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Occupational & Environmental Health Seminar Series

Application of the HIA Framework to Projects in North America

Lindsay McCallum, Ph.D. (Candidate)

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Intent of Seminar

To provide an introduction to HIA theory and practice, with real-world examples of HIAs completed across various sectors. It will also focus on recent developments in HIA methodology to facilitate a broader understanding of the process and its applications.

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Lindsay McCallum, Ph.D. (Candidate) Declaration:

- Environmental Health Scientist and the Health Impact Assessment Lead at Intrinsik Corp.
- Currently completing doctoral research in the area of Health Impact Assessment (HIA) of major infrastructure projects at the University of Toronto.
- Research is focused on development and implementation of scientifically rigorous methodologies and assessment tools to facilitate the application of HIA within a variety of sectors.

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What is Health?

- World Health Organization (WHO, 1948) definition of health:

> *"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."*

- The Ottawa Charter for Health Promotion (1986)

> *"The ability of an individual or group must be able to identify and to realize aspirations, to satisfy needs, and to change or cope with the environment"*

- Health Impact Assessment is based on a holistic definition of health

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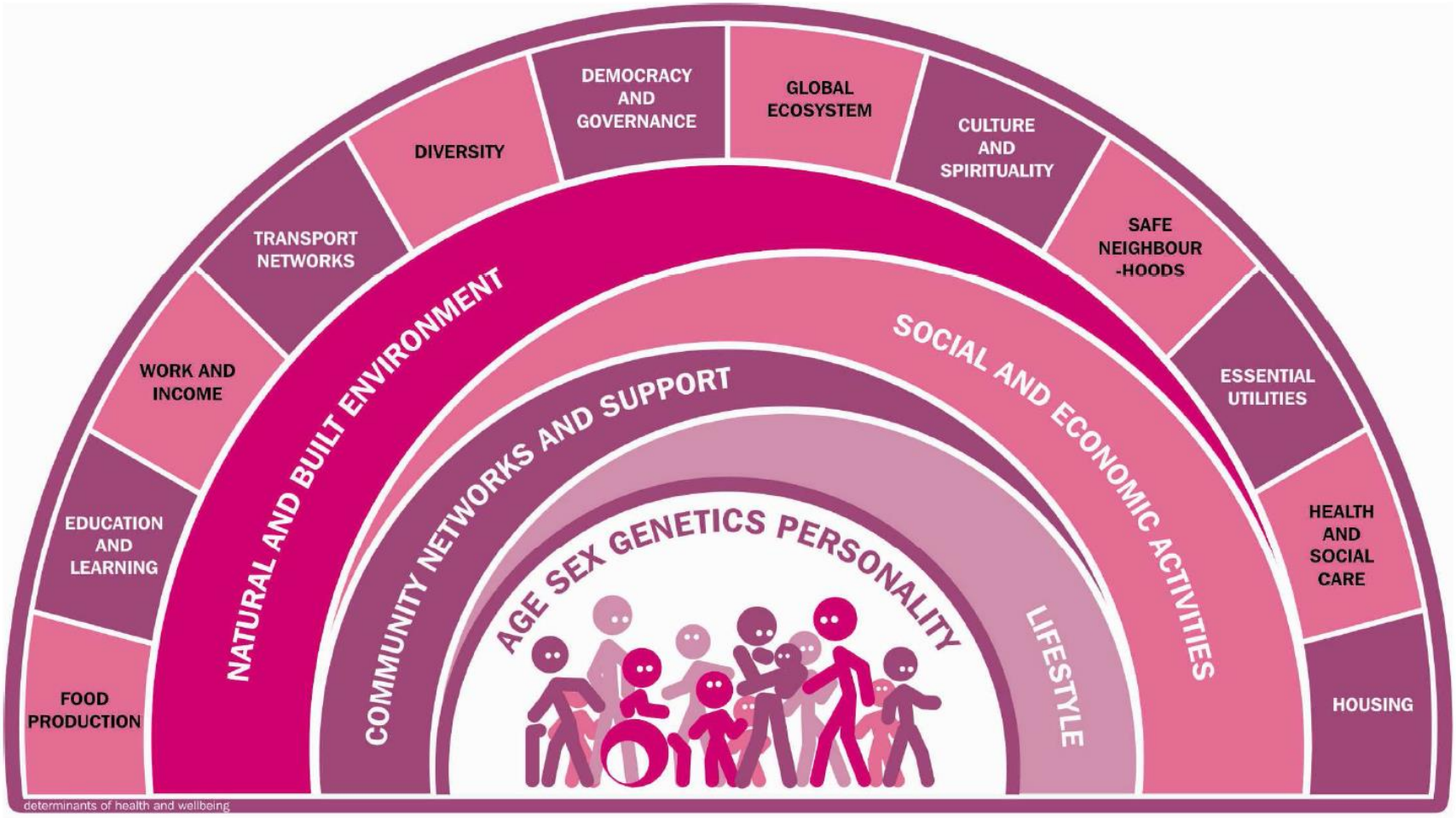
The Determinants of Health



Public Health by Design (Modified from Whitehead and Dahlgren, 1991):

http://www.publichealthbydesign.com/resources/

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I think I know what HIA is…?

