

Integrating Health Impact Assessment into the Wider Impact Assessment Process

Context

Health impact assessment (HIA) is a component of impact assessment (IA) under the *Impact Assessment Act (IAA)*, but HIA cannot and should not be conducted in a silo. Health is a function of a great many factors, and so HIA must draw upon the entirety of an IA, but HIA may also have outputs that should be considered in the assessment of other pillars. Furthermore, the results of an HIA pertain not just to the conclusions of one or more health valued components (VCs) but to the broader decision criteria of the *IAA*.

Health is defined by the World Health Organization (WHO) as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” and having the ability “to identify and to realize aspirations, to satisfy needs, and to change or cope with the environment” (WHO 1948; Undated).¹ The Canadian government adopts this definition of health, recognizing the many **determinants of health (DoH)** that can come into play in a HIA, such as income and employment, housing and cultural activities, social capital and equity, and environmental quality (Canada Undated; WHO Undated). HIA will thus be concerned about how a project affects **DoH**, positively or negatively, but ultimately all HIAs should be concerned about **health outcomes**.

Many **DoH** are covered in assessments associated with other pillars of IA under the *IAA* (biophysical, cultural, economic, social, and Indigenous Peoples), even though these assessments are not examined with health in mind. Environmental **DoH** are often examined in numerous biophysical VCs, such as visual aesthetics, noise levels, water quality, and wildlife. Cultural, economic, and social **DoH** – such as traditional harvesting, employment, and community safety – are usually covered in several VCs and a section dedicated to Indigenous peoples. HIA can and should take advantage of the strong linkages between HIA and these other parts of an IA.

¹ The WHO uses the term ‘well-being’, and the term is used throughout the IAAC’s HSE guidance and TISG template, but this memo avoids the term and instead simply uses the term ‘health’.

It is also important to recognize overlaps between the WHO definition of health and *IAA* decision criteria. The Act requires that final decisions rest on a project's contribution to sustainability and the public interest, requiring decision-makers to synthesize all of an IA's conclusions with respect to these broad, over-arching concepts. The WHO's definition of health is also broad in its scope of interest, raising the question of what the distinction is between sustainability, the public interest, and health.

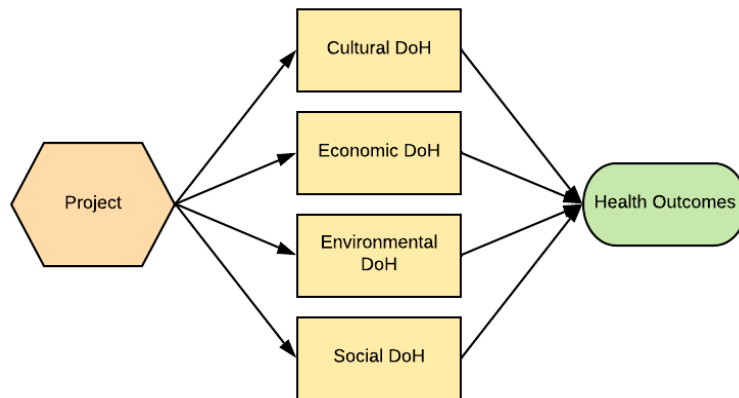
The Health, Social, Economic Guidance (HSE guidance) and Tailored Impact Statement Guidelines template (TISG template) do not explicitly capture the linkage between health and other pillars, nor the overlap between health and the *IAA*'s decision criteria, and as such this memo seeks to help guide participants to the IA process with respect to how HIA fits within the broader IA process. The overlap between health and the *IAA*'s decision criteria is also examined in the Critique of HSE Guidance and TISG Template memo.

Recommended Practices to Integrate HIA within Broader IA Process

Scoping the HIA

1. The particular health issues to be examined in a given HIA should reflect the particular issues and context of a given IA. Particular places, projects, and communities will raise particular health issues, and HIA should focus on these if there is a reasonable expectation of a substantial pathway of effect. This process of scoping takes effort: the HIA practitioner requires the time and resources to determine the HIA's foci, including thorough genuine engagement with potentially-affected communities.
2. During the process of scoping, HIA practitioners should begin with the assumption that there are numerous **DoH** that shape **health outcomes**. Generally, these **DoH** can be categorized into the rest of the topics (pillars) typically covered in an IA. Figure 1 presents a generic HIA pathway of effect (POE) model capturing the linkages between a project, **DoH**, and **health outcomes**. In reality, each pillar may embody multiple **DoH**, and certain **DoH** may be more important than others. There may be several **DoH** within a particular pillar that may be most relevant to **health outcomes**, and there may even be whole pillars that matter little. As well, the practitioner should keep in the mind that there may be important positive or negative linkages between **DoH**, including across pillars (hopefully these linkages are being explored by the practitioners responsible for assessing those topics (e.g., environmental quality may affect economic activity, and therefore economic **DoH** may be influenced by a project's impacts on the environment)).

