliography lists of such reviews may indicate studies meeting the inclusion criteria.

Follow up of grey literature sources whilst valuable, are time-consuming, and therefore may need to be limited. Grey literature sources will therefore include:

- Bibliography lists of included studies
- Bibliography lists of review articles suggested by experts and authors
- Follow up of references that may meet inclusion criteria suggested by experts and authors in the field

Use of a screening tool

Results of the electronic database searches will be downloaded to a reference management software tool; RefWorks. Within RefWorks the results of each electronic database will be filed separately. Sources that cannot be automatically downloaded will be viewed on screen to identify those that meet the inclusion criteria and these will be manually entered into their own file in RefWorks. Numbers of citations retrieved and excluded from non-downloadable databases will be documented. In RefWorks a duplicates search will be run to allow duplicates to be identified and excluded. Titles and abstracts of de-duplicated citations will be viewed on screen to determine whether or not they meet the inclusion criteria using a screening tool that will determine eligibility for either review 1 or review 2. At this stage articles that may be interesting for the context, methodology, author expertise or relevance to later reviews will also be identified and catalogued.

Inclusion and exclusion criteria

a) Inclusion criteria

5. Population

- The human population affected by the proposed project or plan (reviews 1 & 2)

6. Intervention

- The appraisal or assessment of the impact of the proposed project (review 1) or plan (review 2) on the health of the local population.
- Technologies and tools to conduct such appraisals include but are not limited to; Strategic Environmental Assessment (SEA), Sustainability Appraisal (SA), Environmental Impact Assessment (EIA), Health Impact Assessment (HIA), Sustainability Impact Assessment (SIA), Integrated Appraisal, Social Impact Assessment (SIA), Equity Impact Assessment, Inequality Impact Assessment, (reviews 1 & 2).
- Projects and plans may also be referred to using a variety of other terms including but not limited to; strategies or frameworks, which will specifically include Regional Spatial Strategies, Local Development Frameworks, Local Transport Plans (reviews 1 & 2)

7. Comparison

- No use of the appraisal or assessment process e.g. before and after studies (reviews 1 & 2)
- An alternative appraisal or assessment process e.g. between country studies (reviews 1 & 2)

8. Outcomes

One or more of the following outcomes (reviews 1 & 2)

- Were health outcomes (including health equity issues) considered in the appraisal / assessment process?
- Were any specific recommendations about health outcomes included following appraisal / assessment?

- Were health recommendations acted upon? / Was there any evidence that any of the health recommendations were implemented?
- Was there any evidence of an impact on health? Specifically:
    - Changes in levels of physical activity?
    - Mental health and wellbeing?
    - Environmental issues affecting health (including air, water & noise pollution, contaminated land, waste management)
    - Unintentional injury?
- Knowledge and skills of planners of the importance of health outcomes?
- Was there evidence of participation and engagement of communities / populations / stakeholders in the discussion of health outcomes?

Examples of study types that will be included (reviews 1 & 2)

- Before and after studies
- Ecological studies
- Case-control or case-comparison studies
- Evaluated case reports or case series

Note: The review team considers it unlikely that evidence from study designs towards the top of the hierarchy of evidence (e.g. RCTs, controlled non-randomised trials, etc) will be found

Restrictions on searches

3. Time period

- Studies conducted since 1987 (publication of the Brundtland Report: Our Common Future, by the World Commission on Environment and Development)

4. Language

- No language restrictions will be applied at the search stage of reviews 1 & 2 for electronic database searches.

- We acknowledge that this is contrary to the standard methods for the development of NICE public health guidance but is proposed for two reasons:
    1. The review team is aware of good practice in other countries (principally European and Scandinavian countries) that may not be published in English
    2. To competently answer Q2 it is necessary to include non-English language articles at the search stage to be able to identify potentially valuable papers.
- It is proposed that, as the majority of non-English language articles will include an English translation of the title and abstract, all languages should be included in the electronic database searches to allow quantification of the contribution of non-English literature to the evidence base. Discussion with NICE will determine subsequent decision-making on how to manage / document these non-English language papers e.g an appendix may report the English titles and abstracts of these papers should we chose to exclude them.

Spatial Planning for Health Collaborating Centre
23rd November 2009

Appendix B: Search methodology and strategy

The search strategy applied to electronic databases is detailed below; this strategy was adapted to accommodate searching of the other databases, some of which did not allow the ease or flexibility afforded by Embase.

Embase (1980 to 2009 Week 50)

1	(spatial or structur$ or core or urban$ or rural or municipal$ or town$ or settlement$ or village$ or region$ or sub-region$ or subregion$ or city or cities or neighbourhood$ or neighborhood$ or local$ or suburb$).tw.	1978715
2	exp urban area/ or exp rural area/ or exp suburban area/ or exp city/	37536
3	(sustainab$ or environment$ or economic$ or social or conservat$ or landscape$ or accessib$ or regenerat$ or renewal or redevelop$).tw.	666087
4	exp environment/ or exp landscape/	1768262
5	(transport$ or cycl$ or bicycl$ or pedestrian$ or walk$ or non-motori#ed or road$ or ringroad$ or rail$ or tram$ or bridge$ or tunnel$ or train$ or underground or metro$ or tube or TGV or motorway$ or street$ or autobahn$ or freeway$ or expressway$ or autostrada or turnpike$ or super#highway$ or carriageway$ or highway$ or path$ or link$ or bus or buses or coach$ or route$ or interchange$ or bypass$ or airport$ or heliport$ or port$ or terminal$ or harbour$ or harbor$ or cargo$).tw.	2717494
6	exp motor vehicle/ or exp bicycle/ or exp motorized transport/ or exp pedestrian/ or exp walking/ or exp railway/ or exp airport/	41910
7	(active adj travel).tw.	18
8	((open or recreation$ or leisure or commun$ or public or play or green or blue) adj space$).tw.	526
9	(park$ or recreation$ or leisure or greenspace$ or garden$ or playground$).tw.	73550
10	exp recreation/ or exp leisure/	13595
11	((land or single or mixed or multi) adj "use").tw.	4152
12	(shop$ or retail$ or outlet$ or market$ or supermarket$ or mall$ or arcade$ or wholesale$ or business$ or office$ or industr$ or commerc$ or service$ or school$ or college$ or universit$ or hospital$ or clinic$ or surger$ or infrastructur$ or building$).tw.	2662130
13	(quarr$ or excavation$ or mine$ or dredg$).tw.	77384
14	((holiday or chalet or caravan) adj (park$ or camp$ or site$ or village$)).tw.	37
15	(mast$ or pylon$ or pipeline$ or (overhead adj cable$)).tw.	62690
16	(hydro#electric$ or nuclear or coal or gas or oil or fuel or electricity).tw.	387496
17	renewable energy.tw.	291
18	exp commerce/ or exp business/ or exp school/ or exp college/ or exp university/ or exp hospital/ or exp health center/	244777
19	((scienc$ or techno$ or educat$ or health) adj park$).tw.	32
20	((distribution or communit$ or health or leisure) adj (centre$ or center$)).tw.	8877
21	(river$ or water or reservoir$ or canal$ or coast$ or fluvial or pluvial or flood$ or swale$ or drain$ or rain$).tw.	437721
22	exp river/ or exp water management/ or exp flooding/ or exp seashore/ or exp rain/	94307
23	(home$ or residen$ or accommodat$ or estate$ or hous$ or apartment$ or flat$ or condominium$).tw.	333491
24	exp home/ or exp housing/ or exp accommodation/ or exp residential area/	13036
25	(incinerat$ or landfill$ or waste or recycl$ or compost$).tw.	53478
26	exp landfill/ or exp recycling/ or exp incineration/ or exp waste management/ or exp composting/	82108
27	((air or water or noise or land or soil) adj (quality or pollut$ or contaminat$ or protect$ or prevent$)).tw.	30227
28	exp air quality/ or exp air pollution/ or exp water quality/ or exp water pollution/ or exp noise	144654

	pollution/ or exp soil pollution/	
29	(eco#town$ or eco#village$).tw.	0
30	(eco adj town$).tw.	2
31	(built adj (environment$ or form)).tw.	339
32	exp building/	3166
33	((green or brown) adj field$).tw.	20
34	(greenfield$ or brownfield$).tw.	575
35	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34	7085661
36	exp city planning/	342
37	(plan$ or masterplan$ or master#plan$ or framework$ or strateg$).tw.	654328
38	(project$ or proposal$ or develop$ or submission$ or application$).tw.	1991208
39	36 or 37 or 38	2435944
40	35 and 39	1838672
41	exp environmental impact assessment/	8301
42	environmental impact assessment$.mp.	8434
43	environmental appraisal$.mp.	7
44	health impact assessment$.mp.	214
45	strategic environmental assessment$.mp.	30
46	social impact assessment$.mp.	13
47	social impact appraisal$.mp.	0
48	integrated assessment$.mp.	299
49	integrated appraisal$.mp.	3
50	sustainability appraisal$.mp.	1
51	equity impact assessment$.mp.	0
52	equity assessment$.mp.	3
53	equalit$ impact assessment$.mp.	2
54	equalit$ assessment$.mp.	1
55	41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53 or 54	8882
56	(knowledge or skill$).tw.	244309
57	exp professional knowledge/	2563
58	(participat$ or engagement or stakeholder$ or consult$).tw.	237071
59	exp mental health/	34235
60	exp wellbeing/	17360
61	(mental adj (health or wellbeing or well-being)).tw.	38150
62	exp accidental injury/ or exp accident/	57322
63	(accident$ or injur$).tw.	345241
64	exp physical activity/	106965
65	physical activit$.tw.	28268
66	active travel.tw.	18
67	exp obesity/	107913
68	(obes$ or overweight).tw.	93290
69	exp exercise/	91899
70	exercise$.tw.	122166
71	exp health/	114065
72	((air or particulat$ or water or noise$ or sound$ or acoustic$ or land) adj (quality or pollut$ or contaminat$ or protect$ or prevent$)).tw.	29048
73	(PM10 or "PM2.5" or partic$ or "nitrogen dioxide" or NO2 or "sulphur dioxide" or SO2 or benzene or VOC or "volatile organic compound$").tw.	924529
74	exp air quality/ or exp air pollution/ or exp water quality/ or exp water pollution/ or exp noise pollution/ or exp soil pollution/	144654
75	56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65 or 66 or 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74	1963699

76	40 and 55 and 75	2685
77	limit 76 to yr="1987 -Current"	2669
78	nonhuman/ not human/	2767956
79	77 not 78	2058

Appendix C: Website search protocol

Purpose

This protocol describes

1. the process by which websites should be searched for evidence that meets the inclusion criteria for reviews 1 and 2 undertaken by the Spatial Planning for Health Collaborating Centre
2. the audit information that should be recorded when a website search is undertaken

Process

- Only websites specified in the search protocol and agreed by NICE should be searched
- New websites/organisations identified during a website search that are considered omissions and therefore potential additions to the list in the search protocol should be discussed initially with the SPfHCC team and, if agreed, a formal request to NICE should be made to amend the search protocol.
- Only pages within the named website should be searched i.e. links to external organisations should not be followed.
    - The only exception to this rule is when an external organisation is required to access the abstract or full text of the evidence sought.
- Each website is searched once, by a named researcher, and details of that search recorded
- Within the website the following areas should be searched where possible:
    1. The website Sitemap or Index
    2. Website section headed ‘Publications’ or ‘Reports’ or equivalent
    3. Website section headed ‘Research’ or ‘Data’ or ‘Evidence’ or equivalent

- Internal search facilities within websites will not routinely be searched because the majority lack the ability to conduct a targeted search and result in a large number of hits with poor precision.

- However, if there is no Sitemap / Index, no Publications / Reports section and no Research / Evidence / Data section, but an internal search facility exists, then a search will be conducted where possible and the terms used recorded
- Appropriate search terms include:
    - Environmental impact assessment
    - Environmental appraisal
    - Health impact assessment
    - Strategic environmental assessment
    - Social impact assessment
    - Social impact appraisal
    - Integrated assessment
    - Integrated appraisal
    - Sustainability appraisal
    - Equity impact assessment
    - Equity assessment
    - Equality impact assessment
    - Equality assessment

Audit information

- For each website searched specific information should be recorded in a separate MS Word document (see template in Annex 1)
- References / evidence / reports should be listed in a bibliography at the end of the table
- Electronic versions of the references / evidence / report should be stored on a shared electronic drive, where available

Annex 1: Template for recording website search information

Website searching template

Organisation Name	
URL	
Searcher name	
Search date	
Sitemap or Index available	Yes / No
Number of records retrieved	
Publications section available (or equivalent)	Yes / No
Number of records retrieved	
Research section available (or equivalent)	Yes / No
Number of records retrieved	
Internal search facility available	Yes / No
Internal search facility used	Yes / No
Search terms used	
Number of records retrieved	
Name of RefWorks folder	
Number of records manually entered into RefWorks folder	
Number of records after deduplication in RefWorks folder	

Identified references for manual entry into RefWorks:

Appendix D: Full text screening tool

For the identification of included studies:

- If all criteria are met the citation is **included**
- If any of the criteria fail to be met the study is **excluded**

Citation:

Author(s).....

Title.....

Journal/book/report citation .....

.....

Inclusion criteria

	Criteria	✓
1	**Population**	
	Populations studied included human populations	
2	**Intervention/Exposure [either a) or b) must be met]**	
a)	An appraisal or assessment undertaken as part of a planning/regulatory process to examine the impact of a proposed project (review 1)	
b)	An appraisal or assessment undertaken as part of a planning/regulatory process to examine the impact of a proposed plan (review 2)	
c)	Health impact assessment done retraspectively	
3	**Comparison [either a) or b) must be met]**	
a)	The study / report includes an objective evaluation of the intervention, in time	
b)	The study / report includes an objective evaluation of the intervention, in setting	
4	**Outcomes [at least one of the following must be met/specified]**	
a)	Levels of physical activity	
b)	Mental health / well being	
c)	Unintentional injuries	
d)	Environmental outcomes affecting health (air quality, water quality, noise pollution, or land contamination)	
e)	Some other element of health	
f)	Health knowledge or skills of planners	
g)	Health outcomes/equity were considered following the appraisal / assessment process	
h)	Recommendations about health outcomes/equity were included following the appraisal / assessment process	
i)	Health/equity recommendations were acted upon / implemented following the appraisal / assessment process	
j)	Health outcomes/equity were discussed as part of participation and	

	engagement of communities / populations / stakeholders	

Exclusion criteria

	Criteria	✓
1	Only non-human fauna, flora or environmental variables were studied	
2	The study did not include an assessment or appraisal process of a project or plan	
3	The assessment / appraisal process used was not one of the included methods: Strategic Environmental Assessment (SEA), Sustainability Appraisal (SA), Environmental Impact Assessment (EIA), Health Impact Assessment (HIA), Sustainability Impact Assessment (SIA), Integrated Appraisal, Social Impact Assessment (SIA), Equity Impact Assessment, Inequality Impact Assessment	
4	Not an evaluation study	
5	Health outcomes or knowledge/skills of planning staff were not reported	
6	Language of full text publication not English*	
7	Date of publication prior to 1987	
8	Other**	

* papers where the title and abstract are in English and suggest a relevant study, but the full text is not available in English will be listed in the appendix, but will not be formally translated.

**'Other' should be recorded

Appendix E: Critical appraisal tool for case studies

This checklist has been adapted from:

Critical appraisal guidelines for single case study research. Atkins C & Sampson J. 10th European Conference on Information Systems (ECIS) 2002 June 6-8, Gdansk, Poland

and draws upon Appendix H of the NICE Public Health Methods handbook, Quality appraisal checklist – qualitative studies.

The published guidelines for single case study research assume that data sources will be qualitative. The case studies included in Reviews 1 and 2 by the Spatial Planning for Health Collaborating Centre will use methodologies (e.g. EIA, SEA etc) that will utilise both qualitative and quantitative data sources. The checklist has therefore required adaptation to reflect this mixed research approach.

Note that the sub-questions given as examples under each question are intended to highlight some of the key issues to be considered for that question. They are not intended to be exhaustive. Additional considerations can be recorded in the comments box.