- "Health Impact Assessment (HIA) is a combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population" (WHO, 1999)

- Very large scope – includes all "potential effects on health"

- Looks at health in terms of:
  - Physical health
  - Mental well-being
  - Social / Cultural determinants
  - Economic determinants

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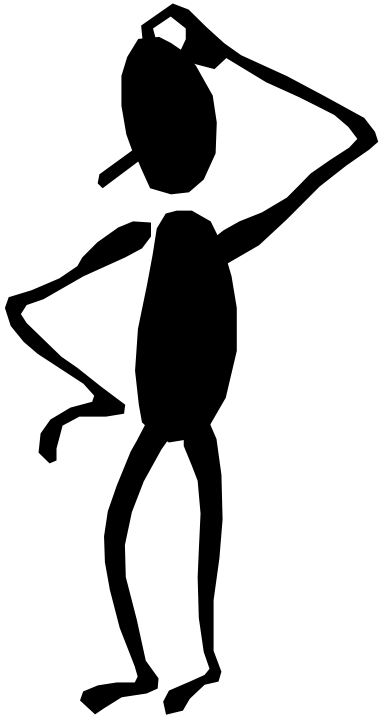
…but what does it actually DO?



- Provides a framework for assessment of health impacts
- Identifies both positive and negative effects
- Provides recommendations for mitigating negatives and enhancing positives
- Used to inform decision-making processes
- Can be conducted alone or in cooperation with other commonly applied types of assessments such as Environmental Assessment (EA) and Human Health Risk Assessment (HHRA)

When should an HIA be conducted?

At the planning stage:

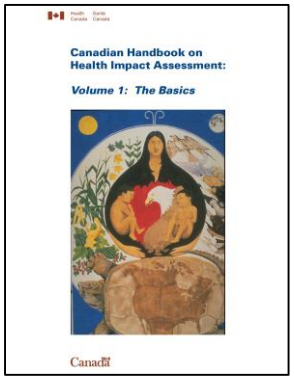
- What is the best option?
- Where is the optimal site / how can this best be implemented?
- Focus on big picture and how to best tackle the issue in general

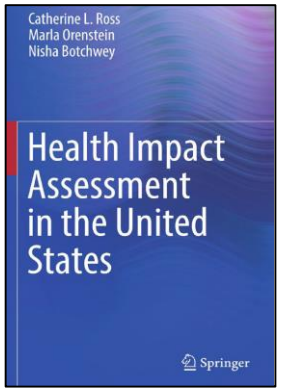
At the implementation / operational stage:

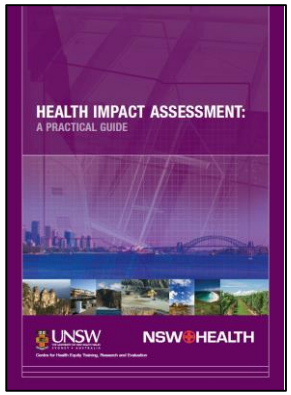
- How is this project impacting the local community?
- Is there anything that can be done to minimize impacts?
- Focus on local concerns and community involvement

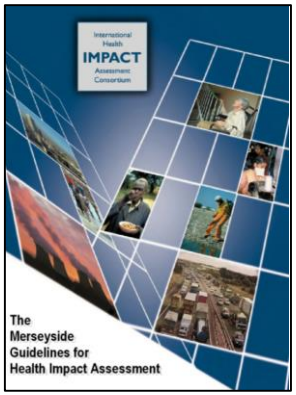
HIA Around the Globe

- HIAs are conducted in many different countries
  - Developed and developing countries
- Currently under-utilized in Canada
- Different guidance documents for different countries
  - Some similarities but there is no universally “agreed upon” method









- HIA typically spearheaded largely in developed countries; however, HIA is used in developing nations, especially for large-scale extraction projects

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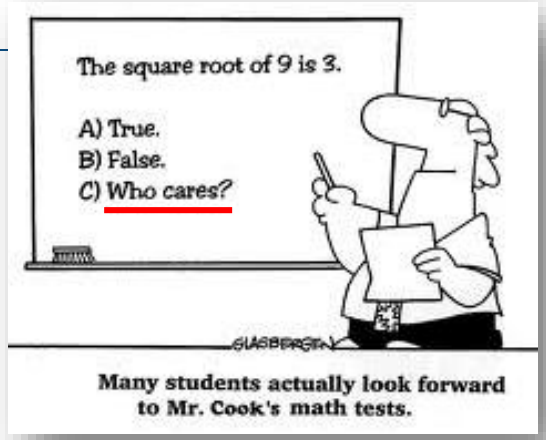
Why bother?



- This is the most important question
  - Why should anyone bother to conduct an HIA?

- HIA has the ability to look at all facets of a policy/project and identify not only negative impacts but also benefits
  - This can help provide a more accurate picture of the overall 'impact'
  - Includes health determinants not always considered in other types of assessment (e.g., Risk Assessment, Environmental Assessment)
  - Need a consistent set of "triggers" for HIA (more on this later…)

- Government, health officials and the public have taken an increasing interest in HIA

- Toronto Public Health created guidance in 2008 that has been used in several HIA initiatives

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Steps of an HIA

- Is an HIA necessary and an appropriate option?
- Identify key issues and engage stakeholders/public
- Conduct assessment (quantitative and/or qualitative)
- Make recommendations based on assessment findings
- Disseminate information to stakeholders/public
- Evaluate HIA process and impact
- Monitor impact/recommendations (if applicable)

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Okay, but what does it look like?