Figure 1. Generic HIA pathways of effects model



3. As the practitioner becomes familiar with the particular health issues of a place and project, the HIA may benefit from adopting elements of one or potentially more existing **DoH** frameworks developed by health professionals and academics, and refining the POE model. Much research has been undertaken in recent decades about **DoH** and how they inter-relate and collectively shape **health outcomes** – the HIA practitioner need not re-invent the wheel, and the practitioner can benefit from the insights provided by pre-existing health models. Certain frameworks may provide greater granularity and/or focus on certain **DoHs** that are particularly relevant in a given IA context. Certainly, an Indigenous framework can be expected to be most suitable when Indigenous peoples' health are at issue, as **DoH** for Indigenous people may vary substantially from that of non-Indigenous people. See CCSDH (2015) for a review of DoH frameworks and their applicability to HIA in Canada, and see Orenstein et al. (2013) for examples of health impact-related POE models.
4. The initial and later, more refined pathway of effects (POE) model(s) should be used to structure the HIA. The conceptual model(s) should capture the relevant factors that shape **health outcomes** (i.e., the **DoH**) and their inter-relations, and thus is a guide to what indicators the practitioner should use. Depending on the structure of the HIA, it may be appropriate to have a single POE model capturing the linkages between a project and health, or have multiple POE models to provide more resolution.

Baselines

5. Baselines should describe past, present, and reasonably foreseeable future **DoH** and **health outcomes** for the average person as well as for groups with particular health concerns and/or that are disproportionately affected. Table 1 exemplifies how an HIA baseline might summarize quantitative baseline data pertaining to both **DoH** and **health outcomes** (qualitative baseline data would also need to be captured, and may be as or more relevant than any quantitative data that can be collected).

Baselines should extend into the future – what some might call the ‘no project scenario’ – so that the practitioner has a basis for distinguishing the future with and without the project (see Joseph et al. 2017; see Case Study below for an example). As well, baselines should be interpreted in terms of their significance; practitioners should explore the meaning of past, present, and reasonably foreseeable future health conditions, as it is critical to know the context for additional impacts of a project (and because this is critical input to the common effects characterization criterion ‘context’) (Joseph et al. 2017).

Table 1. Illustration of baseline summary

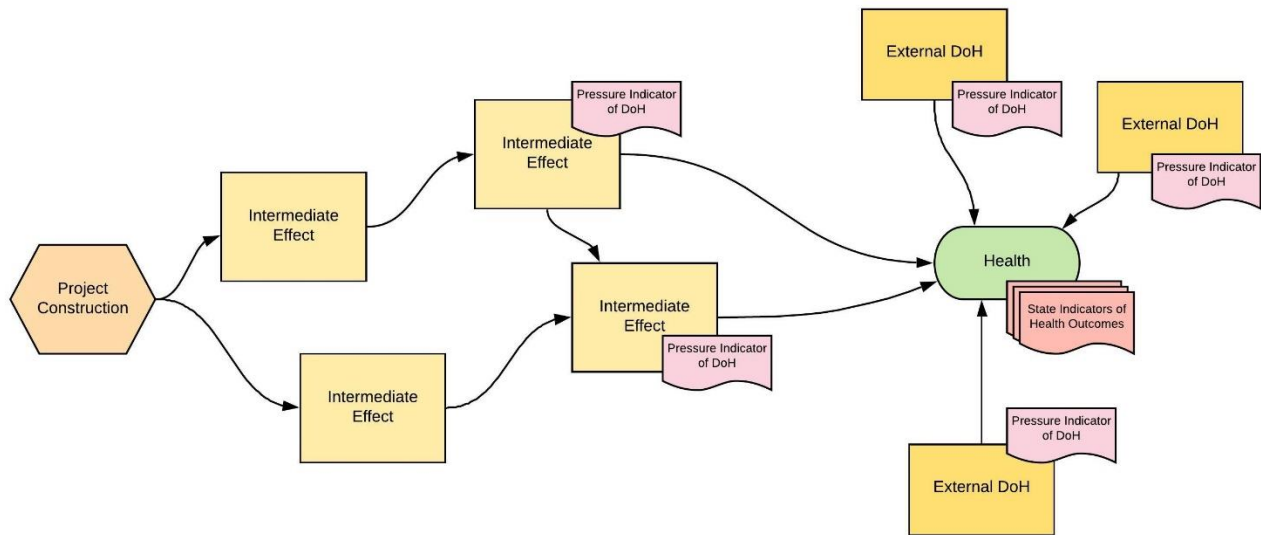
Population Group	Determinants of health									Health outcomes				
	Cultural			Economic			Environmental		Social		Perceived Health (very good or excellent)			
	% fluency in native language	...	...	Median income	...	...	PM _{2.5} 24-hour (µg/m ³)	...	...	Housing (% of households; core housing need indicators)	...	...
General population	85%	...	...	\$67,000	...	...	95	...	...	- 30% unaffordable - 6% unsuitable - 17% inadequate	...	59.5%	...	...
Subgroup	15%	...	...	\$39,000	...	...	110	...	...	- 40% unaffordable - 9% unsuitable - 25% inadequate	...	56%	...	...