Checklist

Study identification Author, title, reference, year of publication		
Key research question/aim		
Checklist completed by (name)		
Checklist completed on (date)		
Question	**Category**	**Comments**
Way of thinking		
Q1) Is a case study approach appropriate? E.g. Does the author justify using a case study approach? Are the strengths and weaknesses of this approach considered?	☐ Appropriate ☐ Inappropriate ☐ Unclear	
Q2) Is there evidence that any author bias is taken into account when performing the analysis? E.g. Does the author reflect upon how their perspective or stance has influenced the study process or conclusions? What elements of the approach seek to minimise bias?	☐ Yes ☐ No ☐ Unclear	
Way of controlling		
Q3) Has the analysis been confirmed by an independent	☐ Yes ☐ No	

researcher E.g. has the analysis been undertaken by an independent researcher not involved in process evaluated?	☐ Unclear	
Q4) Have opportunities for triangulation of data been exploited? E.g. Have multiple sources of information been used to reduce bias?	☐ Yes ☐ No ☐ Unclear	
Q5) Are the outcomes reported reliable? E.g. were robust sources of information for outcomes used? Were validated instruments used to collect outcome information?	☐ Yes ☐ No ☐ Unclear	
Q6) Do the results / conclusions arise from the data? E.g. Are the results justified? Are the conclusions grounded in the data?	☐ Yes ☐ No ☐ Unclear	
Way of working		
Q7) Are the criteria used to select the appropriate case and participants clearly described?	☐ Clearly described ☐ Unclear ☐ Not described	
Way of supporting		
Q8) Does the study describe and use a systematic method to analyse the data? E.g. is the method for data analysis replicable from the description given?	☐ Clearly described ☐ Unclear ☐ Not described	
Way of communicating		
Q9) Are the aims and objectives of the study clearly stated?	☐ Clearly stated ☐ Unclear ☐ Not stated	
Q10) Are the limitations of the study acknowledged and described? E.g. are the strengths and weaknesses of the study stated?	☐ Clearly described ☐ Unclear ☐ Not described	
Q11) Is sufficient detail given to allow researchers to evaluate the potential transferability of the research to other contexts?	☐ Clear detail ☐ Partial detail ☐ No detail	

Overall assessment

Internal validity
This reflects how well the study was conducted, and the likelihood that the conclusions reflect the truth and are unbiased.

The study should be graded

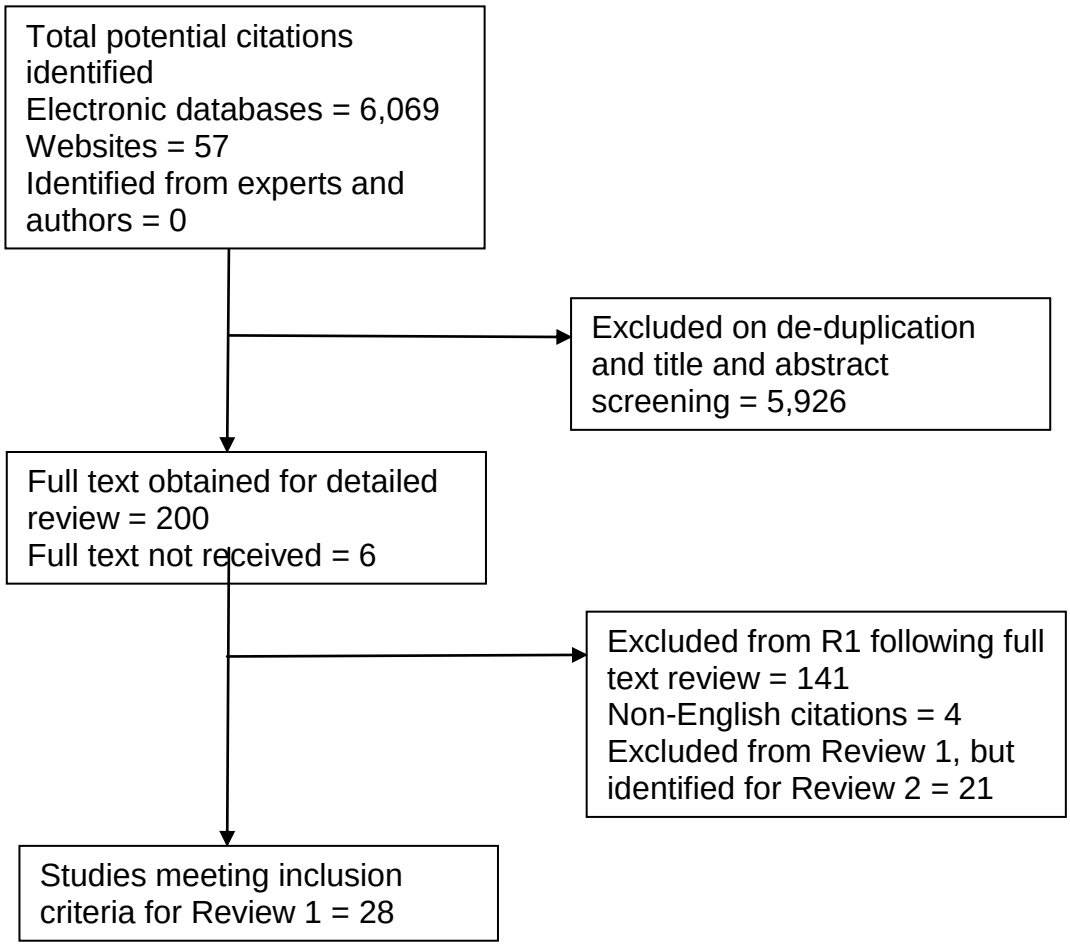
++	All or most of the checklist criteria have been fulfilled, where they have not been fulfilled the conclusions are unlikely to alter
+	Some of the checklist criteria have been fulfilled, where they have not been fulfilled, or not adequately described, the conclusions are unlikely to alter
-	Few or no checklist criteria have been fulfilled. The conclusions are likely or very likely to alter if this information were available.

External validity
This reflects the extent to which the findings of the case study are generalisable beyond the confines of the study to the study's source population. Consider the participants, the intervention, the comparison, the outcomes, and any resource or policy implications.

The study should be graded either ++, + or –

Appendix F: Summary of search findings and included studies for Review 1 and Review 2

Figure 1: Flowchart illustrating included and excluded studies



Please note that because some citations include case studies that are relevant for Reviews 1 and 2 it is therefore not possible to disaggregate some of the figures.

Appendix G: Quality Appraisal of included studies

Study	Questions from the critical appraisal tool- (see Appendix E)										
	1	2	3	4	5	6	7	8	9	10	11
Bekker, M., *et al* (2005)	AP	UC	Y	Y	UC	Y	CD	UC	CS	CD	cd
Bendel, N & Owen-Smith, V. (2005)	AP	Y	N	Y	Y	Y	CD	ND	CS	CD	pd
Bhatia, R., & Wernham, A. (2008)	AP	N	N	Y	UC	Y	CD	ND	CS	ND	cd
BMA (1999)	AP	UC	UC	N	Y	Y	CD	UC	CS	UC	nd
Bond, R., *et al* (2001)	AP	UC	Y	NR	Y	Y	NR	ND	CS	NR	pd
Corburn, J. & Bhatia, R. (2007)	AP	UC	Y	Y	Y	Y	CD	CD	CS	CD	cd
Dannenberg, A., *et al* (2008)	AP	UC	N	UC	UC	Y	CD	CD	CS	CD	pd
Frannsen, E.,*et al* (2002)	NR	N	UC	UC	UC	Y	NR	ND	CS	ND	NR
Gomez-Balandra, M. (2002)	AP	N	N	UC	Y	Y	ND	ND	CS	ND	pd
Hay, L., & Kitcher, C. (2004)	NR	N	N	N	Y	Y	NR	CD	CS	ND	pd
Jobin, W. (2003)	AP	N	N	N	Y	UC	ND	CD	CS	ND	pd
Kjellstrom, T., *et al* (2003)	AP	N	UC	Y	UC	Y	ND	ND	CS	UC	pd
Kosa, K., *et al* (2007)	AP	Y	N	N	Y	Y	CD	CD	CS	CD	pd
Kwiatkowski, R., & Ooi, M. (2003)	UC	UC	UC	N	Y	Y	ND	ND	NS	ND	pd
Lester, C., & Temple, M. (2006)	NR	N	N	Y	Y	Y	NR	NR	CS	ND	pd
Manning, K., & Jeavons, J. (2000)	NR	N	N	N	UC	Y	NR	NR	CS	ND	NR
Mwalyosi, R. & Hughes, R. (1998)	AP	UC	Y	Y	Y	Y	CD	CD	CS	CD	cd
Noble, B. F. & Bronson, J. E. (2005)	AP	Y	UC	Y	Y	Y	CD	ND	CS	CD	pd
Pena Alid, A. (2002)	AP	N	N	UC	Y	Y	ND	ND	CS	ND	pd
Petticrew, M., *et al* (2007)	AP	UC	N	N	UC	Y	ND	ND	CS	CD	pd
Planning Advisory Service (PAS). (2008)	AP	N	UC	N	UC	Y	ND	ND	CS	ND	nd
Shoobridge, D., & Kapila, S. (2002)	AP	N	N	N	UC	Y	UC	UC	NS	ND	cd
Sutcliffe, J. (1995)	AP	N	Y	Y	Y	Y	UC	UC	CS	ND	pd
Taylor, N., *et al* (2003)	AP	N	N	UC	Y	Y	ND	UC	CS	CD	pd
Tullos, D. (2009)	AP	UC	Y	Y	Y	Y	CD	CD	CS	CD	cd
Utzinger, J., *et al* (2005)	AP	UC	Y	Y	Y	Y	CD	CD	CS	ND	cd
Viinikainen, T., & Kaehoe, T. (2007)	AP	N	UC	UC	UC	Y	CD	ND	CS	ND	nd
Wismar, M., *et al* (2007)	AP	Y	Y	UC	UC	Y	CD	CD	CS	CD	cd

Table key:	Code
Appropriate	AP
Inappropriate	IA
Unclear	UC
Clearly Described	CD
Not Described	ND
Clearly Stated	CS
Not Stated	NS
No detail	nd
Yes	Y
No	N
Clear detail	cd
Partial detail	pd

Appendix H: Data extraction tables

Data Extraction Tables for each citation included for Review 1 are presented on following pages in alphabetical order by first named author.

Title of paper: ***Evaluating the impact of HIA on urban reconstruction***

Study details	**Population and setting**	**Project details and method of appraisal**	**Outcomes assessed***	**Results**	**Notes**
Authors Bekker, M., Putters, K. and van der Grinten, T. **Year:** 2005 **Citation**: Evaluating the impact of HIA on urban reconstruction decision-making. Who manages whose risks? EIA review 25 (2005) 758-771 **Aim of study**: Examines through a case study how perceptions and decision-making behaviour of policy-makers affect the impact of an HIA. **Study design**: Qualitative multi-case study design: Literature search in Pubmed; Archive data search and analysis;	**Country**: Netherlands **Setting:** urban **Population**: Triangular area in the middle of an urbanised region (no precise details)	**Project**: municipal reconstruction project (no name) including: Hospital Sports facilities Emergency services Commercial and primary care facilities Shops, offices Houses Parking facilities **Method of appraisal**: HIA requested and initiated by a medical environmentalist working at the municipal health service and city officials cooperated	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: (iv) Post-development evaluation: *b) Specific outcomes:* (i) Physical activity: Y (ii) Mental wellbeing: Y (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: Specify: *c) Knowledge outcome:* Planners health knowledge or skills: Y *d) Other outcome*: N/R Specify:	HIA could not inform planning application decision as HIA was delayed because data was difficult to collect but HIA **recommendations informed the optimisation of the project**: including: **Relocation of housing** But relocation based on strategic rather than health considerations (visibility of environmental issues in HIA have an impact on house sales, i.e HIA used as a political tool)	**Limitations identified by author(s)**: HIA has been seen in that example as a potential threat to the project. **Limitations identified by review team**: **Evidence gaps &/or recommendations for future research**: Evaluation of other cases needed to compare. **Source of funding**: Netherlands Organisation for Health Research and Development

Interviews with key stakeholders **Quality score**: **+** **External validity score: ++**					

Title of paper: ***A prospective health impact review of the redevelopment of Central Manchester Hospitals***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Bendel, N & Owen-Smith, Vicci **Year:** 2005 **Citation**: Environmental Impact Review **25**. 783-790. **Aim of study**: Describes a health impact review (HIR) of the plans for a major redevelopment of Central Manchester Hospitals (England). Demonstrates a summary of the most significant health impacts of the policy & projects. **Study design**: Case study **Quality score**: **+** **External validity score: +**	**Country**: England **Setting** (eg urban/rural) Urban **Population**: Collection of hospital locations all under the same umbrella control, but spaced throughout Manchester. Population includes local neighbours, patients & staff.	**Project**: Discussion of HIR programme, with emphasis on the role of the Local Authority Health Overview & Scrutiny Committee's to ensure the uptake of recommendations from the HIA. **Method of appraisal**: Health Impact Review (HIR). Useful when the policies, programmes or projects being assessed are so broad and intertwined as to make an in-depth analysis infeasible. It's based on review of published analysis of similar policies, including other HIA's by a panel of experts by a panel of experts. Summary estimation of most significant impacts on health of the policy or cluster of programmes or projects, without necessarily disentangling the precise impacts of the various parts of the HIR on specific health.	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: **Y** (ii) Health recommendations incorporated in proposal: **Y** (iii) Evidence of being implemented: **Y** (iv) Post-development evaluation: **Y** *b) Specific outcomes:* (i) Physical activity: **N** (ii) Mental wellbeing: **N** (iii) Air / noise quality etc: **Y** (iv) Unintentional injury: **N** (v) Other health: **Y** Specify: *c) Knowledge outcome:* Planners health knowledge or skills: **Y** *d) Other outcome*: **Y** Specify:	**Health indicators assessed**- economic prosperity and business performance; employment and educational opportunities; the image of the area; regeneration; access to goods and services; housing and homelessness; levels and fear of crime; causes of ill health and premature death; travel patterns and transport; air quality and environmental nuisance – using a integrated impact appraisal tool kit. Locally the framework was adapted to consider inequalities. **Recommendations** - construction and design of the building (e.g. internal temperatures during periods of extreme weather), issues relating to the design and construction phase of the project (e.g. park and ride facilities for construction workers and staff whose parking is displaced) as well as more general issues relating to the impact of the project on the wider community (e.g. housing, crime and disorder, environmental	**Limitations identified by author(s)**: Integration of stakeholder involvement & HIA introduced late, meaning some understandable objections were raised from the primary funders (PFI- private finance initiative), and, and community engagement was limited to broad views collated through a local ward-coordinator to the steering group. **Limitations identified by review team**: Author's are part of the same PCT, so complete objectivity not assured. Although part of separate body within this. **Evidence gaps &/or recommendations for future research**: **Source of funding**: Not reported

				nuisance, etc.). Community consultation and that a representative should attend the meetings of the PFI Project Board to provide ongoing feedback to local partnerships through the City Council's ward co-ordination structures. All recommendations to be reviewed after 6 months. **Outcomes**- An updated version of the recommendations was considered after 6 months & 2 years. As a result the strategic health authority proposed to undertake HIA's on all construction schemes of £10m or less but likely to impact on health impacts.	

Title of paper: ***Integrating Human health into Environmental Impact Assessment: an unrealised opportunity for environmental health & justice***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Bhatia, R., Wernham, A. **Year:** 2008 **Citation**: Environ Health Perspec 116:991-1000 (2008) **Aim of study**: Review EIA & existing regulations for health effects' analysis, & barriers/opportunities for integration of both. **Study design**: Literature review & empirical research on EIA plus 4 case studies. **Quality score**: **+** **External validity score: ++**	**Country**: US **Setting** (eg urban/rural) Urban & rural **Population**: 1. San Francisco, California 2, 3 & 4.North Slope Inupiat communities, Alaska	**Project**: 1.Urban rezoning (employment & rent controlled flats to market housing) 2, 3 & 4.Oil & gas developments **Method of appraisal**: HIA to influence EIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations made: Y (iii) Health recommendations acted upon: Y (iv) Health outcomes discussed during consultation: Y *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: Y (iii) Air / noise quality etc: N (iv) Unintentional injury: N (v) Other health: Y Specify: -Food insecurity & substandard living conditions -Displacement of subsistence animals leading to change in diet/obesity -disease transmission from to new population *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: Y	1.Officials revised the scope of the project's EIA to include residential displacement & any impacts on health, unless the developer chose to mitigate these effects with revised plans. Developer agreed to keep 360 of new units as rent controlled, with lifetime leases for existing tenants. All EIA in SF now have to include analysis of residential displacement & new policy was put in place to require replacement of affordable housing lost in the development process. 2.No changes made. 3.Agreement to address new health-focused mitigation at lease-sale stage. 4.EIS to include mitigation measures,	**Limitations identified by author(s)**: **Limitations identified by review team**: Author involved the case study **Evidence gaps &/or recommendations for future research**: **Source of funding**: Wernham, A., received funding from Columbia University to write the review

			Specify: Future EIA in City	plus monitoring of range of health indicators and subsequent mitigation if necessary.	