- Examples of HIAs that have been conducted in various sectors around the world are briefly discussed below, including:

1. **Waste Management Policy (UK)**
2. **Transportation Infrastructure (Canada)**
3. **Oil Drilling Project (USA)**

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EXAMPLE 1: Waste Management

- An HIA was commissioned for the Wales Regional Waste Plan to ensure that health was “considered and safeguarded”
- The HIA was intended to be strategic and largely qualitative since the waste management plan did not yet have technologies or sites selected
- The HIA included assessment of concerns voiced by the public during a series of open houses

Welsh Assembly Government, 2008

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EXAMPLE 1: Waste Management

- The potential human health impacts associated with the accumulation and decay of untreated waste include:
  - Emissions into the air, water and soil
  - Odour
  - Dust
  - An increase in pests and vermin
  - Detraction from the visual aesthetics
  - Impacts on green space
  - Impacts on flora and fauna
  - Fire hazard
  - Infectious and chronic diseases

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EXAMPLE 1: Waste Management

- The report found that alternative waste facilities (landfill, incineration, composting, waste transfer and recycling) have similar positive and negative impacts including:

POSITIVE IMPACTS FROM:

- the collection and treatment of waste
- employment opportunities
- the stimulus to the wider local economy
- the minimization of potential climate change impacts (global warming) through reduction in the use of landfills and the associated production of greenhouse gases.

NEGATIVE IMPACTS FROM:

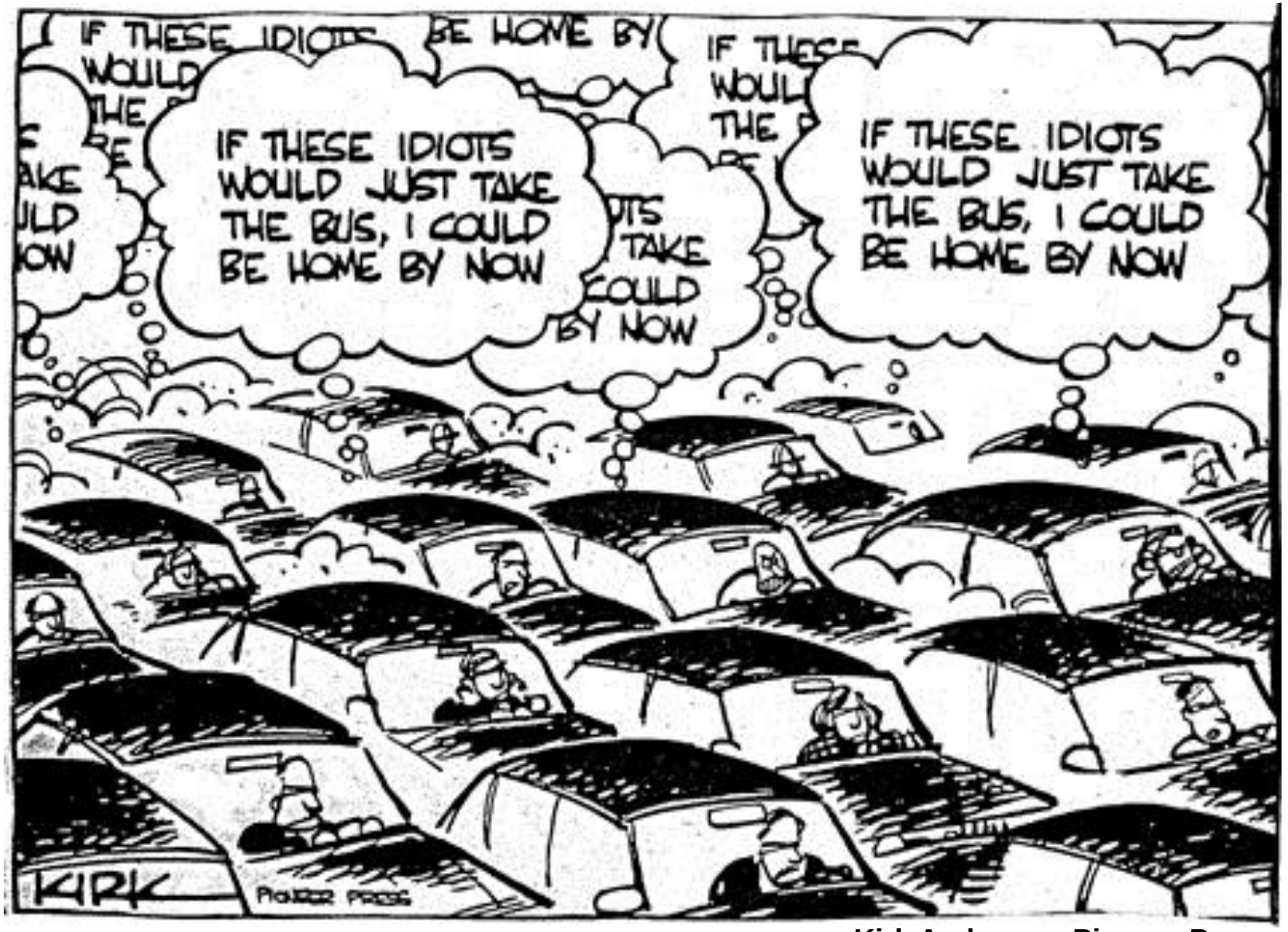
- odour
- noise
- pests
- dust and litter
- quality of life effects
- emissions given off by waste facilities into the air, water and soil (air, water and soil pollution)
- concern and worry about the potential negative health impacts.