Mitigation Planning and Effects Prediction

- The ultimate objective of HIA is to predict how **health outcomes** will be affected, yet **health outcomes** result from the interplay (i.e., cumulative effects) of numerous factors, shaped not only by the project but also external stressors.
- It is often difficult (and potentially impossible) to distinguish project impacts on **health outcomes**, due to the many contributors to **health outcomes**, and so on a practical level impact prediction in HIA must often focus on predicting impacts to **DoH** and then using this information to infer eventual, net effects on **health outcomes** (Figure 2)(Westwood and Orenstein 2016). For example, it may not be possible to predict impacts on disease rates (a **health outcome**) directly, and so the HIA practitioner may need to instead predict changes in air quality (a **DoH**). Likewise,

it is generally more practical to design mitigation strategies targeting **DoH** 'upstream' of and instead of **health outcomes**. In other words, practitioners will often find it more practical to focus their efforts on health **pressure indicators** to infer how health **state indicators** may be impacted by a project than to try to predict changes in **state indicators**. Bringing the findings on **DoH** back to how outcomes may be affected is essential, though: what decision-makers need to know is how a project will affect **health outcomes**, and if conclusions are not made with respect to **health outcomes**, the point of HIA can come into question.

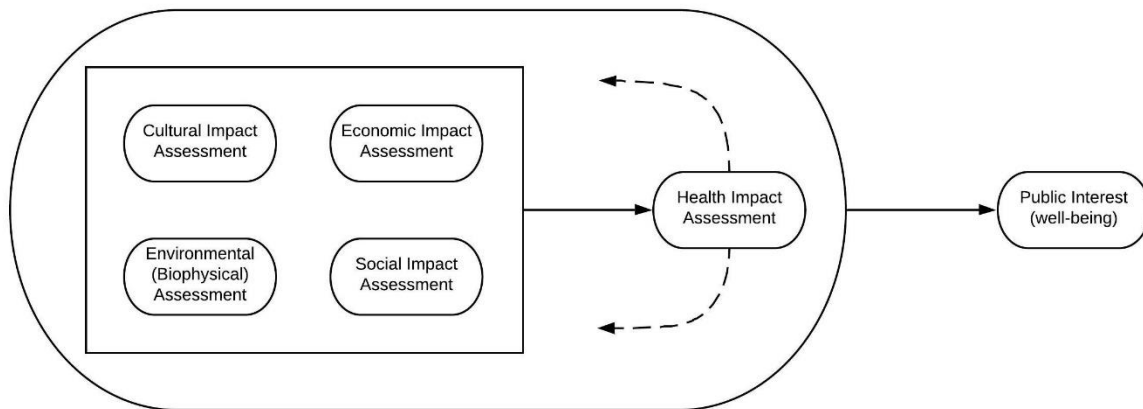
Figure 2. Illustration of pathway of effects model for health