Title of paper: ***Health and environmental impact assessment – an integrated approach Earthscan: London***

Study details	**Population and setting**	**Project details and method of appraisal**	**Outcomes assessed***	**Results**	**Notes**
Authors BMA **Year:** 1999 **Citation**: Health and environmental impact assessment – an integrated approach Earthscan: London **Aim of study**: Considers the need for integrated health and EIA and suggests way how this could be done in the UK **Study design**: Practice guide With illustrative case studies **Quality score**: **+** **External validity score: ++**	**Country**: UK **Setting** both **Population**: Manchester	**Project**: Manchester airport **Method of appraisal**: EIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: N (iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: N/R (ii) Mental wellbeing: N/R (iii) Air / noise quality etc: N/R (iv) Unintentional injury: N/R (v) Other health: N/R Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N/R *d) Other outcome*: N/R Specify:	**Recommendations to address health impact of the proposed second runway at Manchester airport from unpublished submission to the public enquiry into by Manchester and Stockport Health Commissions (Will, Ardern, Spencely and Watkins) were accepted by the airport's planners**	**Limitations identified by author(s)**: **Limitations identified by review team**: BMA publication Only one case study relevant and used to illustrate the practice guide, so only brief information on it **Evidence gaps &/or recommendations for future research**: **Source of funding**: BMA

Title of paper: ***Integrated Impact assessment for Sustainable Development: a case study approach***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Bond, R., Curran, J., Kirkpatrick, C., Lee, N., Francis, P. **Year:** 2001 **Citation**: World Development Vol 29, No 6, pp 1011-1024 **Aim of study**: To clarify some of the approaches to integrated appraisal currently in use as a preclude to identifying ways in which practice may be strengthened in the future. **Study design**: Literature review, plus 3 case studies (1 relevant) **Quality score**: **+** **External validity score: +**	**Country**: Mali/Senegal/Mauritania **Setting** (eg urban/rural) Rural (assumed) **Population**: Unknown, agricultural communities?	**Project**: Manantali Energy Project: Retrofitting of hydropower facility at existing dam. **Method of appraisal**: EA (EIA)	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: Y (iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: Y (iii) Air / noise quality etc:N (iv) Unintentional injury: N (v) Other health: Y Specify: -Re-housing – compensation -programmes to eradicate bilharzias & malaria -provision of electricity & income generation projects *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: Y -loss of seasonal flood	The EA of the new scheme allowed some compensation for the impacts of the existing dam (loss of soil fertilisation as a result of annual flood and incidence of new diseases). The mitigation included artificial flooding of agricultural land, thus incurring a 7% reduction in potential maximum electricity output. The loss of value was deemed to be much higher than the resulting economic benefits accrued from agriculture. Thus the social benefits were considered to be sufficient to outweigh the loss of electricity generation.	**Limitations identified by author(s)**: - **Limitations identified by review team**: - **Evidence gaps &/or recommendations for future research**: None relevant **Source of funding**: Unknown

Title of paper: ***HIA in San Francisco: incorporating the social determinants of health into environmental planning***

Study details	**Population and setting**	**Project details and method of appraisal**	**Outcomes assessed***	**Results**	**Notes**
Authors Corburn, J. and Bhatia, R. **Year:** 2007 **Citation**: Journal of environmental planning and management Vol. 50 (3), 323-341 **Aim of study**: Examines whether and how the social and physical determinants of health can be integrated into the planning process through HIA. **Study design**: Mixed case study methods Participant-observer Document analysis Interviews and narrative qualitatively analysed **Quality score**: **+** **External validity**	**Country**: USA **Setting** urban, San Francisco **Population**: some focus on declining health of Latino and African American population in some neighbourhoods where regenerations is planned and existing tenants evicted; low-income population in general	**Project**s: 1. redevelopment of Trinity Plaza apartments – eviction of low-income families, loss of affordable housing 2. Rincon Hill condominium – new development in unused land **Method of appraisal**: HIA within EIA Development of an community-based HIA (see results)	**Outcomes measured for both projects:** *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: Y (iv) Post-development evaluation: N/R *b) Specific outcomes:* (i) Physical activity: N/R (ii) Mental wellbeing: Y (iii) Air / noise quality etc: N/R (iv) Unintentional injury: N?R (v) Other health: Y Specify: social determinants of health, social housing *c) Knowledge outcome:* Planners health knowledge or skills: N/R *d) Other outcome*: N/R Specify:	1. Trinity Plaza case: City Planning department based on local residents' evidence and advocacy and on the environmental health section required developers to include an analysis of residential displacement and its adverse impacts on health **Developers modified the final project to include a guarantee that all existing tenants could remain in the new building in rent-controlled units**. 2. Rincon Hill: City Planning department considered that the new development would exacerbate the job-housing spatial mismatch as developers were going to reduce the	**Limitations identified by author(s)**: Integration of social determinants of health into EIA limited. Conditions for integration: 1. Public agencies use an expanded definition of environmental health 2. New health advocacy networks are organised within and outside government 3. Learning by doing approach is used 4. Broad scientific evidence base is generated to substantiate policy change **Limitations identified by review team**:

score: ++				availability of affordable units in Rincon area and meet 12% affordable housing requirement miles away. Community groups showed evidence that development would severely strain local infrastructure **Developers asked to increase proportion of below market rate units in Rincon Hill area project to 17.5% from 12% and construct all the below-market-rate housing either on-site or within the local planning district. & developers agreed to pay $25 per square foot impact fee that was used to create a $20M community fund for social and physical infrastructure needs.** **Following these 2 cases, independent HIA considered by key stakeholders (community, city council and SF**	**Evidence gaps &/or recommendations for future research**: Explore how HIA processes might handle recurring conflicts over political power and health values (when private project clashes with health objectives of community. **Source of funding**: N/R

				department of public Health. HIA has no legal force, but community-based HIA has been designed by environmental health section of the city council to address regeneration affecting Eastern neighbourhoods community in SF: ENCHIA was born= only community-based HIA in the USA at time of writing.	

Title of paper: ***Use of Health Impact Assessment in the US, 27 case studies, 1999-2007***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Dannenberg, A., Bhatia, R., Cole, B., Heaton, S., Feldman, J., Rutt, D **Year:** 2008 **Citation**: American Journal of Preventative Medicine 2008; 34 (3) **Aim of study**: To document the growing use in the US of health impact assessment methods to help planners and others consider the health consequences of their decisions **Study design**: Review of 27 HIA case studies (some not relevant to this NICE review) **Quality score**: **+** **External validity score: +**	**Country**: USA **Setting** (eg urban/rural) Various **Population**: Various – see individual case study information	**See below for case studies**	**See below for case studies**	"Only limited information is available about the impact that these 27 HIAs have had on decision processes. In a few cases, changes in policies or projects were made directly as a result of the HIA. More commonly, the HIA raised awareness of health issues among decision-makers and others; subsequent changes that occurred may be due in part to that increased awareness. HIA practitioners who have ongoing working relationships with their local community leaders may be able to influence decisions more than those who lack such relationships. To accomplish change, such links may be more important than rigorous quantitative data in the HIA report. "	**Limitations identified by author(s)**: - **Limitations identified by review team**: Co authors involved as primary investigators or consultant for some of the HIA studied. **Evidence gaps &/or recommendations for future research**: - **Source of funding**: Unknown

		Project: Trinity Plaza housing redevelopment, San Francisco, 2003 **Method of appraisal**: HIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: Y (iv) Post-development evaluation: N/R *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: Y (iii) Air / noise quality etc: N (iv) Unintentional injury: N (v) Other health: Y Specify: -Loss of affordable housing -rent burden Reduced social capital *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify:	Recommended to planning department that displacement analysis be done and prevention strategy developed **Developer required to provide replacement rent controlled housing**	
		Project: Executive Park Sub Area Plan, SFDPH, San Francisco, 2007 2800 unit mixed-use neighbourhood on waterfront	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y/N ?	HIA recommendations to: review transportation system, improve access to goods/services, coordinate with other development, 135	

		commercial site **Method of appraisal**: HIA --- **Project**: Oak to 9th Avenue project, Oakland CA , 2006 – redevelopment of former industrial to mixed use neighbourhood. Existing 19% area poverty rate; health disparities **Method of appraisal**: HIA	(iii) Evidence of being implemented: N (iv) Post-development evaluation: N/R *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y/N (iv) Unintentional injury: N (v) Other health: Y Specify: -inadequate infrastructure -health disparities *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify: --- **Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N (iii) Evidence of being implemented: N (iv) Post-development evaluation: N/R *b) Specific outcomes:* (i) Physical activity: Y (ii) Mental wellbeing: Y	specific recommendations for area plan & planning process **At 2007, plans & recommendations being reviewed.** HIA recommended a number of mitigation measures including routes to park, traffic calming, speed limits, air quality risks. **Project approved without consideration or mitigation of health Impacts.**	

		_____ **Project**: MacArthur BART Transit Village, Oakland, CA, 2007 – mixed use development on transit station parking lot. **Method of appraisal**: HIA	(iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: Y Specify: -affordability of housing -school capacity -social cohesion -open space *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify: _____ **Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: - Project on hold (iii) Evidence of being implemented: N (iv) Post-development evaluation: N/R *b) Specific outcomes:* (i) Physical activity: Y (ii) Mental wellbeing: Y (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: Y Specify: -affordability of housing -employment opportunities	. Recommendations made by HIA: unbundle parking from houses, add bicycle parking, connect to bike network, pedestrian safety measures. **Outcome unknown as at 2007, the plans were under review.**	

		_____ **Project**: Jack London Gateway senior housing project - 54 units of low income senior housing and new retail services **Method of appraisal**: HIA	-social cohesion - access to open/green space -transportation access *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify: _____ **Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: N/R (iv) Post-development evaluation: N/R *b) Specific outcomes:* (i) Physical activity: Y (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: Y Specify: -access to shops *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N	Recommendations to incorporate design features to improve indoor air quality; use noise-insulating features; make building non-smoking; increase private security; add walkability amenities and traffic-calming measures; allow pets; provide transport to services. **Developer has engaged with HIA team and stakeholder group in discussion on project design; final decisions pending.**	

			Specify:		
		Project: East Bay Greenway - Project to build 12 miles of walking and biking paths under elevated rail transit tracks. **Method of appraisal**: HIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N/R Pending (iii) Evidence of being implemented: N/R (iv) Post-development evaluation: N/R *b) Specific outcomes:* (i) Physical activity: Y (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify:	Recommendations to: Optimize design to reduce pedestrian and bicyclist injury risks; incorporate public safety measures to reduce risk of crime. **Project pending.**	
		Project: Greyfield Redevelopment - Project of highway redevelopment and policy of changed priority uses of road corridor Low-income immigrant	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N/R	Recommendations: Use incremental approach for redeveloping the area, increase housing density, assure mixed-income housing includes affordable housing.	

		population Health disparities **Method of appraisal**: HIA	(iii) Evidence of being implemented: N/R (iv) Post-development evaluation: N/R *b) Specific outcomes:* (i) Physical activity: Y (ii) Mental wellbeing: N (iii) Air / noise quality etc: N (iv) Unintentional injury: Y (v) Other health: Y Specify: Built environment *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify:	**Unknown outcome, but facilitated CDC's dialogue with state and federal departments of transportation, county commissioners and county board of health.**	
		Project: Farmers Market, and Project for Public Spaces, Trenton - Plan for Revitalisation for area Farmers market. **Method of appraisal**: HIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N (iii) Evidence of being implemented: N (iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: Y (ii) Mental wellbeing: Y (iii) Air / noise quality etc: N (iv) Unintentional injury: N (v) Other health: Y	Recommendations: Create master plan; improve diversity of farm products sold; install public seating in eating area, bicycle racks, and cash machines; improve signage and pedestrian connections to market. **Decision makers showed minimal interest in study's findings and recommendations.**	

			Specify: Economy Social capital Public health services *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify:		
		_____ **Project**: Beltline transit, trails, and parks project - Project of new trails, parks, transit, and redevelopment of brownfields and greyfields **Method of appraisal**: HIA	_____ **Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N/R (iii) Evidence of being implemented: N/R iv) Post-development evaluation: N/R *b) Specific outcomes:* (i) Physical activity: Y (ii) Mental wellbeing: Y (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: N Specify: *c) Knowledge outcome:* Planners health knowledge or skills:/N *d) Other outcome*: N	Recommendations included: Encourage faster progress than current 25-year schedule to obtain earlier health benefits; add health professional to advisory board; add more parks to underserved area; assure adequate affordable housing is built. **Unknown outcome**	

		_____ **Project**: Taylor Energy Center - Project of new coal-fired power plant **Method of appraisal**: HIA _____ **Project**: Arctic Outer Continental Shelf Oil and Gas Leasing Program - U.S. Outer Continental Shelf for	Specify: _____ **Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: N/R (iv) Post-development evaluation: N/R *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y (iv) Unintentional injury: N (v) Other health: N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: Y Specify: Jobs _____ **Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations	Recommendations included: Purchase low-polluting coal; collect ambient particulate matter data in county; explore technology to reduce emissions; hire diverse workforce; provide health benefits to all employees. **Development authority Accepted recommendations and evaluation indicators; project subsequently suspended due to CO_2 emissions.** Nine alternative plans to the proposed action identified, assessed, and included in EIA report.	

		oil and natural gas exploration and development. *Communities in multiple areas of Alaska, many of which have large Alaskan Native populations who experience major health disparities.* **Method of appraisal**: HIA _____ **Project**: Chukchi Sea Oil and Gas Lease Sale and Seismic Surveying Activities, Alaska Eight Inupiat villages in North Slope Borough with 250 to 4000 residents each who experience major health	incorporated in proposal: N/R (iii) Evidence of being implemented: N/R (iv) Post-development evaluation: N/R *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing:/N (iii) Air / noise quality etc: Y (iv) Unintentional injury: N (v) Other health: Y Specify: -sociocultural disturbance -impact on subsistence resources -access to drugs & alcohol *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify: _____ **Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N/R (iii) Evidence of being implemented: N/R (iv) Post-development evaluation: N/R	**U.S. Minerals Management Service that oversees offshore oil and gas development has committed to work to develop new health-related mitigation measures at the lease sale stage.** Develop a monitoring strategy to identify and track regional health indicators; continue study of how oil and gas development impacts determinants of health; institute health-focused mitigation measures.	

		disparities including high rates of cancer, social pathology, and chronic illness. **Method of appraisal**: HIA _____ **Project**: Lowry Corridor Project - Project of redevelopment of blighted urban corridor into mixeduse, pedestrian friendly area. 1*8,000 residents in neighborhoods affected by project; health disparities associated with concentrated poverty and unemployment.* **Method of appraisal**: HIA	*b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y (iv) Unintentional injury: N (v) Other health: Y Specify: sociocultural disturbance -impact on subsistence resources -access to drugs & alcohol *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify: _____ **Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: Y (iv) Post-development evaluation: N/R *b) Specific outcomes:* (i) Physical activity: Y (ii) Mental wellbeing: N (iii) Air / noise quality etc: N	**Anticipated health mitigation measures at the project permitting stage.** Recommendation incuded: Pedestrian-level lighting; driver feedback speed limit signs in pedestrian and school areas; ‘Share the Road’ signs; increased public signage and maps for public transit routes. **HIA helped project manager obtain funding for countdown timers at key intersections, bike racks at key**	

			(iv) Unintentional injury: Y (v) Other health: N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: /N *d) Other outcome*: Y Specify: employment social capital	**public buildings, and markers to encourage pedestrian traffic**	
		Project: Derby Redevelopment - Master plan, zoning cordinance, Design guidelines, and budget request for community redevelopment Project. *Groups at high risk for physical inactivity include children and teens, elderly, lowincome individuals and Hispanic and black residents* **Method of appraisal**: HIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: N/R (iv) Post-development evaluation: N/R *b) Specific outcomes:* (i) Physical activity: Y (ii) Mental wellbeing: Y (iii) Air / noise quality etc: N (iv) Unintentional injury: N (v) Other health: Y Specify: Nutrition *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N	Take action to spur redevelopment plan; fund traffic calming, parks and open space; prepare bicycle and pedestrian plan; add affordable housing and universal design features; create a “Clean and Safe” Program of property maintenance and code enforcement for junk, weeds, and trash; police and community surveillance. **City Council approved Derby Sub-Area Master Plan, rezoning ordinance, and Design Guidelines; funding decisions under consideration.**	