EXAMPLE 1: Waste Management

- Overall, the report found that:

> *"the review of the evidence on health impacts shows that there is no single best solid waste management option from a public health perspective and that well designed, operated and regulated waste treatment facilities are likely to have mainly positive and little or no negative impacts on the health and wellbeing of local communities and waste facility employees."*

EXAMPLE 2: Transportation



Kirk Anderson, Pioneer Press

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EXAMPLE 2: Transportation

- A Rapid HIA is currently underway to evaluate potential health impacts of High Occupancy Vehicle (HOV) and High Occupancy Toll (HOT) lanes in the City of Toronto and the GTA

- Transportation policy has considered implementation of HOV and HOT lanes

- HIA being conducted in a collaborative effort between Intrinsik and the University of Toronto.

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(Waheed et al., 2016)

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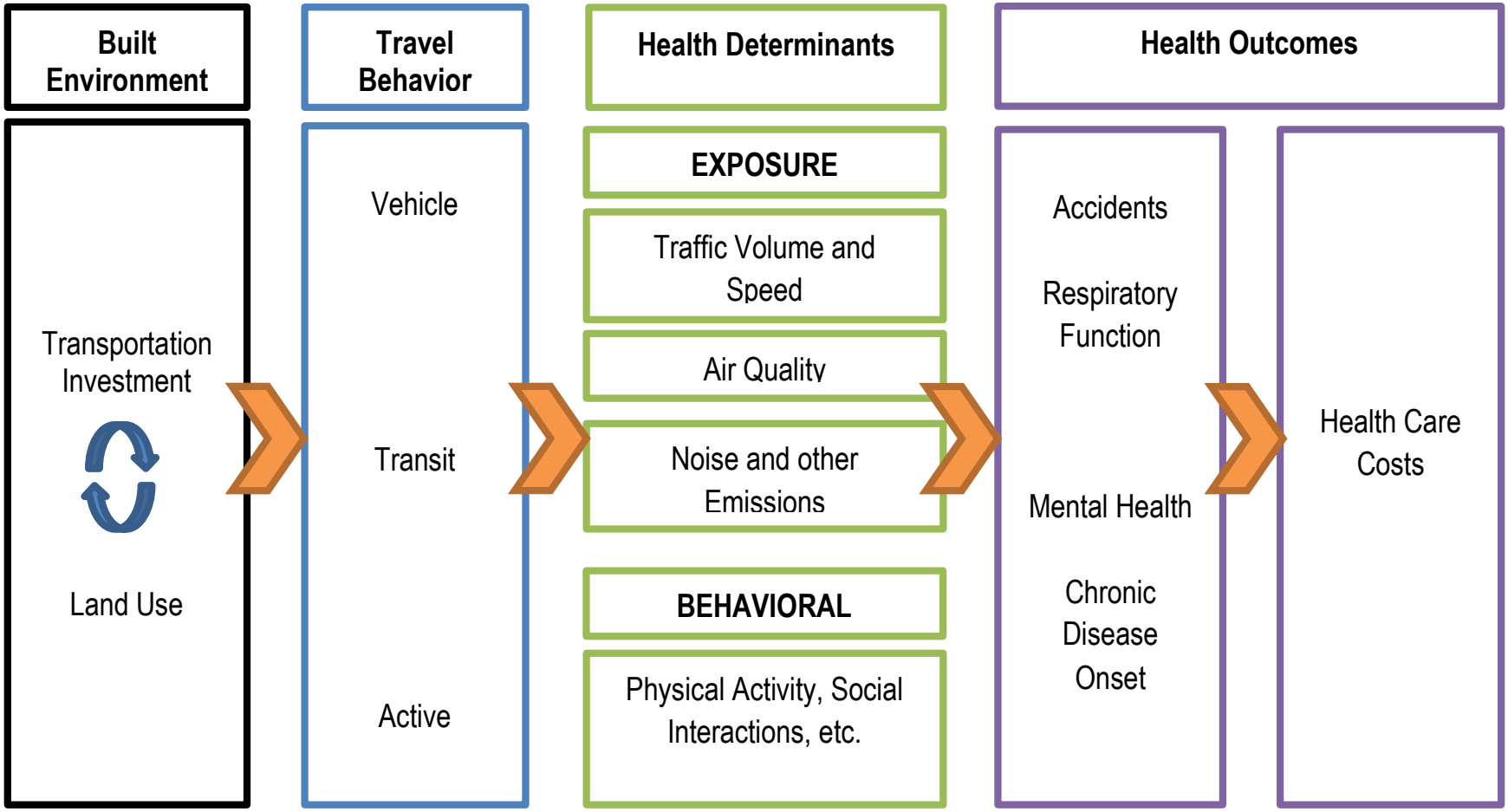
EXAMPLE 2: Transportation



(Health & Community Design Lab, 2013)

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EXAMPLE 2: Transportation

- Completed a comprehensive scoping workshop that included stakeholders from Toronto Public Health, Public Health Ontario, City of Toronto Transportation Planning, Ministry of Transportation Ontario, Metrolinx, and representatives from various NGOs and community groups.