8. HIA should recognize its linkage to the rest of an IA (Figure 3). Without a doubt HIA should begin in earnest alongside the IAs of other pillars, but as **health outcomes** are a function of **DoH**, and as many **DoH** are examined directly or indirectly in other parts of the IA by other specialists, HIA is a natural collector and user of the information output by the rest of the IA. Therefore, the HIA practitioner should draw upon the rest of the IA. Ideally the HIA practitioner is able to shape these other IAs (such as with respect to other practitioners' choice of indicators), but the HIA practitioner may have to simply draw upon whatever work done in other VCs is relevant to the HIA, buttress this with whatever additional research is necessary, and then infer how **DoH** (and then **health outcomes**) may be impacted. For example, to assess environmental **DoH**, the HIA practitioner could directly refer to the air quality VC's assessment of ambient air pollutant concentrations in a proposed project's host community, and then add to this evidence base as necessary. Similarly, to assess effects on social **DoH**, the HIA practitioner could directly refer to a social or community VC's use of emergency services and add to this evidence as necessary. To infer residual effects, the HIA can and should look to other sections of an IA for

mitigation that is relevant to addressing health impacts of a project. Overall, HIA can be thought of as a synthesis of the IAs done for other VCs, and a re-interpretation and re-purposing of this information. In doing so, HIA can not just rely on IAs that happen to cover DoH topics, but instead must examine these topics with a health lens and buttress what is done by other IA practitioners. As HIA tends to follow from what is found in the IAs of other pillars, it makes sense that HIA should not be concluded until other IAs are substantially or fully complete.

Figure 3. HIA tends to follow from other pillars' IAs



9. However, HIA conclusions may have feedbacks into the rest of an IA (Figure 3). For example, changes in mental health could lead to effects on the social pillar, as might happen when mental illness leads to substance misuse or loss of housing (Wlodarczyk and Tennyson 2003). HIA should therefore be conceived as much as IA focused on its own set of issues, but also as cross-pollination from and to other parts of an IA.
10. Due to the linkages of HIA with the rest of an IA, mitigation planning should also be done in an integrated fashion. Measures that mitigate adverse effects on **DoH** (or even enhance **DoH**) may already be proposed by other discipline leads in other parts of an IA, and the HIA practitioner can engage with these other disciplines to tweak the design of mitigation measures to help deal with effects on **health outcomes**. Mitigation measures to address visual impacts of a project might be adjusted to benefit particular groups living in sight of a proposed project whose health is already compromised. At the same time, the HIA practitioner must also be aware of potential unintended consequences of mitigation measures they put forward on other VCs.

11. The complexity and technical challenges of making predictions on **health outcomes** means that HIA in practice is often an exercise in organized reasoning.² To be able to make a reasoned argument about whether on balance a project's impacts will be net positive or net negative, the practitioner must therefore take advantage of available quantitative and qualitative data, try to make sense of it all through a conceptual model, and ultimately make an informed judgement of the net impacts of a project on **health outcomes**. This triangulation of information serves to enable the making of conclusions in the HIA, but also, because of the broadness of the concept of health, serves to support decision-makers with respect to understanding the sustainability and public interest contributions of a project.

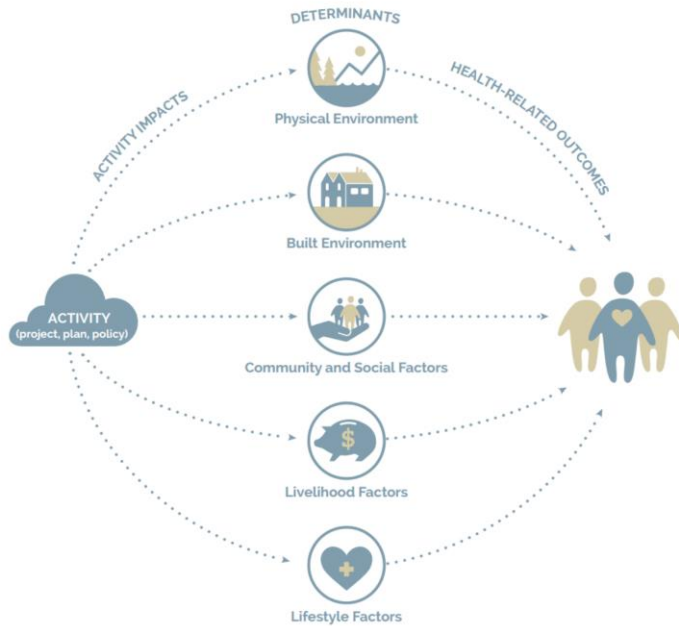
Case Study: Re-interpretation in an HIA of a Highway Project

Given that peoples' health is a function of a great many factors, HIA can and should naturally draw upon much if not all of the rest of an IA. One recent HIA that explicitly demonstrates these linkages is that done on the George Massey Tunnel Replacement Project near Vancouver, BC (Habitat Health Impact Consulting 2016).