Title of paper: ***Assessing health consequences in an environmental impact assessment, the case of Amsterdam Airport Schiphol***

Study details	**Population and setting**	**Project details and method of appraisal**	**Outcomes assessed***	**Results**	**Notes**
Authors Frannsen, E., Staatsen, B., Lebret, E. **Year:** 2002 **Citation**: Environmental Impact Assessment Review 22 (2002) 633-653 **Aim of study**: Description of a complrehensive approach for the evaluation of possible health effects in an EIA. **Study design**: Literature review, plus review of case study **Quality score**: **+** **External validity score: +**	**Country**: Netherlands **Setting** (eg urban/rural) Urban/urban fringe **Population**: Suburbs of south west Amsterdam	**Project**: Proposal for 5th runway & new terminal building. EIA prepared for planning application. **Method of appraisal**: HIA as part of EIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y/N ? (iii) Evidence of being implemented: Y/N ? (iv) Post-development evaluation: Y/N ? *b) Specific outcomes:* (i) Physical activity: Y/N (ii) Mental wellbeing: Y (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y/N (v) Other health: N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: Y *d) Other outcome*: N Specify:	The study reports, “the Committee for Environmental Impact Assessment has endorsed the conclusions of the HIA & adopted the recommendations”. However it is not clear if the recommendations that were accepted were changes to the proposals or just those for further research into further health indicators.	**Limitations identified by author(s)**: **Limitations identified by review team**: Authors appear to have prepared the HIA. **Evidence gaps &/or recommendations for future research**: **Source of funding**: Unknown

Title of paper: ***Huites Irrigation Dam***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Gomez-Balandra, M. **Year:** 2002 **Citation**: UNEP 'EIA Training Resource Manual' **Aim of study**: Review of the EIA of the project. **Study design**: None given **Quality score**: **+** **External validity score: +**	**Country**: Mexico **Setting** (eg urban/rural) Rural **Population**: North western Mexico in the states of Sonora & Sinoloa	**Project**: Construction of dam & subsequent reservoir. **Method of appraisal**: EIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: Y (iv) Post-development evaluation: Y *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: Y (iii) Air / noise quality etc: N (iv) Unintentional injury: N (v) Other health: Y Specify: Social, due to relocation of people's homes & livelihoods *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: Y Specify: -strengthening of existing ejidos (cooperative farms) - irrigation -improved living conditions -infrastructure & service provision at relocation sites -3,500 jobs created in construction	Mitigation measures = 9.6% of total project budget. Need for community participation early in the planning of the project. Community should be supported in participation process so they are not manipulated. UWE Note: Whilst significant compensation awarded & mitigation implemented, whole communities were relocated.	**Limitations identified by author(s)**: **Limitations identified by review team**: **Evidence gaps &/or recommendations for future research**: **Source of funding**: Unknown

Title of paper: ***An analysis of the benefits of a cross-sectoral approach to a prospective health impact assessment of a container port development.***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Hay, L., Kitcher, C. **Year:** 2004 **Citation**: Environmental Impact Assessment Review 24 (2004) 199-206 **Aim of study**: Discussion of perceived benefits of Joint planning/health approach to HIA **Study design**: Identification of perceived benefits of a joint HIA **Quality score**: **+** **External validity score: +**	**Country**: England **Setting** (eg urban/rural) Urban fringe **Population**: Bathside Bay, Harwich	**Project**: Proposed construction of container port (Permission granted by Act of Parliament, but awaiting detailed proposals) **Method of appraisal**: HIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: N (iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: Y (ii) Mental wellbeing: Y (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: Y/N Specify: Impact of increased population on services *c) Knowledge outcome:* Planners health knowledge or skills: Y *d) Other outcome*: Y Specify: -Additional employment -Pos^{ve} relationships: planners/health	No details of whether HIA was implemented in detailed proposals. Study lists positive & negative impacts. The main outcome of this study is the positive working relationship between planners & health professionals for the future & the knowledge exchange that was made possible by the joint approach.	**Limitations identified by author(s)**: - **Limitations identified by review team**: - **Evidence gaps &/or recommendations for future research**: - **Source of funding**: Unknown

Title of paper: ***Health and equity impacts of a large oil project in Africa.***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Jobin, William. **Year:** 2003 **Citation**: Bulletin of the World Health Organisation 81 (6) 420-426 **Aim of study**: The paper reviews the implementation of an environmental, social & health assessment devised for a World Bank funded oil project, crossing Chad & Cameroon. The paper was authored by the health expert brought in to assess the health implications for the proposed project and make recommendations. **Study design**: Case study **Quality score**: **+** **External validity score: +**	**Country**: Chad & Cameroon **Setting** (eg urban/rural) Rural **Population**: (size , characteristics…) Population density 17 persons / km2, dependent primarily on agriculture. Very poor, average annual income US$200 per annum. Poor health, life expectancy of 50, 1 in 5 children die before they're 5. Major health risks, malaria & HIV/AIDS.	**Project**: Large oil extraction & pipeline. 300 deep wells in southern Chad near Doba, connected by 1000km of pipeline through Chad & Cameroon to a tanker permanently moored offshore from Kribi on the coast of Cameroon, to transfer oil to ocean going vessels. **Method of appraisal**: Environmental, Health & Social Assessment	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: **Y** (ii) Health recommendations incorporated in proposal: **Y** (iii) Evidence of being implemented: **Y (partly)** (iv) Post-development evaluation: **Y** *b) Specific outcomes:* (i) Physical activity:**N** (ii) Mental wellbeing: **N** (iii) Air / noise quality etc: **Y** (iv) Unintentional injury: **Y** (v) Other health: **Y** Specify: *c) Knowledge outcome:* Planners health knowledge or skills **N** *d) Other outcome*: **N** Specify:	**Health outcomes** considered- prevention & treatment of Malaria, reduction in traffic accidents and construction accidents. & diarrhoeal disease. **Recommendations,** Malaria- heavy clothing, mosquito repellents, bed nets and prophylactic drugs. "Elaborate provisions were made to minimise construction accidents. & diarrhoeal disease through protection of food & water. Dust, water quality and noise control. Implementation of a expanded programme to promote safe sex, and an alternative system of relays, removing necessity for overnight stays of truckers near brothels. **Outcomes-** Malaria- bednets distributed in Chad & along pipeline in Cameroon. The overnight policy, was not taken on board. The resettlement & compensation for affected residents in the locality were taken on board. The figures for each indicator were presented and showed that Malaria,	**Limitations identified by author(s)**: The EA and management plans were prepared by consultants working for the funding consortium. The expert panel, including the author (health), had to base their recommendations on the EA and not on their own data. 'project decision wre based on cost & profit considerations, little or no decision making power to the affected communities. Concerns raised by expert panel were "likely to face opposition by the proponents". **Limitations identified by review team**: Potential bias, as paper was written by the expert employed to advise on the project. Clear from the paper this was unsuccessful in view of the author **Evidence gaps &/or recommendations for future research**:

				sexually transmitted diseases and other diseases, hospitalization numbers were all controlled by the EA. **Inequalities** within the project there were “space age technology for all operations including protection of health, ambulances, clinics, air con, medicine, telecoms. Outside the local hospital had no fuel, or vehicles, inadequate staff & facilities and few drugs.	**Source of funding**: Not reported

Title of paper: **Comparative assessment of transport risks- how it can contribute to health impact assessment of transport policies.**

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Kjellstrom, T., Van Kerkhoff, L., Bammer,G. & McMichael, T. **Year:** 2003. **Citation**: Bulletin of the World Health Organisation 81 [6]. **Aim of study**: Comparative assessment of transport risks- how it can contribute to health impact assessment of transport policies. **Study design**: Case study critique **Quality score**: **+** **External validity score: +**	**Country**: Review of case studies in Australia [1] & Sweden [2] **Setting** (e.g. urban/rural) Major road projects **Population**: Not reported	**Project**: The project reviews a series of HIAs and comparative risk assessments, and reports the health impacts considered, whilst also highlighting where health impacts were omitted and where a more formal approach than that offered under the HIA system would have been appropriate. **Method of appraisal**: HIA, CRA in conjunction with EIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y/N (ii) Health recommendations incorporated in proposal: Y/N (iii) Evidence of being implemented: Y/N (iv) Post-development evaluation: Y/N *b) Specific outcomes:* (i) Physical activity: Y/N (ii) Mental wellbeing: Y/N (iii) Air / noise quality etc: Y/N (iv) Unintentional injury: Y/N (v) Other health: Y/N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: Y/N *d) Other outcome*: Y/N Specify:	[1] Australian motorway scheme. (a) (i) Y (ii) y (iii) N (iv) Y (b) (i) N (ii) N (iii) N (iv) Y (c) N (d) N The assessment concluded that the motorway would have an overall benefit for health, with reductions in injuries from traffic crashes and noise pollution (on existing roads) outweighing the risks of any increase in air pollution. The latter increase was not quantified, however, and the tendency for motorways to increase traffic may have negated any estimated benefits. A formal comparative approach in this instance would have led to a more systematic analysis of the health issues, but no data were available to support a more comprehensive assessment. HIA, although less rigorous in the comparative sense, is also more flexible in accommodating the data that are available. [2] Swedish 28 road projects. Author examined the	**Limitations identified by author(s)**: Limited published research **Limitations identified by review team**: Justification for choice of case studies not provided. Limited primary data to evaluate, have to rely upon author evaluation **Evidence gaps &/or recommendations for future research**: As road transport systems are associated with different types of health effects, the full picture of how policies influence total health impacts can be produced only by an integrated analysis. Although HIA and CRA provide frameworks within which such an integrated assessment can be conducted, they can be strengthened by consideration of the ‘‘non-health ‘effects as well — for example, whether a decision will reduce greenhouse gas emissions and future climate change.

				inclusion of health in 28 road projects, specific detail of the case studies is missing but the outcomes were as follow; health expertise, and although 21 mentioned traffic crash injury as important, only 14 estimated the potential changes in incidence of crash injuries after implementation of the project. Other issues that were raised commonly were noise, the dangers of transporting hazardous goods on the new road, and the potential health impacts of air pollution—but no attempts were made to quantify these health impacts. The analysis concluded that HIA of road projects in Sweden was poorly developed. Lack of quantification, or partial quantification, of health factors is a weakness in HIA, as the tendency is often to assume that the factor that has been measured (in these cases, traffic crash injury) is the most important. Use of a CRA would ameliorate this weakness but, as noted earlier, would not be able to support all health-related issues or	Such added benefits can be labelled ‘‘collateral externality gains’’ of actions aimed at reducing air pollution (25). A comprehensive integrated health risk or impact assessment would take these collateral externality gains into account and would provide the best basis for decision-making about the public health impact of road transport. The potential for using CRA to contribute to HIA and to account for the wide range of issues inherent in transport decision-making is significant, but the scientific and consultative resources needed to do this effectively should not be underestimated. **Source of funding**: Burnett Award to Professor McMichael and the Australian National Medical Health and Research Council Capacity building grant in environmental health.

				concerns. This may simply shift the imbalance, so that the quantified factors are considered, but qualitative factors are not. Overall author conclusions- HIA offers substantial steps forward by providing a structure that encourages stakeholder participation and by potentially generating more ‘‘socially robust’’ policy decisions. CRA offers strengths in the comprehensive and systematic use of scientific information to yield more ‘‘scientifically robust’’ outcomes. Application of CRAs within a more flexible HIA framework has the potential to enhance decision-making along both social and scientific dimensions.	

Title of paper: **Rapid health impact appraisal of eviction versus a housing project in a colony dwelling Roma community**

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Kosa, K Molnar, A. McKee, M & Adany, R. construction accidents. & diarrhoeal disease. **Year:** 2007 **Citation**: Journal Epidimiol Community Health.: **61** 960-965 **Aim of study**: Project looks at the health implications between two potential options to improve the health & social wellbeing of a 'Roma' community living in a squat in Hungary. Options were building a new housing project near the same site, or putting the residents on a housing register, but not necessarily re-housing them immediately. **Study design**: Case study assessment-comparison of two options **Quality score**: **+** **External validity score: +**	**Country**: Hungary **Setting** (eg urban/rural) urban **Population**: Roma community, comprising 70 people, including 25 children living in a government owned building illegally with no sanitation or power.	**Project**: Assessed the implications of two options for the Roma community. Option 1- eviction from the current buildings, and owing to a shortage of housing in the city, placing the families on a waiting list for social housing. This option entailed taking some children in to care. Option 2- the creation of a new housing project, either on the same site or elsewhere- but maintaining the coherence of the community. **Method of appraisal**: Health Impact Appraisal	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: Y (iv) Post-development evaluation: Y *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: Y (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: Y Specify: gastro intestinal disease, smoking, alcohol consumption. Access to education Wellbeing of children not put into care, or communities broken up with likely associated problems. *c) Knowledge outcome:* Planners health knowledge or skills: Y *d) Other outcome*: Y Specify:	The process of undertaking the HIA, highlighted the issues that might otherwise have been overlooked, such as some of the financial costs & benefits. It also showed the first successful participation of this type with the marginal Roma community. The HIA meant it was possible to delay the eviction and establish a broad-based consortium to address housing problems facing the community. The project served as an important acknowledgement of the value of HIA, as without an already disadvantaged group, would have been made homeless under ordinary EIA. Author conclusions-make HIA a statutory requirement. Short term financial gain must be set against long-term health losses.	**Limitations identified by author(s)**: Information in research only offers a snap shot in time. Does provide an important baseline against which to assess the communities' health. **Limitations identified by review team**: Limited direct transferability due to relatively small community **Evidence gaps &/or recommendations for future research**: Decisions on housing of disadvantaged communities have important consequences for health & thus should be informed by HIA. **Source of funding**: ETT 445/2003 Of The Ministry Of Health, Social & Family Affairs. 3017/13/2003-0017 NUF of the Ministry of Health NKFB-1B/0013/2002 of the Ministry of Education Hungary.