- Specific determinants under consideration include:
  - Air quality
  - Traffic Congestion
  - Mobility
  - Accessibility – services/resources
  - Noise
  - Safety and security – traffic-related injury
  - Stress – mental health
  - Physical activity – active transport
  - Social capital / social cohesion
  - Health equity – equal access to transportation

- This HIA is being finalized – results to be released in 2016

EXAMPLE 3: Oil Drilling (Hermosa)

- Hermosa Beach is a small city located in LA County
  - Population = 20,000; Land area = 1.43 square miles

- Highly educated, affluent community with relatively young demographic
  - Average house price >$1,000,000 USD

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EXAMPLE 3: Hermosa Beach HIA

- **THE ISSUE:** an election held to allow residents to decide whether to repeal existing ban on oil drilling within the City limits.

- Repealing the ban on oil drilling would allow the proposed oil drilling and production project to move forward.

- **THE PROJECT:** the proposed Oil Development Project consisted of drilling 30 oil wells on a 1.3-acre site located on existing City Maintenance Yard property.

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EXAMPLE 3: Determinants of Health included in HIA

Through consultation with community members, the HIA identified six major categories and 18 determinants of health in relation to the proposed Project:

- ✓ Air Quality
- ✓ Water and Soil Quality
- ✓ Upset Conditions
- ✓ Noise and Light Emissions
- ✓ Traffic
- ✓ Community Livability

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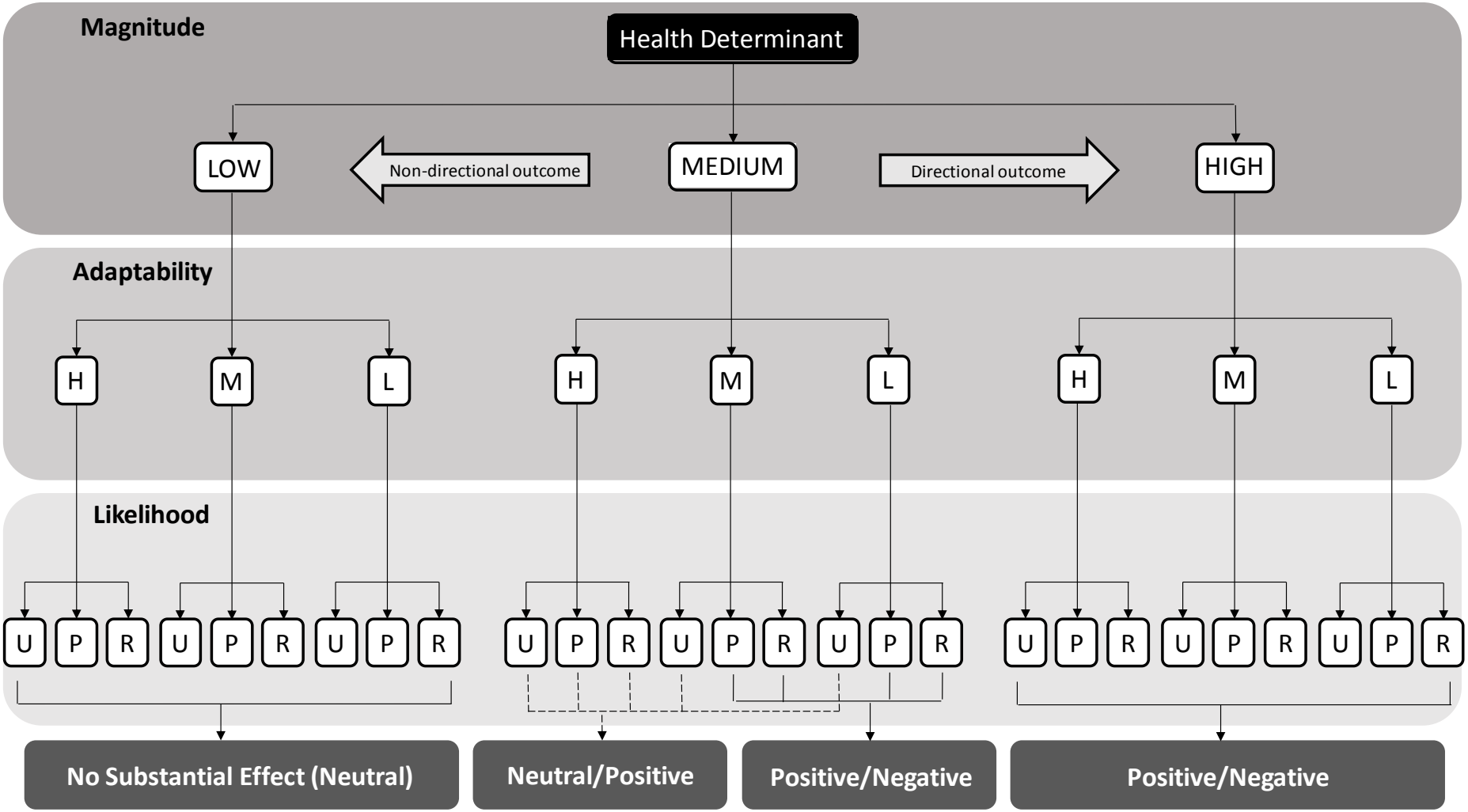
EXAMPLE 3: Decision-Making Framework