In this HIA, the consultant was hired after much of the IA was completed, and so the consultant had the freedom to undertake an HIA that explored a range of **DoH** in detail, though with the disadvantage of not being integrated with the rest of the IA team or process. The consultant identified an established **DoH** framework that doubled as a POE model, linking the project's construction and operational activities to **DoH** and eventually to **health outcomes** (Figure 4). Based on all of the studies and stakeholder engagement that had already been done in the IA for the project to date, the consultant identified 12 'health interests' (i.e., **DoH**) within the structure of their POE model: exposure to airborne contaminants; noise; food and water consumption; GHG emissions; active and public transportation; traffic safety; connectivity and access; emergency response; safety and security; economic health effects; recreation and parks; and tolling.

² See <https://www.glennbrown.ca/organized-reasoning/> as well as Hicks (2011).

Figure 4. POE model used in George Massey Tunnel HIA



Source: Habitat Health Impact Consulting (2016).

The consultant then drew upon the rest of the IA to make conclusions about how the project would affect the 12 'health interests' (**DoH**), and ultimately how the project would affect **health outcomes**. Throughout, attention was paid to effects across each of the 12 'interests' to the general public as well as to vulnerable populations and Indigenous people. For example, the project IA had looked at air pollution, but from a typical human health risk assessment (HHRA) perspective and not in terms of how air quality might contribute to **health outcomes** overall. To do the latter, the HIA consultant reproduced a variety of relevant materials in their report, including current and anticipated future air quality conditions without the project as predicted by the HHRA, and then re-purposed this information with a view to health effects on important sub-populations, including residents, recreationists, and vulnerable populations. The consultant then made their own conclusions on direction, distribution, magnitude, likelihood, equity, and confidence, and then interpreted these predictions with respect to **health outcomes**. Similar steps were undertaken for the rest of the 12 'health interests', though the extent of information that the HIA practitioner could draw upon was not always the same; in some cases more original analysis was required and undertaken.

In the HIA, the consultant made conclusions about not just how the project would affect each 'health interest' (**DoH**), but also the consequence of each for **health outcomes**. Twelve sets of conclusions were therefore produced, with respect to not only how the general population would be affected but also how vulnerable populations and

Indigenous people would be affected. The consultant did not try to make any conclusions about the overall, net effect on **health outcomes**, under the notion that doing so might mask important resolution across factors and groups.

This HIA was atypical in that it was commissioned following the completion of much of the rest of the IA (Orenstein, pers. comm. February 11, 2021). Unlike other HIAs that get done in parallel to the IAs for other pillars and values in which the IA practitioners can all integrate their activities, the George Massey Tunnel HIA was done later. While the consultant could not derive the benefits of parallel integrated assessment, such as shaping the assessments in other pillars and values, nor could the HIA consultant loop their conclusions back into the rest of the IA, the HIA consultant had the freedom to structure their assessment and explore their topic matter to a resolution that they saw appropriate. Typical IAs allow for a human health VC that covers human health risk assessment and some sort of single 'community health' VC that is constrained in terms of the resolution it might provide. The case study HIA, in contrast, was able to explore 12 separate topics in detail, in a structure that suited the HIA. This freedom may not often be found when HIA is done in parallel with the rest of IA, but HIA practitioners should nonetheless strive to examine health with a high degree of resolution and therefore should seek the resources to enable it, even the HIA practitioner is required to insert it all into a single VC chapter.

Tensions and Challenges in HIA

The recommendations of this memo, and the case study, raise an important issue with respect to the linkages between HIA and other parts of an IA, and how the HIA practitioner should proceed within this process. HIA, with a foundation and substantial focus on **DoH**, naturally draws from other parts of an IA, but how exactly should an HIA practitioner draw from these other parts of an IA? Should the HIA practitioner simply take the conclusions of the rest of the IA at face value, not being a technical expert on such matters, and go no further, or should the HIA practitioner delve deeper into the information gathered in other parts of the IA and not just view through a health lens but re-interpret the information and potentially come to conclusions that conflict with those of the other IAs' authors? HIA practitioners will not tend to have technical expertise across the rest of an IA's topic matter, yet if a relevant VC conclusion is 'not significant', how should the IA practitioner proceed? What if the HIA practitioner uses another VC's materials and concludes that **health outcomes** will decline, even when that other VC's conclusion is 'not significant'? This all speaks to a critical tension in HIA: the need to re-interpret the rest of an IA from the perspective of health, but the lack of technical expertise in the many disciplines covered in an IA within the HIA practitioner. It may be that the only solution is early planning for integration, execution of this integrated

analysis, but also the expectation that depending on the topic, conflicting conclusions may emerge.