Title of paper: ***Integrated environmental impact assessment: a Canadian example***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Kwiatkowski, R., Ooi, M. **Year:** 2003 **Citation**: Bulletin of the World Health Organisation 2003, 81; (6); 434-438 **Aim of study**: Review of an Integrated Impact Assessment against 7 of the determinants of health **Study design**: Case study **Quality score**: **+** **External validity score: ++**	**Country**: Northern Canada **Setting** (eg urban/rural) Rural, very low density population **Population**: Three territories: Yukon, Northwest Territories & Nunavut. Large proportion of Aboriginals, high unemployment, with significant health & wellbeing problems.	**Project**: 1994 proposal to develop Canada's first diamond mine **Method of appraisal**: Integrated Impact Assessment within EIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations made: Y (iii) Health recommendations acted upon: Y (iv) Health outcomes discussed during consultation: Y *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: Y (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: Y Specify: -education & skilling -employment -social support networks -preservation of culture -personal health programme/advice -health plan provision. *c) Knowledge outcome:* Planners health knowledge or skills: Y/N *d) Other outcome*: Y/N Specify:	Study conclusions: Health of environment is important part of a community's health, but not the only determinant. Integration of health, social & environmental considerations into an holistic assessment process facilitates decision-making which is fully consistent with Agenda 21. Of the diamond mine case, the Federal Government's Panel system of considering EIA said that the effects of the project were largely predictable & could be mitigated, & those not predictable could be monitored under the environmental management plan. The Panel made 29 recommendations accepted & actioned by the mining Company.	**Limitations identified by author(s)**: None **Limitations identified by review team**: Authors appear to have had a role in appraisal process **Evidence gaps &/or recommendations for future research**: - **Source of funding**: Unknown

Title of paper: ***Health Impact Assessment & community involvement in land remediation decisions.***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Lester, C., Temple, M. **Year:** 2006 **Citation**: Public Health (2006) 120, 915-922. **Aim of study**: Description of collaborative HIA of land remediation options where action had been delayed by conflict between stakeholders. **Study design**: Literature & case study review **Quality score**: **+** **External validity score: +**	**Country**: Wales **Setting** (eg urban/rural) urban **Population**: Cynon Valley, South Wales: former coal mining area – legacy of ill-health - socio-economic deprivation	**Project**: Options' appraisal for site of spoil left after closure of smokeless fuel factory (minimal action or full remediation) **Method of appraisal**: HIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: Y (iv) Post-development evaluation: Y/N ? *b) Specific outcomes:* (i) Physical activity: Y (ii) Mental wellbeing: Y (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: Y/N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: Y/N *d) Other outcome*: Y/N Specify: neighbour consultation	The fact that residents perceived that site was affecting health, is a strong predictor of poor self-reported ill health: the belief is more harmful than actual toxicity. Conclusion was that the noise & atmospheric pollution would be acceptable in the short term if all traces of the factory were removed. Inaction may have had fewer negative health impacts, but the majority view of residents that it should be removed was overwhelming. Work was commenced on site clearance. Benefits of collaborative HIA are highlighted (local knowledge & experience).	**Limitations identified by author(s)**: - **Limitations identified by review team**: Author carried out the HIA **Evidence gaps &/or recommendations for future research**: **Source of funding**: Unknown

Title of paper: ***Odour control and the planning arena***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Manning, K., Jeavons, J. **Year:** 2000 **Citation**: Water Science & Technology, Vol 41 No 6 pp 1-8 2000 **Aim of study**: The role of planning in minimising odour pollution & examine the effectiveness of EIA process with reference to communication. Case study of Derby STW. **Study design**: Literature review & then case study **Quality score**: **+** **External validity score: +**	**Country**: England **Setting** (eg urban/rural) Urban edge **Population**: (size , characteristics…) Spondon, south of Derby. Residential neighbourhoods close by. Long history of complaints about odours.	**Project**: New Primary Settlement Tank & storm tanks etc at established Sewage Treatment Works. EIA formed part of planning application. **Method of appraisal**: EIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented:/N (iv) Post-development evaluation: Y/N *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y Odour (iv) Unintentional injury: N (v) Other health: N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: Y *d) Other outcome*: Y/N Specify: Public consultation	Odour pollution is a recognised health impact. Effective communication of complex technical data to planners & neighbours is essential. Importance of EIA process to effectively communicate issues. The EIA provided the vehicle to demonstrate mitigation of any potential odour impacts and thus the design of the replacement STW.	**Limitations identified by author(s)**: **Limitations identified by review team**: Authors employed by water company – assume undertook EIA? **Evidence gaps &/or recommendations for future research**: **Source of funding**:

Title of paper: ***The performance of EIA in Tanzania: an assessment***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Mwalyosi, R. and Hughes, R. **Year:** 1998 **Citation**: IRA research paper 41 **Aim of study**: Assess the influence and effectiveness of EIA in assisting national governments to implement sustainable development objectives **Study design**: EIA performance assessment in Tanzania through Case studies: - Desk study of EIA review literature to develop performance review approach - Case study to assess effectiveness of EIA across	**Country**: Tanzania **Setting** urban/rural **Population**: Workers in the plant Residential areas near the plant in Moshi town	**1. Project**: building of the Moshi Pesticide plant producing 3000 tonnes of fungicide **Method of appraisal**: EIA but stand alone as EIA undertaken after the plant was ready for commissioning – no link between project design and management	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N (iii) Evidence of being implemented: N (iv) Post-development evaluation: Y: preliminary EIA followed by a initial environmental evaluation according to author (not equivalent to a comprehensive EIA) *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: N (iv) Unintentional injury: N (v) Other health: N Specify: *c) Knowledge outcome:* Planners health	EIA indentified that major risks and severe health impacts could result from emissions or careless handling of carcinogenic and toxic chemicals Preliminary EIA recommended: Comprehensive EIA Training programmes for health and safety Waste incinerator **No recommendation implemented because of lack of funds** **EIA process did not involve significant levels of stakeholders involvement** (for all projects): Lack of robust legislative and procedural framework for EIA in Tanzania	**On all projects:** **Limitations identified by author(s)**: Impact of EIA on the planning process proved difficult to determine and not all impact can be determined in quantitative terms holistic study **Limitations identified by review team** (on study) Studies carried out before the national framework for EIA was adopted **Evidence gaps &/or recommendations for future research**: Examine situation after the EIA legislation was passed **Source of funding**: Ministry of foreign affairs of the Netherlands

Tanzania **Quality score**: **++** **External validity score: +**			knowledge or skills: N/R *d) Other outcome*: N/R Specify:		
	Setting: Merelani near Kilimanjaro airport, dry mionbo bushland and savanna scrubland **Population:** 25000 workers employed on site in unregulated gem mining activities, i.e. high risk activity -	**2. Project:** development of a commercial graphite and tanzanite mining operation and processing plant at Merelani – conflictual situation between artisanal mine operation on site and commercial one which generate high quantities of spoil, dumped on adjacent land, large emissions of dust and noise, some evaporation and groundwater infiltration of industrial solvents, detergents. **Appraisal:** EIA required by African development bank (ADB) and drew basic terms of reference. Project proponents carry out EIA. EIA reviewed by ADB	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (minimally) (ii) Health recommendations incorporated in proposal: N/R (iii) Evidence of being implemented: some minimal evidence (iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: Y Specify: economic benefit to the area *c) Knowledge outcome:* Planners health knowledge or skills: N/R *d) Other outcome*: N/R Specify:	EIA was minimal and flawed, many issues on construction and operation of project ignored no formal review process. **EIA met ADB requirements to release financing.** **EIA had no impact on siting, design and operation of project** **Some recommendations implemented: supply of water to cattle trough), but several not implemented, and no mitigation and monitoring recommendations**	**Limitations identified by author(s)**: Weakness of government level, no mediation between stakeholders.

	Setting: Pangani Falls **Population: rural**	**3. Project:** development of hydropower station **Appraisal:** EIA Preliminary EIA statement in 1989, followed by separate studies on biodiversity, env. And socio-eco. 89-94; final EIA document in 1994, 1 year before construction was completed. Terms of reference prepared by funders.	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N/R (iii) Evidence of being implemented: N/R (iv) Post-development evaluation: Y *b) Specific outcomes:* (i) Physical activity: N/R (ii) Mental wellbeing: N/R (iii) Air / noise quality etc: N/R (iv) Unintentional injury: N/R (v) Other health: N/R Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N/R *d) Other outcome*: N/R Specify:	EIA focused on direct impact at project site and failed to predict social and environment issues that later undermined the performance of project. Little public involvement. EIA recommended some mitigation measures **but no significant influence of EIA on decision-making because:** - EIA carried out too late - No integration between project design and EIA Only limited impact on environmental management and design (but evidence weak).	
	Setting: rural, national park **Population**:staff, tourists visiting the Park	**4. Project:** Tourist development in Serengeti National Park, including an incinerator which might	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health	**Rare example of EIA process continuing after the submission of the EIS, providing a framework for**	**Limitations identified by author(s)**: Project proponents

	and villages around the park	have health impact **Appraisal:** EIA at short notice and detailed project designs already prepared by the time the EIA work had started.	recommendations incorporated in proposal: Y (iii) Evidence of being implemented: N (iv) Post-development evaluation: Y *b) Specific outcomes:* (i) Physical activity: N/R (ii) Mental wellbeing: N/R (iii) Air / noise quality etc: Y (iv) Unintentional injury: N/R (v) Other health: N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N/R *d) Other outcome*: N/R Specify:	**negotiation between the proponent and regulator, hence problem identified (liquid waste disposal was addressed in EIA).** EIS per se had minimal direct effect on decision-making at the site as design was completed prior to EIA, also minimal impact on day to day operation of lodge. **Key EIS recommendation of integration of adequate liquid waste treatment facilities into project design had not been implemented at time of evaluation.**	are committed to environmental management, so it is difficult to determine the real influence of the EIA on that project. + Regulator (Tanzanian Park Authority - TANAPA) offers a regulatory framework for EIA that is absent in the rest of Tanzania.
	Setting: rural, national park **Population:** staff, visitor and villages around the park	**5. Project:** tourist development at Grumeti, Serengeti National Park, tented camp. Siting the generator and incinerator close to staff and visitor accommodation can have health impact. **Appraisal:** EIA after	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N (iii) Evidence of being implemented: N (iv) Post-development	EIS recommended a number of features to reduce the environmental impact of the camp. **EIA effect on project planning was marginal,** mainly due to the late stage at which EIA was initiated, little scope to address	

		feasibility studies and project designs had been completed but before formal approval was given by TANAPA. Again short notice to prepare EIA.	evaluation: Y: preliminary EIA followed by a initial environmental evaluation according to author (not equivalent to a comprehensive EIA) *b) Specific outcomes:* (i) Physical activity: N/R (ii) Mental wellbeing: N/R (iii) Air / noise quality etc: Y (iv) Unintentional injury: N/R (v) Other health: N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N/R *d) Other outcome*: N/R Specify:	alternative options and influence environmental performance. **Compliance with recommendations: poor**	
			Mc Arthur river (c) Outcomes measured: broader *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N/R (iii) Evidence of being		

			implemented: N/R (iv) Post-development evaluation: Y *b) Specific outcomes:* (i) Physical activity: (physical health) Y (ii) Mental wellbeing: Y (iii) Air / noise quality etc: Y (iv) Unintentional injury: N (v) Other health: Y Specify: health based monitoring and assessment programmes set up : Assessment of physical health (contaminants) Epidemiological assessment (cancer/mortality) Broader social and community health assessment (employment, income, education, housing, environment, lifestyle, traditional land-use activities) *c) Knowledge outcome:* Planners health knowledge or skills: N/R *d) Other outcome*: N/R Specify		

Title of paper: ***Integrating human health into environmental impact assessment: case studies of Canada's northern mining resource sector***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors: Noble, B. and Bronson, J. **Year:** 2005 **Citation**: ARCTIC 58 (4), p. 395-405 **Aim of study**: Considers whether and how health considerations in EIA have evolved and current nature and scope of health integration in the mining resource sector of the Canadian North. **Study design**: 3 case studies Mixed case study methods Document review and analysis (discourse) Semi-structured interviews of key informants Authors own experience in EIA	**Country**: Canada **Setting**: rural, north of 60° **Population**: **Equity:** Northern society Inuit/indigenous Population Effect of projects on their culture, way of life and health considered	3 mining Projects: 1. Uranium mining in northern Saskatchewan (a) Rabbit Lake-Eagle Point Extension (b) Cluff Lake (c) Mc Arthur river	**Rabbit Lake-Eagle Point Extension (a) Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N/R (iii) Evidence of being implemented: N/R (iv) Post-development evaluation: Y *b) Specific outcomes:* (i) Physical activity: Y (physical health) (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y (radiations) (iv) Unintentional injury: N/R (v) Other health: N/R Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N/R	a. Rabbit Lake): Review panel questioned quality of data of project proponents (samples of local environment), data collection process, hence impact of mining on health and safety of local population not monitored satisfactorily and cannot provide assurance	**Overall comments from author on all case studies:** 1. Little consistency in the integration of human health into project assessment

Quality score: **+** **External validity score: +**			*d) Other outcome*: N/R Specify: NB: EIA focused mainly on physical health and health risks from radiation exposure		
			Cluff Lake (b) Outcomes measured: narrow <u>*a) Process outcomes:*</u> (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N/R (iii) Evidence of being implemented: N/R (iv) Post-development evaluation: unclear <u>*b) Specific outcomes:*</u> (i) Physical activity: Y (physical health) (ii) Mental wellbeing: Y (iii) Air / noise quality etc: Y (radiations) (iv) Unintentional injury: N/R (v) Other health: Y Specify: Employment	b. (Cluff Lake) Review panel acknowledge difficulties in assessing social and other health impacts of uranium mining on the North where there is already social disorder. Causal link cannot be made clearly between project and health impacts	

			Business opportunities Involvement in EIA process Sponsorship donations *c) Knowledge outcome:* Planners health knowledge or skills: N/R *d) Other outcome*: N/R Specify: NB: EIA focused mainly on physical health and health risks from radiation exposure		
			Mc Arthur river (c) Outcomes measured: broader *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N/R (iii) Evidence of being implemented: N/R (iv) Post-development evaluation: Y *b) Specific outcomes:* (i) Physical activity:	c. Mc Arthur River: EIS included broad determinants of health	

			(physical health) Y (ii) Mental wellbeing: Y (iii) Air / noise quality etc: Y (iv) Unintentional injury: N (v) Other health: Y Specify: health based monitoring and assessment programmes set up : Assessment of physical health (contaminants) Epidemiological assessment (cancer/mortality) Broader social and community health assessment (employment, income, education, housing, environment, lifestyle, traditional land-use activities) *c) Knowledge outcome:* Planners health knowledge or skills: N/R *d) Other outcome*: N/R Specify:		
		2. Northwest Territories diamond mine	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes	**2 (diamond mine)** Monitoring partnership good step but data collection too	2. EIAs have tended to focus on elements that the project

			considered: Y (ii) Health recommendations incorporated in proposal: Y (proponents included panel recommendations for management actions to take into account impact on traditional land use and lifestyles (iii) Evidence of being implemented: N/R (iv) Post-development evaluation: Y *<u>b) Specific outcomes:</u>* (i) Physical activity: Y (ii) Mental wellbeing: Y (iii) Air / noise quality etc: unclear (iv) Unintentional injury: Y (v) Other health: Y Specify: development of a monitoring partnership between project proponents and government of NWT, to assess effects of mining on the health and well-being of local population	broad geographically, hence inconclusive results in linking social and health changes to diamond mining.	proponents control (i.e. employment, business opportunities:

			(suicide, injuries, alcohol-related crime, teen births, family violence, communicable disease, average household income. *c) Knowledge outcome:* Planners health knowledge or skills: N/R *d) Other outcome*: N/R Specify		
		3. Voisey's Mine/mill for production of mineral concentrates	3. Voisey's Mine/mill for production of mineral concentrates **Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N (iii) Evidence of being implemented: N/R (iv) Post-development evaluation: Y *b) Specific outcomes:* (i) Physical activity: Y (ii) Mental wellbeing: Y	3.Voisey's mine: one of the most comprehensive northern EIA completed as considered health impact on Innu and Inuit populations in detail: Land-use activities and wildlife migration patterns. + sustainability mandate of the EIA + Gender-based impacts required by review panel	3. little evidence from cases that social health and quality of life are monitored well post EIA stage.

			(iii) Air / noise quality etc: Y (iv) Unintentional injury: N/R (v) Other health: Y Specify: traditional land-use activities, housing, quality of life, health, diet and country food dependency, morbidity, mortality and interactions between these indicators *c) Knowledge outcome:* Planners health knowledge or skills: N/R *d) Other outcome*: N/R Specify	BUT more focus on existing social, economic and health issues to argue that project will help address these rather than considering the direct negative impact of project. Gender-related issues: no serious impact noted and no remedial action taken.	