Health Determinant	List the determinant being assessed
Potential Health Outcome	List potential health outcomes associated with each determinant
Pre-Mitigation Discussion	The discussion is limited to identification of the direction of the pre-mitigation impact (positive, negative, neutral or unknown) and identification of any potential issues that could arise if no mitigation measures were implemented.
EIR Mitigation	List mitigation measures from the Environmental Impact Report (EIR), where applicable
Geographic Extent	Localized or Community
Magnitude	Low, Medium, High, or Unknown
Adaptability	High, Medium, Low, or Unknown
Likelihood	Unlikely, Possible, or Probable
Post-Mitigation Health Effect	Negative, Positive, No substantial Effect, or Unknown
Comments or Additional Recommended Measures	None, or Additional Recommendations (specific and actionable)

EXAMPLE 3: Decision-Making Framework



H = high; M = medium; L = low; U = unlikely; P = possible; R = probable

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EXAMPLE 3: Overall Conclusion

Based on the proposed mitigation measures in the EIR and additional recommendations provided in the HIA, we do not believe that the Project will have a substantial effect on community health in Hermosa Beach."

Series of recommendations included in a legally binding document drafted by the City (enforceable if project were to proceed)

Successful peer-review process led to a stronger and more defensible assessment.

City held an election in March 2015 where the residents voted not to lift the existing ban on oil drilling

HIA Research & Development

- Literature review and gap analysis identified several areas requiring additional research:

i. The nature of HIA triggers
ii. Consistent scoping and stakeholder engagement approaches
iii. Use of evidence and transparency of decision-making
iv. Reproducibility of assessment methods
v. Monitoring and evaluation protocols
vi. Integration within existing regulatory frameworks.

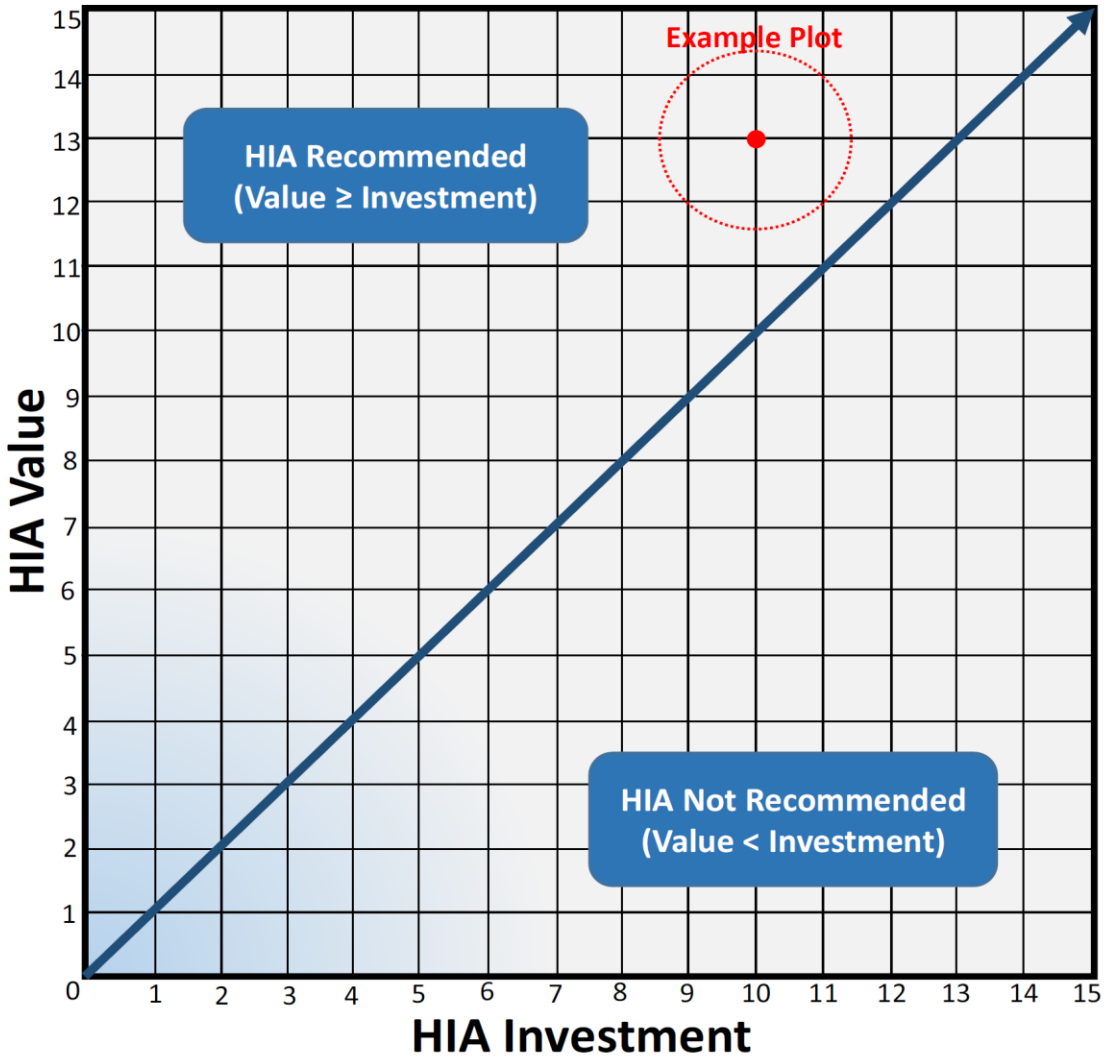
- The US EPA conducted a review of HIA practice in the US and concluded: “there are considerable disparities in the quality and rigor of HIAs being conducted” (Rhodus et al., 2013).