Another challenge in HIA is alluded to in the case study, juxtaposed by a key principle of HIA expressed earlier in this memo: the difficulty making sense of **health outcomes** across multiple contributing factors (**DoH**) within the larger context of needing to inform decision-makers of how peoples' health will be affected by a project. HIA done well examines health across its dimensions, which means looking at many **DoH**, but what does the HIA practitioner do with it all? The case study HIA did not try to 'add up' all of the effects across **DoH** to give a single, net effect prediction on **health outcomes**. Yet ultimately this is what decision-makers need to know as they seek to determine how a project contributes to sustainability and the public interest. A focus on the 'net effect' may miss important pieces of the health impact story – there may be particular effects that may get hidden in doing so, and there may be particular groups that may be adversely affected – never mind the methodological challenge of how to add it all up. Further guidance could broach this subject further, advising practitioners to leave their outputs disaggregated, to aggregate in some manner, or to use their judgment as to both the overall effect of the project on health outcomes and the key details masked under this 'net effect' conclusion.

Key Points to Remember

1. The ultimate objective of HIA is to predict how a project will affect peoples' **health outcomes**.
2. Due to challenges predicting effects on **health outcomes**, the HIA will often focus on predicting changes to **DoH**, and then using these predictions to infer changes in **health outcomes**.
3. Find one or more **DoH** frameworks suitable to the IA context, and use these to develop one or more POE models and to structure the assessment.
4. With a basis in **DoH** that are often examined in other parts of an IA, HIA naturally follows from the rest of an IA, but HIA can achieve the greatest results if it is done in parallel to the rest of an IA – influencing it, learning from it, and feeding information back into it.
5. HIA practitioners must re-purpose and re-interpret a broad range of IA information across much or all of the rest of an IA, often without technical expertise in this broad range of topics.
6. Ultimately, decision-makers need to know what the net effects of a project on **health outcomes** are, yet HIA practitioners are methodologically challenged to do so and need to ensure that important details of who is affected how is not lost.

Key Terms

determinants of health: factors that influence the health status of people

health outcomes: physical, mental, or other expressions of peoples' health status

pressure indicators: indicators of the levels of stress on a value (in the health context, **pressure indicators** are generally indicators of DoH)

state indicators: indicators of the conditions of values (in the health context, state indicators are generally indicators of health outcomes)

Sources

Key Sources

Aalhus, M. (2018). The social determinants of health impacts of resource extraction and development in rural and northern communities: A summary of impacts and promising practices for assessment and monitoring. Northern Health. 76pp.

This report reviews DoH relevant to major project impact assessment in hinterland BC. The report explores what health is, how DoH shape health, and Indigenous perspectives on health, health patterns in BC, describes in some detail 15 DoH relevant to hinterland BC, and then goes on to describe IA methods to examine impacts on DoH. This report is a useful overview of DoH and how they can be used in HIA, and this report should be useful for HIAs conducted anywhere in Canada.

CCSDH (Canadian Council on Social Determinants of health) (2015). A Review of Frameworks on the Determinants of health. 76 pp.

This report reviews 36 different DoH frameworks, including seven that are argued to be particularly useful for Canadian application. Frameworks are dissected and analysed. The review concludes that no single framework is perfect, and that the practitioner should choose or adapt one or more frameworks to suit their assessment context. This report should be a useful starting point for practitioners seeking to identify a DoH framework to structure their HIA.

Health Canada (2004). Canadian Handbook on Health Impact Assessment.

This four-volume guide is officially defunct but provides substantial, useful guidance to the conduct of HIA and IA generally. The guide covers everything from 'what is health?' to working with Indigenous communities, methods of not just HIA but also other socio-economic topics, the role of stakeholders, and discusses health impacts of various types of development projects. While lengthy, this may be one of the most important manuals of IA ever produced in Canada, and any IA professional could benefit from taking the time to read it.

Orenstein, M., M. Lee and A. Angel (2013). Determinants of health and Industrial Development in the Regional Municipality of Wood Buffalo. Calgary, AB, Habitat Health Impact Consulting. 79 pp.

This document is a great resource illustrating the linkages between DoH and health outcomes. POE models, and discussion of the linkages to health outcomes, are provided for 12 DoH. The document is focused on the oil sands context but is a good resource for anyone developing POE models and scoping and planning a HIA.

Other Sources

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