		Method of appraisal: EIA by new project proponents And initial EIA reviewed by panel of independent experts when impacts on environment high			This is explained by:: - Perhaps legislation that defines environmental effect as focussing mainly on impact of project on physical environment and addresses human/health impacts only when caused by environmental changes directed due to project actions. - challenging to construct model to understand the relationship between environmental changes and health Recommendation from authors : - Adopt inclusive definition of health - only to allow projects that have a positive effect on health conditions - require

					monitoring of health and social impacts not only the biophysical impacts - design management and mitigation programmes relevatnt o northern culture **Limitations identified by review team**: Cases linked to northern population where projects come from outside corporations, clear specific cultural and equity issues. **Evidence gaps &/or recommendations for future research**: Base line in social health and quality of life, develop methods to monitor health and social impacts efficiently post EIA **Source of funding**: Social Sciences and humanities research council of Canada

Title of paper: ***Experiences in the first pulp mill project submitted to the environmental impact assessment system in Chile***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Pena Alid, A. **Year:** 2002 **Citation**: UNEP 'EIA Training Resource Manual' **Aim of study**: To review a voluntary (ie pre-regulation) EIA & its procedures **Study design**: EIA reviewed against the EIA System for Chile. **Quality score**: **+** **External validity score:** **+**	**Country**: Chile **Setting** (eg urban/rural) Unknown (possibly rural) **Population**: Small communities in Southern Chile	**Project**: Pulp Mill adj Cruces River & RAMSAR site **Method of appraisal**: EIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: Y (iv) Post-development evaluation: Y *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y (iv) Unintentional injury: N (v) Other health: N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: Y Specify: Socio-economic: - increase in jobs -cultural -impact on infrastructure & services	Applicant had to set up SO^2 monitoring & a control system to reduce emissions. NOTE: it is unclear whether this was for protection of humans or RAMSAR	**Limitations identified by author(s)**: **Limitations identified by review team**: **Evidence gaps &/or recommendations for future research**: **Source of funding**: Unknown

Title of paper: ***Validating health impact assessment: Prediction is difficult (especially about the future)***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Petticrew, M., Cummins, S., Sparks, L., Findlay, A. **Year:** 2007 **Citation**: Environmental Impact Assessment Review 27 (2007) 101-107 **Aim of study**: Retrospective HIA to consider the difference between predicting health impacts and measuring them. **Study design**: Comparison of diet & self reported health for new food store with similarly deprived area without a store, using a quasi-experimental study design. **Quality score**: **+** **External**	**Country**: Scotland **Setting** (eg urban/rural) urban **Population**: Springburn, Glasgow: One of the most deprived locations in UK. High levels of ill health, smoking; Mean income 1/3rd below Scottish average.	**Project**: Tesco hypermarket **Method of appraisal**: Limited scope, retrospective HIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N/R (iii) Evidence of being implemented: N/R (iv) Post-development evaluation: Y *b) Specific outcomes:* (i) Physical activity: N/R (ii) Mental wellbeing: N/R (iii) Air / noise quality etc: N/R (iv) Unintentional injury: N/R (v) Other health: Y Specify: Fresh food provision *c) Knowledge outcome:* Planners health knowledge or skills: N/R *d) Other outcome*: Y Specify: Employment	Contrary to a previous study on a food store in a 'food desert' in Leeds, which found a statistically significant increase in fruit & vegetable consumption (Wrigley et al 2002, 2003), this study, despite a an increase of about 1/3rd of a portion /day, had no more of an increase than a control area. "Therefore the new store did not significantly impact on the most plausible health related outcome – diet". Need for control groups in monitoring & predictive validation. Prospective validation is not the only means of validating the accuracy of HIA predictions. Retrospective desk-based tests of the predictive abilities of	**Limitations identified by author(s)**: Limited HIA **Limitations identified by review team**: **Evidence gaps &/or recommendations for future research**: **Source of funding**: UK Department of Health (Phase 1 of its Inequalities in Health Initiative).

validity score: +				HIA practitioners, may shed some light on how evidence is used & weighted, & provide an indirect estimate of the validity of HIA predictions.	

Title of paper: ***Prevention is Still Better than Cure: planning for healthy communities***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Planning Advisory Service **Year:** 2008 **Citation**: IDeA November 2008 **Aim of study**: To identify successful initiatives in creating healthy environments **Study design**: Case study reviews **Quality score**: **+** **External validity score:** **+**	**Country**: England **Setting** (eg urban/rural) Various **Population**: Various	**Project**: Various **Method of appraisal**: HIA, SA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: Y (iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: Y (ii) Mental wellbeing:/N (iii) Air / noise quality etc: N (iv) Unintentional injury: N (v) Other health: Y Specify: - community development workers -facilitating fresh food retailing *c) Knowledge outcome:* Planners health knowledge or skills: Y *d) Other outcome*: Y Specify: -Collaboration between public health & planning professionals -Robust evidence base for public health needs	1. Need to sell benefits of planning for healthy communities: planning & health's role 2. Plan strategically (health into planning & planning into health) 3. Be realistic about opportunities & limitations 4. Mitigate negative health impacts & increase positive.	**Limitations identified by author(s)**: **Limitations identified by review team**: Seemingly anecdotal **Evidence gaps &/or recommendations for future research**: **Source of funding**: Unknown

Title of paper: ***Environmental Impact Assessment of the Camisea Gas Project: the importance of consultation and local participation***

Study details	**Population and setting**	**Project details and method of appraisal**	**Outcomes assessed***	**Results**	**Notes**
Authors Shoobridge, D., Kapila, S **Year:** 2002 **Citation**: UNEP 'EIP Training Resource Manual' **Aim of study**: Study of EIA with particular ref to public consultation & participation. **Study design**: Review of procedures & outcomes **Quality score**: **+** **External validity score:** **+**	**Country**: Peru **Setting** (eg urban/rural) Rural/rainforest **Population**: Indigenous population in Camisea Region of south-east Peru	**Project**: Additional Gas plant, 600km pipeline to coast & fractioning plant & marine terminal. Pre-planning application or application stage. **Method of appraisal**: EIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: N (iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: Y/N (ii) Mental wellbeing: Y (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: Y Specify: - Disturbance to fish (food source) - Increase in river traffic interfere with washing/bathing - new diseases imported *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: Y/N Specify: impact on education & agriculture	Significant levels of public consultation was undertaken to identify human health impacts. After 4 years appraisal, the project was not continued as not considered viable. Some mitigation & goodwill measures agreed: 1. Assessment of impact of helicopters on game 2. Empowerment training for women and elders 3. Development of river safety programmes 4. Establish flight paths to minimise disruption 5. Strict control of loggers 6. Forestry & agriculture training programmes 7. Establish links to markets 8. Promote palm re-afforestation Local participation is key to delivering long term project success.	**Limitations identified by author(s)**: Project halted. **Limitations identified by review team**: Author employed by consultancy conducting the EIA **Evidence gaps &/or recommendations for future research**: **Source of funding**: Unknown

Title of paper: **Environmental Impact Assessment a healthy outcome**

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Sutcliffe, J. **Year:** 1995 **Citation**: Project Appraisal 10:2. 113-124 **Aim of study**: This article concentrates on the UK, using a study of EISs to determine whether health was in practice included. 10 EISs are considered. Hinkley point nuclear power station is considered in detail. As is EIS for installation of power lines. **Study design**: Cross sectional **Quality score**: **+** **External validity score:** **+**	**Country**: UK **Setting** (eg urban/rural) rural **Population**: Unknown for 9 of the 10 summary case studies. In-depth case study: Hinkley Point Nuclear Power Station, Somerset- over 23,000 people objected. 82 individuals or groups involved in the planning inquiry.	**Project**: The paper reviews 10 EISs briefly to determine the health effects considered, and compares it to health effects that should have been included. Then looks in detail at 1that went to public inquiry on health grounds. **Brief description given of 10 EISs, plus extra in-depth & comparison with Canadian case.** **Method of appraisal**: Cross sectional study of EISs statements, reviewed to determine health effects considered, and omissions in the assessment of health. **Project** <u>1. Combined cycle gas turbine, Didcot, Oxon.</u>	**Outcomes measured**: **See below for individual projects** **Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y Ltd (ii) Health recommendations incorporated in proposal: N	‘Safety brief mention, relevant H&S legislation mention, Consultation with HSE. Ch6 mentions EHO with ref to noise. No specific mention of health’	**Limitations identified by author(s)**: **Limitations identified by review team**: Unbiased sampling not assured. Limited detail extracted on 9 of the cases **Evidence gaps &/or recommendations for future research**: Extend the process of EIA used for projects, for plans, programmes and policies. Inclusion at the policy level would greatly improve systematic inclusion of health impacts. **Source of funding**: Not reported.

			(iii) Evidence of being implemented: N (iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y Ltd (iv) Unintentional injury: N (v) Other health: N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify:		
		Project: <u>2. Flue gas desulphurisation, Drax, Yorks.</u>	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: N (ii) Health recommendations incorporated in proposal: N (iii) Evidence of being implemented: N (iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: N Ltd	'No specific health effects addressed. Refers to noise, vibration, water & air qual but no health consequences. Standards are considered for health but not spelled out, nor who in the community would be affected and extent'.	

			(iv) Unintentional injury: N (v) Other health: N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify:		
		Project: <u>3.Coal-fired power station, Fawley, Hamps.</u>	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: N (iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y (iv) Unintentional injury: N (v) Other health: Y Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N	Reference to additional employees leading to increase for health services (gives reference to Oxford Polytechnic study) and on site medical centre. Chapters on air & water quality, solid products, noise & vibration.	

		Project: **5.** Nuclear power station, Hinckley Point, Somerset. **(detailed case study)**	*d) Other outcome*: N Specify: **Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: N (iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: Y Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify:	ES: section on H&S refers back to public enquiry at Sizewell Sections on radiation exposure for members of the public and assessment of radiological impacts. Includes some accidents. Health services requirements mentioned: GPs health visitors, facilities on-and-off-site. Excludes consideration of supporting activities; uranium mining & mills, tailings, enrichment, hexafluoride process & their waste streams. Does not include alternatives and health impacts. Does not list chemicals nor cumulative implications. Evidence brought out in the public enquiry included likely increase in childhood cancer, based on outcomes of Sizewell inquiry.	
		Project: 5. Hayle Harbour,	**Outcomes measured**: *a) Process outcomes:*		

		Hayle, Cornwall	(i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: N (iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: N (iv) Unintentional injury: Y (v) Other health: N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify:	Accidents on sand bar at harbour mouth, closure to large boats because unsafe. Transport in separate report.	
		Project: 6. Waste disposal gypsum, Barlow, Yorkshire	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N (iii) Evidence of being implemented: N (iv) Post-development evaluation: N	Materials assessed (COPA Special waste) Regs 1980. Special license not required. Goo d housekeeping practices. Chapters on noise, dust & water quality.	

			b) Specific outcomes: (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y (iv) Unintentional injury: N (v) Other health: N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify:		
		Project 7. Asbestos works,Avonglen landfill site, Polmont, Scotland	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N (iii) Evidence of being implemented: N (iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: Y (iii) Air / noise quality etc: Y (iv) Unintentional injury: N (v) Other health: N Specify:	Examines landscape, traffic, noise pollution. Extremely ltd even on well known health risks linked to lung cancer, mesothelioma, asbestosis.	

		Project: 8. Oil refinery, Shell Haven refinery, Essex.	*c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify: **Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: N (iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: Y Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify:	H&S in design, noise, Control of Industrial Major Accident Hazards (CIMAH), Control of Substances Hazardous to Health (COSHH) regs 1989- aims to reduce workplace occupational ill health.	

		Project: 9. Wind Park, Capel Cynon, Wales. **Project:** 10. Road, A50 Trunk Blythe Bridge to Queensway, Staffs.	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N (iii) Evidence of being implemented: N (iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y (iv) Unintentional injury: N (v) Other health: N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify: **Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N (iii) Evidence of being implemented: N	Chapters on visual, noise, construction, flicker Vehicle exhaust emission hazards: lead, polycyclic aromatic hydrocarbon (PAH), petrochemical oxidants, carbon monoxide (CO) nitrogen dioxide (NO2), fumes Noise, pollution, pedestrians &	

			(iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify:	accidents.	

Title of paper: ***Social Impacts of out-of-centre shopping centres on town centres: A New Zealand case study***

Study details	**Population and setting**	**Project details and method of appraisal**	**Outcomes assessed***	**Results**	**Notes**
Authors Taylor, N, McClintock, W. & Buckenham, B. **Year:** 2003 **Citation**: Impact Assessment and Project Appraisal. Vol 21:2. 147-153 **Aim of study**: Indicates the value of SIA in highlighting social, cultural & quality of life benefits. **Study design**: Case study review **Quality score**: **+** **External validity score:** **+**	**Country**: New Zealand **Setting** (eg urban/rural) Urban **Population**: Residents of a Wellington suburb. Low income	**Project**: A SIA undertaken after pressure from local residents to overturn a planning decision to grant permission to an out of town retail centre **Method of appraisal**: Social Impact Assessment (SIA)	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: Y (iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: Y/ (ii) Mental wellbeing: Y (iii) Air / noise quality etc: Y (iv) Unintentional injury: N (v) Other health: YSpecify: *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: Y Specify: Retention of green space & protection of social capital & employment & accessibility in existing centre	An out of town shopping centre approved for planning permission using an environmental appraisal tool, was overturned following the undertaking, and consideration of a SIA. The local residents interviewed as part of the SIA were concerned over the deterioration of existing amenities and services in the main centre. As well as the loss of social capital, and green space. Deterioration of existing local amenities, such as health centre, shop variety, loss of green space/ loss of social contact opportunities.	**Limitations identified by author(s)**: Not reported **Limitations identified by review team**: The author represented the objectors in the planning enquiry-potential source of bias **Evidence gaps &/or recommendations for future research**: Not reported **Source of funding**: Not reported

Title of paper: ***Assessing the influence of environmental impact assessment on science and policy: an analysis of the three Gorges project***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Tullos, D. **Year: 2009** **Citation**: Journal of international Management 90 (2009) S208-S223 **Aim of study**: Examines the feedback between science and policy and EIA **Study design**: Review of case study **Quality score**: **+** **External validity score:** **++**	**Country**:China **Setting** rural but some human/urban settlements affected by project **Population**: ¾ million – 1.2 million estimates of population resettled.	**Project**: Damming of 3 Gorges for flood protection, hydropower regeneration and improved navigation **Method of appraisal**: EIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: N/R (iii) Evidence of being implemented: N/R (iv) Post-development evaluation: N/R *b) Specific outcomes:* (i) Physical activity: N/R (ii) Mental wellbeing: N/R (iii) Air / noise quality etc: N/R (iv) Unintentional injury: N/R (v) Other health: Y Specify: water quality Pollution would limit fish consumption *c) Knowledge outcome:* Planners health knowledge or skills: Y *d) Other outcome*: Y/N Specify:	EIA recommendations stated that project would have environmental impacts, but nature of these impact on health not described on paper, although health impact considered by EIA Broad result is that: Government decided that it was important to implement recommended measures (but we are not sure if there were any linked to human health directly) for limiting environmental impact, BUT concluded that **"environmental issues do not affect the feasibility of the project".**	**Limitations identified by author(s)**: EIA process would have benefited from the integration of a more formal and interdisciplinary approach for characterising the uncertainty of impact projections. -need for policy that continuously integrate scientific findings **Limitations identified by review team**: Chinese context examined: no mention of governance issues and government economic priorities **Evidence gaps &/or recommendations for future research**: Health impact, although mentioned by study was not detailed enough to draw any conclusions. **Source of funding**: National Science Foundation (USA)

Title of paper: **Assessing health impacts of the Chad-Cameroon petroleum development and pipeline project: challenges and a way forward**

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Utzinger, J, Wyss, K, Moto, D.D., Yemadji, N'D., Tanner, M * Singer, B.H **Year:** 2005 **Citation**: Environmental Impact Assessment Review. 25 63-93 **Aim of study**: Presentation of a summary of the implementation of the HIA, expand and update previous reports on the HIA. Also develop a guiding framework of 5 steps for HIA, review project documents and relevant literature. Advance a series of broad determinants if health, social wellbeing and equity, beyond the project fence line. **Study design**: Case study evaluation **Quality score**: **++** **External validity score:** **++**	**Country**: Chad & Cameroon **Setting** (eg urban/rural) Rural **Population**: Population density 17 persons / km2, dependent primarily on agriculture. Very poor, average annual income US$200 per annum. Poor health, life expectancy of 50, 1 in 5 children die before they're 5. Major health risks, malaria & HIV/AIDS.	**Project**: US $37 oil extraction & pipeline in sub-Saharan Africa,. 300 deep wells in southern Chad near Doba, connected by 1000km of pipeline through Chad & Cameroon, to a floating storage vessel. Additional infrastructure includes upgraded and new rail, road and air strips, new bridges and storage and shipping yards, and 18 work camps. A training centre for workers, offices and accommodation for the work force. Financed by a consortium of private sponsors, and World Bank group loans. **Method of appraisal**: Environmental Assessment and accompanying Environmental Management Plans (EMP), and Health Impact Assessment explored through an human environment, socioeconomic and public health survey.	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: Y (iv) Post-development evaluation: Y/N *b) Specific outcomes:* (i) Physical activity: **N** (ii) Mental wellbeing: **Y** (iii) Air / noise quality etc: **N** (iv) Unintentional injury: **Y** (v) Other health: **Y** Specify: vector borne disease and sexually transmitted disease. Water borne disease, poor hygiene & low vaccine coverage *c) Knowledge outcome:* Planners health knowledge or skills: **Y** *d) Other outcome*: **Y** Specify: Training of 30 nurses in Chad, facilitated through community health outreach.	Sources health Exxon Mobil & World Bank reports (web accessed), quarterly reports. 2 Inspection Panel Reports and International Advisory Group (IAG) report, and the External Compliance Monitoring Group (ECMG) assessment of health. **Specific outcomes-** H&S- on-site training, protective clothing, prompt medical help, speed limits, clearing of vegetation, good maintenance of equipment & vehicles. HIV/AIDS & STI prevention, include information, education, free condoms, subsidised in local area. Malaria control programme, included information, protective nets & drugs. **Knowledge-** The development of industry wide HIA standards through IPIECA illustrate incorporation	**Limitations identified by author(s)**: None **Limitations identified by review team**: **Evidence gaps &/or recommendations for future research**: Propose the establishment and running of a longitudinal demographic surveillance system-coupled with regular household surveys to facilitate monitoring and evaluation of impacts on health, social wellbeing and equity. A cross sectional seroepidemiological study is required to assess the risk if further spreading of HIV/AIDS. The lack of involvement of any NGO with a health focus, highlights the wisdom that environmental & human rights concerns take precedent over health concerns in these type of development.

				of health issues into the planning of future petroleum industry projects. **Findings-** Clear distinction between health considerations inside the project confines, and outside.	**Source of funding**: Centre for Health and Wellbeing Princeton University and the Swiss National Science Foundation & the Swiss Agency for Development and Cooperation.