HIA Research & Development

- Several new approaches and tools for conducting HIA in a more consistent and transparent manner were developed, including:

  - ✓ **An HIA Screening Tool**
  - ✓ **A Systematic HIA Scoping Tool**
  - ✓ **An Assessment Framework**
  - ✓ **An Assessment Framework for Integration with EA**

HIA Screening Tool



McCallum, L. C., Ollson, C. A., & Stefanovic I. L. (2016). Development of a Health Impact Assessment Screening Tool: A Value vs. Investment Approach. International Journal of Environmental Assessment Policy and Management, 18(3).

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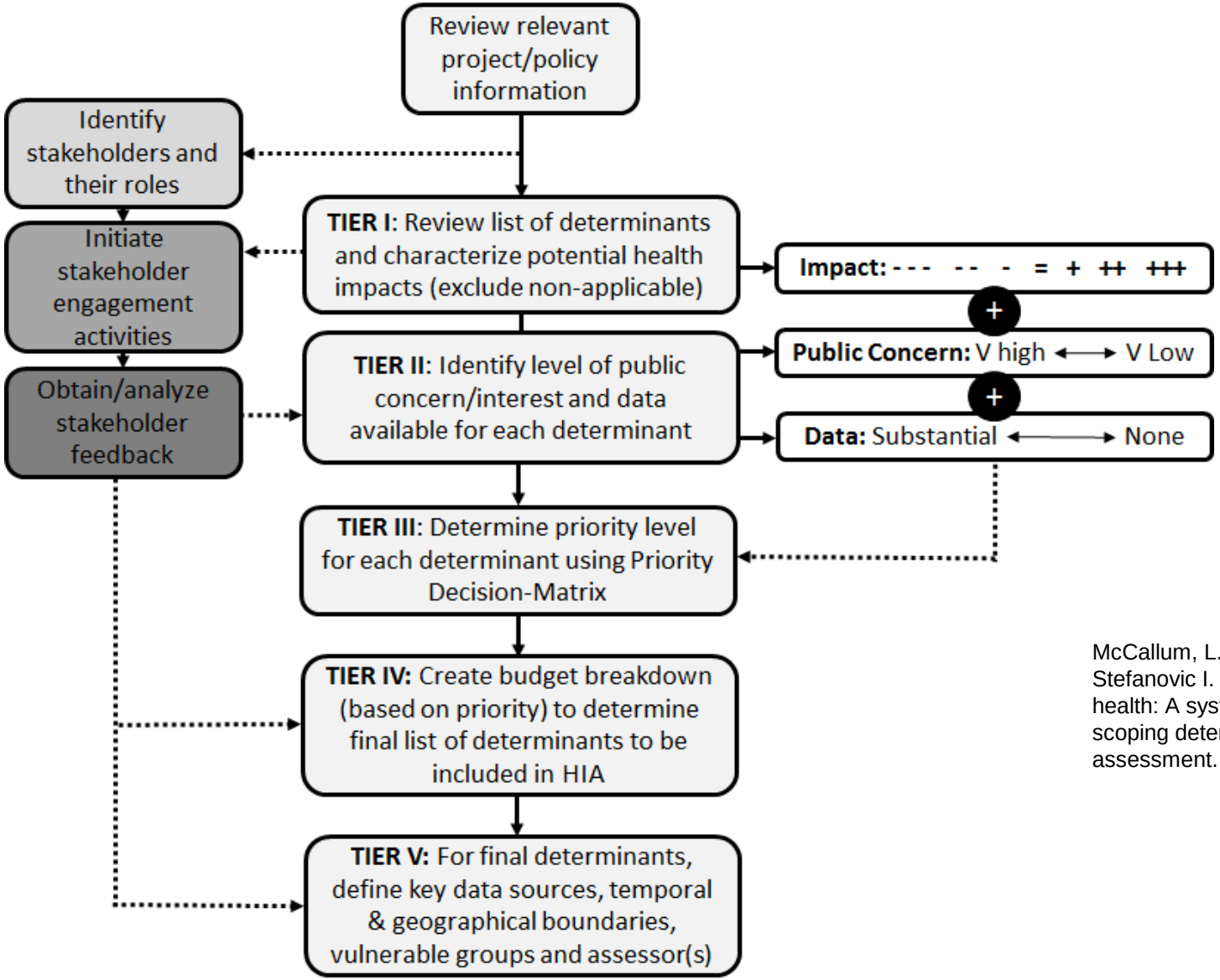
HIA Scoping Tool