Title of paper: ***Social Impact Assessment in Finland, Bypass of the City of Hamina***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Viinikainen, T., Kaehoe, T. **Year:** 2007 **Citation**: Routes Roads 2007 Vol 333 pp 18-23 **Aim of study**: Case study of the social impact assessment and citizen participation in appraisal of a bypass **Study design**: Not detailed **Quality score**: **+** **External validity score: +**	**Country**: Finland **Setting** (eg urban/rural) Urban **Population**: City of Hamina	**Project**: Bypass to enable upgrade of existing European Route to St Petersburg **Method of appraisal**: SIA to accompany EIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations incorporated in proposal: Y (iii) Evidence of being implemented: Y (iv) Post-development evaluation: N *b) Specific outcomes:* (i) Physical activity: Y (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: Y Specify: Community participation *c) Knowledge outcome:* Planners health knowledge or skills: Y/N *d) Other outcome*: Y/N Specify:	Main purpose of SIA is to understand & anticipate how a proposed action will change the life of the community. SIA is well integrated into Finnish road planning. Case study took particular consideration of population groups eg children, disabled, seniors & hard to reach groups. SIA complements EIA. Can facilitate planning process & can ease communities' anxieties. Irreplaceable local knowledge is gained & people had affect on numerous decisions.	**Limitations identified by author(s)**: **Limitations identified by review team**: Single example. Authors possibly not independent. **Evidence gaps &/or recommendations for future research**: **Source of funding**: Unknown

Title of paper: ***The Effectiveness of Heath Impact Assessment, Scope & limitations of supporting decision-making in Europe***

Study details	Population and setting	Project details and method of appraisal	Outcomes assessed*	Results	Notes
Authors Wismar, M., Blau, J., Ernst, K., Figueras, J. **Year:** **2007** **Citation**: WHO 2007 on behalf of European Observatory on Health Systems & Policies **Aim of study**: To map HIA use in EU & evaluate its effectiveness. **Study design**: Literature review & then map HIA use across EU. Review effectiveness of 17 HIA case studies (6 relevant to R1). **Quality score**: **+** **External validity score:**	**Country**: Europe **Setting** (eg urban/rural) Various **Population**: Various	**Projects**: Six individual projects across EU – all major & all analysed by HIA or a form of HIA: **Project** 1.Kings Cross, London: six major developments-HIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations made: Y (iii) Health recommendations acted upon: Y (iv) Health outcomes discussed during consultation: Y	**Authors' Overview:** Most of 17 HIAs in case studies proved effective in some way, but the magnitude of influence varied from "direct effectiveness" (led to modification), "general effectiveness" (no modification, but links understood & awareness raised), "opportunistic effectiveness" (HIA done in support of proposal), or "no effectiveness". It is difficult to assess the effectiveness of the King's Cross HIA for several reasons. The criteria that have been set for the evaluation are not identical to the aims set by the HIA itself and, while it may have been effective in its own terms, it may not be as effective against the criteria set by this	**Limitations identified by author(s)**: Unrepresentative as only limited number of HIA studied, given the coverage. Mainly national level projects, not local or regional levels. **Limitations identified by review team**: Case studies chosen for inclusion based on effectiveness as deemed by individual country researchers (not by authors). **Evidence gaps &/or recommendations for future research**: -HIA predictions need improving -Link sectors who are involved in decision-making. **Source of funding**: European Union Public Health Work Programme

++			*b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: Y (iii) Air / noise quality etc: Y (iv) Unintentional injury: N (v) Other health: Y Specify: - primary care provision *c) Knowledge outcome:* Planners health knowledge or skills: Y *d) Other outcome*: Y Specify: -innovative in community participation techniques to reach homeless, drug users & sex workers-	project. The HIA was one of many inputs into the decision-making process. Many people mentioned a lack of information about concrete examples of the HIA's influence on decision-making. **Most people agreed that the HIA was most directly effective in terms of health** (as opposed to equity or community effectiveness). The decision not to allow 24-hour working at King's Cross Central and the ensuing health benefits to the community were attributed directly to the PCTs' evidence at the planning enquiry. In addition, the problems identified with emergency planning and the subsequent changes in the planning proposals were attributed directly to the HIA. The primary care provision that is anticipated to be included in the Section 106 (Town and Country Planning Act, 1990) agreement is also felt to	

		_____ **Project:** 2.Tuscany, Italy: creation of ecosystem 'wet zone' Rural agriculturally productive area, low density population HIA	_____ **Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations made: Y (iii) Health recommendations acted upon: Y (iv) Health outcomes discussed during consultation: Y *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: N (iv) Unintentional injury: N (v) Other health: Specify: *c) Knowledge outcome:* Planners health knowledge or skills: Y *d) Other outcome*: Y Specify: -community education & empowerment	affect directly the health of the community and of passengers passing through King's Cross. _____ **For health, the HIA addressed all the essential hypothetical aspects in order to avoid unwanted environmental and health-related side-effects**. Such side effects included the association between wet zones and infectious diseases, prevalence of respiratory diseases and animal diseases. **A list of parameters was included as an integral part of the resolution to allow the creation of the wet zone.** The HIA highlighted different community impacts (e.g. agricultural versus suburban communities) for exposure to potential risks (mosquito) from the proposals.	

				Mayoral consent to the creation of the wet zone is conditional upon a *guarantee* from the agricultural firm. that any health damages that may affect the most exposed population which could result in the need to restore the original condition. **HIA activity has helped to empower the population.** It has also stimulated a higher concern and attention for future public decisions and a better understanding of interventions. _____ **HIA in Lithuania & this case in particular provides some interesting pointers**: the legal requirement for HIA puts health at the top of the agenda when new economic activities are planned. HIA is a very effective tool on the strategic level when multiple projects or programmes are planned. The HIA legal basis is dedicated to	
		_____ **Project:** 3. Klaipeda national Seaport, Lithuania , railway extension for seaport expansion plus road, new terminal buildings. Community of 4,000 residents separated from seaport by busy 4-lane road & railway. Existing environmental impacts from port activity.	_____ **Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations made: Y (iii) Health recommendations acted upon: Y (iv) Health outcomes discussed during consultation: Y *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N		

			(iii) Air / noise quality etc: Y (iv) Unintentional injury: N (v) Other health: N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify:	analysing planned economic activities on a single-project level, however this HIA was too late to affect decisions on the reconstruction as no alternatives were presented at the initial stage. The analysis in the HIA was descriptive and this did not lead to concrete Recommendations, however it found adverse effects of noise caused by heavy transport during and after railway reconstruction. It also indicated that the wagon yard will be built only 30 m to 40 m from houses and have a high negative impact. **The developers reacted immediately to this finding and offered to build a high-quality acoustic shield on the railway nearest to the neighbouring households**. Also the municipality plans to **build a crossroad from the city's suburbs to the seaport in**	

				response to the HIA's findings on heavy goods vehicles. The HIA had **little effectiveness for the community**. In accordance with national legislation, HIAs are very bureaucratic and have a **limited number of tools to facilitate community participation**.	
		Project: 4.Stockholm to port of Nynashamn, Sweden: upgrade/realignment of 25km road link (Route 73). Area of high landscape value also important for outdoor recreation. **Method:** HIA to inform EIA (partial) & also complementary HIA.	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations made: Y (iii) Health recommendations acted upon: Y (iv) Health outcomes discussed during consultation: Y *b) Specific outcomes:* (i) Physical activity: Y (ii) Mental wellbeing: Y (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: Y Specify: -Transportation of hazardous goods -accessibility	In Sweden, an EIA contains HIA (partial HIA) as a legal requirement of the Environmental Code. This kind of HIA is focused on environmental health determinants; equity is very seldom assessed and the gender perspective is analysed sparsely. In this case a **complementary HIA** was performed in accordance with the new public health policy in Sweden includes both social and environmental health determinants, equity and gender perspective. Also, all the health aspects are	

			c) Knowledge outcome: Planners health knowledge or skills: Y *d) Other outcome*: N Specify:	presented together to give the decision-makers an overview. HIA examined 7 alignment options: In February 2004 the Ministry of Sustainable Development and the Government made the **decision to permit the construction of Route 73 according to alternative E. The results of the complementary HIA strengthened alternative E's case as the best solution.** **Interviewees noted HIA effectiveness**: - partial HIA had direct health effectiveness as some **changes were made to the proposal** during the process because of presumed health effects. - The complementary HIA considered and analysed prioritised groups thereby helping to **raise awareness of equity** amongst practitioners, stakeholders and decision-makers. - HIA is cost-effective	

		Project: 5.Nant-y-Gwyddon landfill, Rhondda Valley, Wales: post closure remediation proposals. Self-reported health issues & later investigation led to closing of operation & remediation proposals. HIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations made: Y (iii) Health recommendations acted upon: Y (iv) Health outcomes discussed during consultation: Y *b) Specific outcomes:* (i) Physical activity: N (ii) Mental wellbeing: N (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: N Specify: *c) Knowledge outcome:* Planners health knowledge or skills: Y *d) Other outcome*: N Specify:	because it helps to **eliminate bad alternatives and leads to resources being invested in health-improving alternatives.** A remediation option was chosen by specialists following thorough investigation. This was then subjected to HIA. A stakeholder group was set up to undertake key aspects of the process and to facilitate the **partnership approach in order to ensure that the HIA process was participative and inclusive.** The HIA highlighted the need to consider equity and to ensure that no particular groups, especially vulnerable groups, were more affected than any other group in the surrounding area. Authors suggest that a cursory interpretation may conclude that this HIA represents an	

				example of direct health effectiveness, but interviews clearly illuminated the broader politicised arena in which the HIA was played out. The assessment was conducted in response to a long-standing argument between local residents and public agencies and represented an attempt to put the dispute to rest. The authors conclude "Possibly the greatest facilitator for ensuring that the HIA informed the decision-making in this case was the decision-makers own commitment to the process. This required a certain degree of risk … commitment to a participative approach meant that recommendations could have challenged directly the views of the statutory agencies. However, they appreciated the potential value of community engagement …and the process itself was felt to be beneficial….the HIA was felt to have informed local people of plans that	

				would affect their lives and helped to forge a relationship of trust between the community and the statutory agencies.	
		Project: 6. Berlin, Germany: new airport - HIA Densely populated area **Method of appraisal**: HIA	**Outcomes measured**: *a) Process outcomes:* (i) Health outcomes considered: Y (ii) Health recommendations made: Y (iii) Health recommendations acted upon: Y (iv) Health outcomes discussed during consultation: Y *b) Specific outcomes:* (i) Physical activity: Y (ii) Mental wellbeing: Y (iii) Air / noise quality etc: Y (iv) Unintentional injury: Y (v) Other health: Y Specify: -jobs *c) Knowledge outcome:* Planners health knowledge or skills: N *d) Other outcome*: N Specify:	The planning authority and federal legal court had the task of balancing the conflicting arguments and mediating between the different interests. Depending on their personal points of view interviewees reported that mediation had been only more or less successful. Airport opponents unanimously saw the imposed air traffic restrictions during night hours as a partial success of their efforts. However, scepticism remained as it is felt that the dispute between the conflicting parties could be continued when interpreting and establishing the framework of the court's decision (e.g. related to the night traffic between 22:00 and 05:00). **Health effectiveness***:*	

				success in bringing important and justified health demands from the affected population (by legal proceedings) could be identified. **Community effectiveness**: very strong in terms of the mobilization of citizens and community bodies in order to defend civil rights and health (by political, legal and technical defence).	

Appendix I: Studies excluded at the full text stage

Author, year	Reason for exclusion (See inclusion & exclusion criteria at Appendix D)
Al-Damkhi et al (2008)	(EC) 2, 4 only recommendation to incorporate EIA into development projects
Alenius K. (2001)	(EC) 4 No primary data
Antonson, H., Blomqvist, G. & Folkeson, L (2003)	(EC) 6 Full text would be in Swedish
Arenas, Jorge.P. (2008)	(EC) 4 Not an evaluation study (IC) 3 Was not met (comparison)
Aschemann, R. (2004)	(EC) 5
Ascher, N. (2001)	(EC) 2
Atkins Ltd for the Dept. of Transport (2009)	(EC) 3
Atkinson, P. et al (2005)	(EC) 2 Not a spatial planning process, however useful for R7
Bartlett School of Planning UCL (2003?)	(EC) 2, 4
Baviskar, A. & Kumar Singh, A. (1994)	(EC) 3
Birley, M.H. (1995)	(EC) 2,3,4,5 not met. Provides good methodological approach to HIA, and examples of likely health impacts in a range of development scenarios.
Birley, M. (2003)	(EC) 4
Birley, M. & Birley, V. (2007)	(EC) 2,4
Bond, A. et al for HDA (2005)	(EC) 5
Bronson, J. & Noble, B. (2006)	(EC) 2 but of interest as a review paper
Brown, A.L. & van Kamp, I. (2009)	(EC) 2, 3, 4
Burdge, R. (2003)	(EC) 4
Burns, J. & Bond, A. (2008)	(EC) 4
Cave, B. & Curtis, S. ((2001)	(EC) 2 HIA is carried out by researchers themselves, not an evaluation of how an EIA/HIA has influenced plan/project
Church, C. & Wordsworth, C. forCIEH (2003)	(EC) 2, 3
Cook, A. & Kemm, J. (2004)	(EC) 2 Not a spatial planning issue- all to do with licensing
Coombe, D. et al (2001)	(EC) 4
Corvellec, H. And	(EC) 4 Not an evaluation study

Boholm, A.	(EC) 5 Health outcomes unreported (IC) 3 & 4 not met
Coulter, A. & Clegg, S. for BMRB Research(2009)	(EC) 3
Curtis, S et al (2002)	(EC) 2
Curtis, S., Cave, B. & Coutts, A. (2002)	(EC) 2 not a land use project
Daini, P. (2002)	(EC) 5
Davenport,C., et al (2006)	(EC) 2 valuable for background
DEFRA (2007)	(EC) 2, 3, 4 & 5
DEFRA (2008)	(EC) 2, 3 & 4
DEFRA (2009)	(EC) 3 & 4
DEFRA (2010)	(EC) 2 & 4
Defra/Enviros/Scott Wilson/Mark Hannan (2006)	(EC) 4
Demidova, O. & Cherp, A. (2005)	(EC) 4
Den Broeder, L. , Penris, M., &Put, G.V. (WHO bulletin) (2003)	(EC) 2
Dilly,O. & Hüttl,R. (2009)	(EC) 4
Dom, Ann	(EC) 4
Dora, C. & Racioppi, F. (2003)	(EC) 4
Douglas, C (2004)	(EC) 2
Douglas, M. (2001)	(EC) 5
Dube, P. (2000)	(IC) 2,3,4 not met (EC) 2,3,4,5 met
Du Pisani, J. & Sandham, L. (2006)	(EC) 4
Enviros (2004)	(EC) 2,3 & 4 Possible ok for cost benefit R7
Ezzati, M. (2003)	(EC) 2, 4
Fischer, T. (2009)	(EC) 2
Gagnon, F.et al (2008a)	(EC) 2,4,5
Gagnon, F. et al (2008b)	(EC) 2,4,5
Gorman, D. Et al (2003)	(EC) 2 (did not include an assessment or appraisal process of a plan or project. But did focus on policy) (IC) 2 & 3 not met
Gorman, D. (2001)	(EC) 4
Guillois-Becel, Y. et al French paper for NICE (2007)	(EC) 2
Haigh, F.A. & Scott-Samuel, A. (2008I	(IC) 2 not met. Paper reports on policy evaluation
Hallenbeck, W.H. (1995)	(IC) 1234 met (EC) 4 (Not an evaluation study, no mention of the

	impact of the HIA on the decision).
Hamer, L. & Smithies, J. (2002)	(EC) 3 does not include evaluation of an appraisal tool
Harris, P. et al (2007)	(EC) 4 but check reference page 26
Harris, P.J., Harris,E., Thompson, S., Harris-Roxas,B. & Kemp, L. (2009)	(IC) 1,2,3,4 met (EC) 5 met Interesting background paper. Similar research question to ours, but not enough evidence reported on health outcomes, but reflects on inadequacies of HIA in EIA.
Haynes, R. & Savage, A. (2006)	(EC) 2
Higgins, M. et al (2005)	(EC) 4
Higman, R. & McLaren, D. (1993)	(EC) 4
Hirshfield, A. et al (2001)	(EC) 5 see p.109
Hoshiko, M. et al (2009)	(EC) 2
Ison, E. (2003)	(EC) 2, 4
Jacobs UK Ltd et al for Transport Scotland (2008)	(EC) 4
James, E. et al (2003)	(EC) 5
James, E. et al (2007?) for TRL and Dept. of Transport	(EC) 3 but good on NATA appraisal and what appraisals are required on different transport schemes pp.35-39
Kauppinen, T. et al (2006)	(EC) 4
Keir, C. & Matthews, R. (2006)	(EC) 5 HIA application to RES. Just about process/findings/outcomes. No indication if findings of HIA implemented in the RES
Kerney, M. (2003)	(EC) 2,3,4 not met. Paper reports on interviews undertaken before HIA, to get opinions on the best means of public engagement
Kjellstrom, T., et al (2003)	(EC) 2 No primary data reviewed
Kørnøv, L. (2009)	(EC) 5
Kruopiene, J. et al (2008)	(EC) 5
Kwiatkowski, R. et al (2009)	(EC) 4
Leu, W-S., Williams, W.P. & Bark, A.W. (1996)	(EC) 4
Lewis,S.J. (2003)	(IC)2,3,4 not met (EC) 2, 4. Deals with migration, argued can obscure the benefits of a HIA, as the population benefit and move on, or people with poor health move in to benefit from the intervention. Thus, migration may be a confounding factor of HIA.
Lidskog, R. (1998)	(EC) 4
Lidskog, R. & Soneryd, L. (2000)	(EC) 5
MAFF (2000)	(EC) 2 & 4

	Interesting report as it show how little concern is taken of health impacts as opposed to nature conservation etc
Mahony, C. (2003)	(EC) 4 not evaluative
Mahoney, M. et al, for HEIA (2004)	(EC) 2, 4, 5 R1 & R2 good background
Maki, A. (1992)	(EC) 1, 2
Mason, V. (2003)	(EC) 2 not policy (housing renewal) or project, case studies (p 343) some evaluation
Maxwell, M. Harris, P. Peters, S. Thornell, M & D'Souza,L. (2008)	(EC) 4 Keep paper as it has useful points at the end about the importance of on-going review of implementation, though too early to really assess effectiveness. (HB 29/01/10)
McCarthy,M. Et al (2002)	(EC) 2,4,5 met. (The report was based on a hypothetical development). (IC) 2,3 &4 missing
McCormick, J.	(EC) 5
Milner, S.J., Bailey, C. & Deans, J. (2002)	(EC) 2,4,5 .
Mindell, J.S. et al (2008)	(EC) 2, 4
Mindell, J. & Joffe, M. (2003)	(EC) 4 compares HIA with other methods of assessment. Not an evaluation of a specific HIA <u>but</u> have some references been picked up?
Murray, C. (2004)	(EC) 5
Nijssen, J.P.J. et al (1998)	(EC) 2, 3, 4
Noble,B. & Bronson, J. (2006)	(IC) 1,2,3, met 4 (EC) 4, 5 met
Noble, B. & Bronson, J. (2005)	(EC) 2, 4
Office of the Deputy Prime Minister (2004)	(EC) 3
Parry, J. & Wright, J. (2003)	(EC) 2,4,5
Planning Advisory Service (2008)	(EC) 4 Note: One case study exluded from R1 on quality grounds, but a 2nd case study merited inclusion in R2.
Persson, A & Nilsson, M. (2007)	(EC) 4
Petts, J., et al (1994)	(EC) 5
Plant, P. et al (2007)	(EC) 4 not evaluative. Good background p.51
Prashar, A. (2000)	(EC) 4 no indication that HIA recommendations implemented
Queensland Government (2005)	(EC) 4
Quigley, R. et al for HDA (2005)	(EC) 2
Quigley, R. et al for NICE(2005)	(EC) 4

Quigley, R. & Taylor, L. ((2003)	(EC) 4
Rakowski, C.A. (1995)	(IC)1 2 (EC) 4,5 (SIA proposed but not implemented)
Saarikoski, H. (2000)	(EC) 5
Salay, R. & Lincoln, P. (2008)	(EC) 2,3,4,5 useful background/legislation in EU
Scott, D. (1999)	(EC) 5
Shergold, I. & Parkhurst, G. for Centre for Transport & Society, UWE (2009)	(EC) 3
Simpson,S, Mahoney,M., Harris,E. Aldrich,R. & Stewart-Williams, J. (2005)	(IC) 2 not met, all case studies are policy interventions, e.g. breastfeeding strategies.
Snary, C. (2002)	(IC) 3,4 not met (EC)4, 5 met
St-Pierre, L. for Canadian Round Table on HIA (2008)	(EC) 2,4,5
Stergiadou, A.G. (2007	(IC)1 2 (EC) 4,5
Tan, R. & Khoo, H. (2006)	(EC) 3
Storey, K and Jones, P. (2003)	(IC) 4 not met (EC) 5 met
Tang, B. et al (2008)	(EC) 5
Taylor, L., et al (2002)	(EC) 2 no primary data reviewed
Taylor, L., Gowman, N., Quigley, R. for HDA (2003)	(EC) 4
Taylor, L. et al (2003a)	(EC) 2, 4
Thomson, H, Jepson, R., Hurley, F. & Douglas,M. (2008)	(EC) 2 no primary data reviewed
Thomson, H, Petticrew, M. & Douglas,M. (2003)	(EC) 4,5
Thriene, B. (2003)	(EC) 6
Tomlinson, P. & James, E. (date unknown)	(EC) 2, 3, 4
Tortajada, C. (2000)	
Transport, Health & Environment Pan-European Programme for WHO regional office for Europe (2009)	(EC) 2, 3, 4
Trussart, S et al (2002)	(IC) 2,3,4 not met (EC) 2,3,4,5 met

UCL & Deloitte (2007)	(EC) 3, 4, 5
University of Manchester & Land Use Consultants	(EC) 2, 4, 5
Van Buuren, A. & Nooteboom, S. (2009)	(EC) 5
Veerman, J., et al (2005)	(EC) 2 no primary data reviewed
Veerman, J., Barendregt, J. & Mackenbach, J. (2005)	(EC) 4
Von Schirnding, Y. & Yach, D. (1991/2)	(EC) 2
Winkler, M., et al (2010)	(IC) 2 not met (EC) 2 & 4 not part of planning regulatory process/ not evaluation of process
Waltham Forest BC (2009)	(EC) 3, 4
Washburn et al (1989)	(EC) 2
WHO Task Force on Research Priorities for Equity in Health & the WHO Equity team(2005)	(EC) 2
WHO Protection of the Human Environment Geneva (2000)	(EC) 2, 3
WHO CEMP (1992)	(EC) 2
Wiek, A. & Binder, C. (2005)	(EC) 2, 4
Wilson, S. (2008)	(EC) 4
Wood, G. (1999)	(EC) 4
Wright, J., Parry, J. & Mathers, J. for WHO (2005)	(EC) 4, 5
Wright, J. et al (2005)	(EC) 2 useful for R5/R6?
Zamarano, M. Et al (2008)	(EC) 2

Appendix J: Abstracts of studies written in languages other than English

Thriene,B.(2003) *Garbage incineration plants -- planning, organisation and operation from health point of view*. Gesundheitswesen. Vol 65 [2] 118-124.

Abstract.

The Waste Disposal Regulation which became effective March 1, 2001 stipulates that from June 1, 2005 biodegradable residential household and commercial waste may only be deposited on landfills after thermal or mechanical-biological pre-treatment. The Regulation aims at preventing generation of landfill gases that are detrimental to health and climate, and discharge of pollutants from landfills into the groundwater. Waste calculations for the year 2005 predict a volume of 28 million tons. Existing incineration and mechanical-biological treatment plants cover volumes of 14 and 2.5 million tons, respectively. Consequently, their capacity does not meet the demand in Germany. Waste disposal plans have been prepared in the German Federal State of Saxony-Anhalt since 1996 and potential sites for garbage incineration plants have been identified. Energy and waste management companies have initiated application procedures for thermal waste treatment plants and utilization of energy. Health Departments and the Hygiene Institute contributed to the approval procedure by providing the required Health Impact Assessment. We recommended selecting sites in the vicinity of large cities and conurbations and - taking into account the main wind direction - preferably in the northeast. Long-distance transport should be avoided. Based on immission forecasts for territorial background pollution, additional noise and air pollution were examined for reasonableness. In addition, providing structural safety of plants and guaranteeing continuous monitoring of emission limit values of air pollutants, was a prerequisite for strict observance of the 17 (th) BImSchV (Federal Decree on the Prevention of Immissions). The paper informs about planning, construction and conditions for operating the combined garbage heating and power station in Magdeburg-Rothensee (600,000 t/a). Saxony-Anhalt's waste legislation requires non-recyclable waste to be disposed of at the place of its generation, if possible, and utilized as a renewable energy source. This requirement is satisfied in this location. The potential health hazard for residents living in the impact radius is rated low.

Authors: REINIKAINEN,K; KARJALAINEN,TP; TALVENHEIMO,K
Title: *Evaluation of human impacts in road projects* (Ihmisiin kohdistuvien vaikutusten arviointi tiehankkeissa).
Periodical, Full: TIEHALLINNON SELVITYKSIA, FINNRA REPORTS
Pub Year: 2003
Issue: 20/2003(TIEH 3200808) pp42p+app(12
Start Page: Refs
Descriptors: IMPACT STUDY (ENVIRONMENT) [2436]; SOCIAL COST [0215]; HIGHWAY [2755]; BRIDGE [3455]; FINLAND [8035]; EVALUATION (ASSESSMENT) [9020]; PLANNING [0143]

Abstract:
The Finnish Road Administration has applied the environmental impact assessment (EIA) procedure in 35 road and bridge projects altogether, both before and after the Environmental Impact Assessment Act came into force (1994). Evaluation of human impacts has been carried out more and more frequently in the projects. Although human impact assessment is an essential part of the environmental impact assessment procedure, it still needs development and improved skills on the part of both the evaluators and their clients. This report aims at serving development of road project impact evaluation by surveying the status of human impact assessment in the evaluation reports that have been made. The report is expected to function as a tool for mutual exchange of experiences and for the internal learning process in the Road Administration. The report introduces issues that should be given special attention in further development of and training for impact assessment. Chapter 2 of the report describes the human impacts evident in the evaluation reports as well as ways to classify them. Chapter 3 discusses the methods used to assess impacts. Chapter 4 looks into interaction as it has been realised in the process. The contribution of participation to the process is also analysed. Chapter 5 provides conclusions on the basis of the information yielded by the status survey. The general nature of the evaluation reports can be roughly divided into three so far as the human impacts are concerned: 1. the stage of novelty and pilot cases, when the human impacts were also assessed searching for a practical model for implementation, 2. the stage of increased stability and routine, with less weight given to human impacts than in the initial stage, and significant differences were evident in the reports in this respect, and 3. the most recent stage of assessment, which puts the focus on an effort at interaction.
Notes: Language of Summary: ENGLISH; Update Code: 200401
Publisher: TIEHALLINTO, FINNISH NATIONAL ROAD ADMINISTRATION, OPASTINSILTA 12 A, HELSINKI, FIN-00520, FINLAND
ISSN/ISBN: 1457-9871
Author Address/Affiliation: University of Oulu; University of Oulu; University of Oulu

Authors: SCHMIDTBAUER,CRONA,J.; ANTONSON,H.; FOLKESON,L.; BLOMQVIST,G.; BALFORS,B.
Title: *Were the results as intended?: An international overview of knowledge about environmental follow-ups of road and railway projects* (Blev det som det var taenkt?: en internationell kunskapsoeversikt om miljoeuppfoljning av vaeg- och jaernvaegsprojekt).
Periodical, Full: VTI MEDDELANDE
Pub Year: 2003
Issue: 942
Start Page: 76(Refs
Descriptors: ROAD CONSTRUCTION [3665]; IMPACT STUDY (ENVIRONMENT) [2436]; EVALUATION (ASSESSMENT) [9020]; FOLLOW UP STUDY [9112]; INTERNATIONAL [9034]; METHOD [9102]; RAILWAY TRACK [1062]; RECOMMENDATIONS [0177]
Abstract: "Were the results as intended?" The question encapsulates the main purpose of environmental follow-ups of road and railway projects. Documenting how far the real

environmental effects and consequences agree with those that were described in the environmental impact assessment (EIA) is the main purpose of an environmental follow-up. Another of its purposes is to identify unforeseen effects and consequences, so that appropriate countermeasures can be taken. Describing the extent to which any adaptive or mitigation measures had the desired effect may be yet a further purpose of making an environmental follow-up. An environmental follow-up can also aim to describe whether the environmental consequences of the infrastructure project was kept within the framework laid down at the time the investment decision was made. This overview reports how an EIA follow-up is organised and carried out in other countries, principally Norway, the Netherlands, Germany, Switzerland, the USA, Canada, Brazil, Australia, New Zealand and Hong Kong. Procedures are presented for selecting infrastructure projects to follow up, together with the environmental effects that are to be followed up. The importance of clarifying the purpose of the follow-up is emphasised, as is the importance of the follow-up activities being carried out according to a defined programme. Among other things, the follow-up programme describes the various responsibilities, access to baseline data, the timing of the follow-up, the methods to be used, and how the results are to be reported and used. The overview also examines the linkage of the follow-up to an environmental management system. Examples are also given of a method known as adaptive environmental management. Finally, the review looks at how experience gained from follow-ups can be disseminated and transferred to the planning of future infrastructure projects. The review shows that inspiration for more effective approaches and methodology for EIA follow-ups in the road and railway sector can also be sought in experience from follow-ups in other sectors. (A) This document is also available electronically via Internet at URL: http://www.vti.se/PDF/reports/M942.pdf.
Notes: ID: 11583; ID: 68; Language of Summary: ENGLISH; Update Code: 200301
Publisher: STATENS VAEG- OCH TRANSPORTFORSKNINGSINSTITUT, LINKOEPING, SE-581 95, SWEDEN

Authors: Csicsaky,M.
Title: *Evaluating health risk tolerance and risk assessment*
Periodical, Full: Gesundheitswesen
Periodical, Abbrev: Gesundheitswesen
Pub Year: 2001
Pub Date Free Form: Feb
Volume: 63
Issue: 2
Start Page: 66
Other Pages: 69

Descriptors: IM; Carcinogens/ae [Adverse Effects]; Environmental Exposure/ae [Adverse Effects]; Germany; Hazardous Waste/ae [Adverse Effects]; Humans; Incineration; Neoplasms/et [Etiology]; Neoplasms/pc [Prevention & Control]; Risk Assessment

Abstract: According to current regulations, major projects are subject to an environmental impact assessment. Within this framework, not only ecological criteria have to be met, but also the possible health impact for the exposed population must assessed. In the absence of limit values for carcinogenic substances in the air, the health impact assessment can be based on quantitative risk assessment. This technology was formerly developed for the assessment of cancer risk imposed by existing environmental exposures, but it is also suitable for the prediction of future exposures and their health consequences. This is demonstrated by using a planned toxic waste incinerator as a model.

Appendix K: References not obtained/arrived too late

The following list incorporates the references that could not be sourced through inter library loans, that were untraceable due to incomplete citations, or that arrived too late to be screened:

1. American Planning Association (2006) *Health Impact Assessment.* American Planning Association PAS Report
2. American Planning Association (2006) *Integrating Planning and Public Health: Tools and Strategies To Create Healthy Places* American Planning Association PAS Report
3. American Planning Association (2006) *Planning Active Communities* American Planning Association PAS Report
4. Anderson, R., Brand, C., Joffe, M., Watkiss, P., Hurley, F., Pilkinton, A., Mindell, J. (2000) *Informing Transport Health Impact Assessment in London*. NHSE
5. Will, S., Aardern, K., Spencely, M., Watkins, S. (1994) *A Prospective Health Impact Assessment of the ?.* Manchester & Stockport Health Commission