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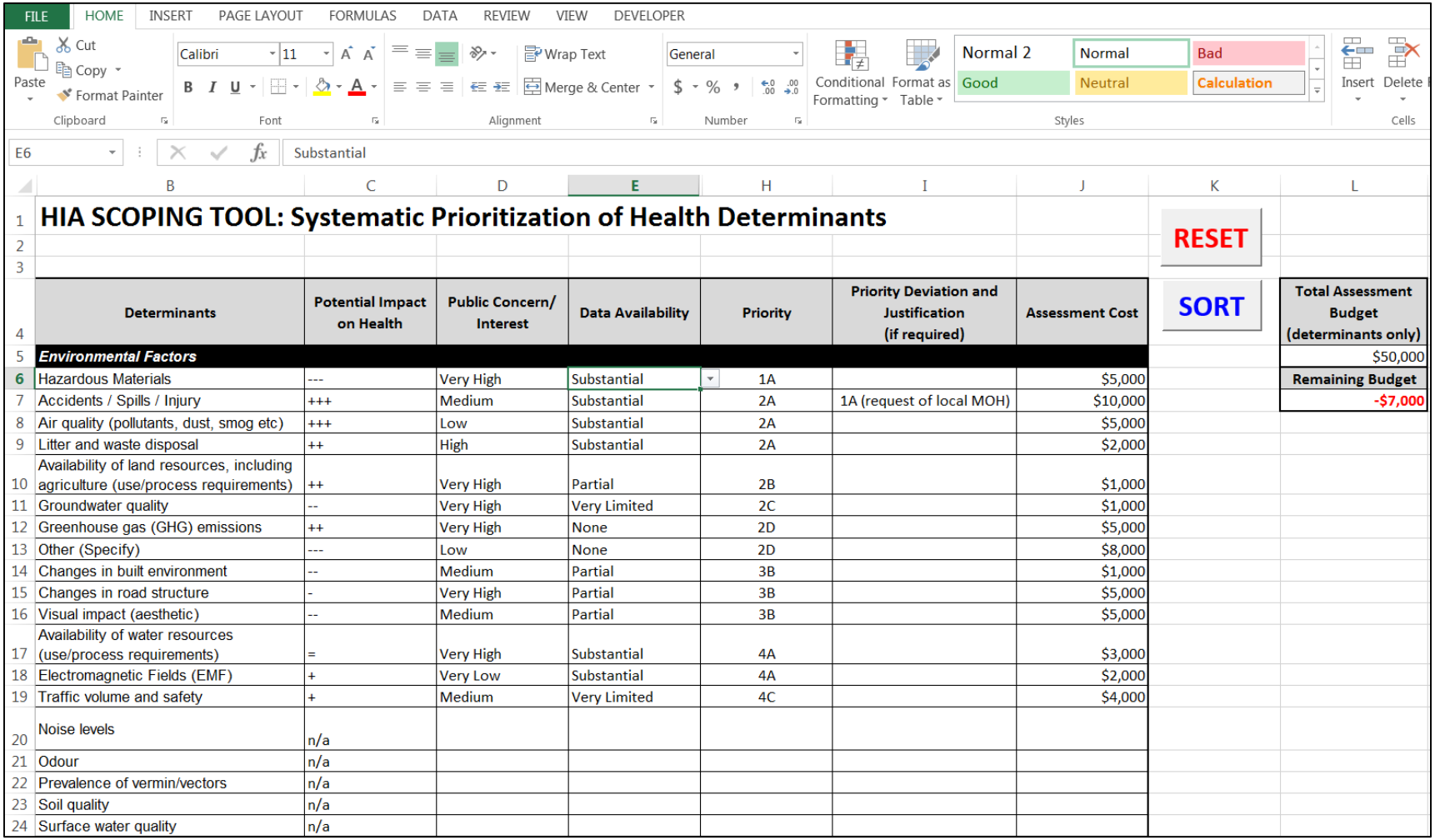
HIA Scoping Tool



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HIA SCOPING TOOL: Systematic Prioritization of Health Determinants

RESET

SORT

Determinants	Potential Impact on Health	Public Concern/ Interest	Data Availability	Priority	Priority Deviation and Justification (if required)	Assessment Cost
Environmental Factors						
Hazardous Materials	---	Very High	Substantial	1A		$5,000
Accidents / Spills / Injury	+++	Medium	Substantial	2A	1A (request of local MOH)	$10,000
Air quality (pollutants, dust, smog etc)	+++	Low	Substantial	2A		$5,000
Litter and waste disposal	++	High	Substantial	2A		$2,000
Availability of land resources, including agriculture (use/process requirements)	++	Very High	Partial	2B		$1,000
Groundwater quality	--	Very High	Very Limited	2C		$1,000
Greenhouse gas (GHG) emissions	++	Very High	None	2D		$5,000
Other (Specify)	---	Low	None	2D		$8,000
Changes in built environment	--	Medium	Partial	3B		$1,000
Changes in road structure	-	Very High	Partial	3B		$5,000
Visual impact (aesthetic)	--	Medium	Partial	3B		$5,000
Availability of water resources (use/process requirements)	=	Very High	Substantial	4A		$3,000
Electromagnetic Fields (EMF)	+	Very Low	Substantial	4A		$2,000
Traffic volume and safety	+	Medium	Very Limited	4C		$4,000
Noise levels	n/a					
Odour	n/a					
Prevalence of vermin/vectors	n/a					
Soil quality	n/a					
Surface water quality	n/a					

Total Assessment Budget (determinants only)
$50,000
Remaining Budget
-$7,000

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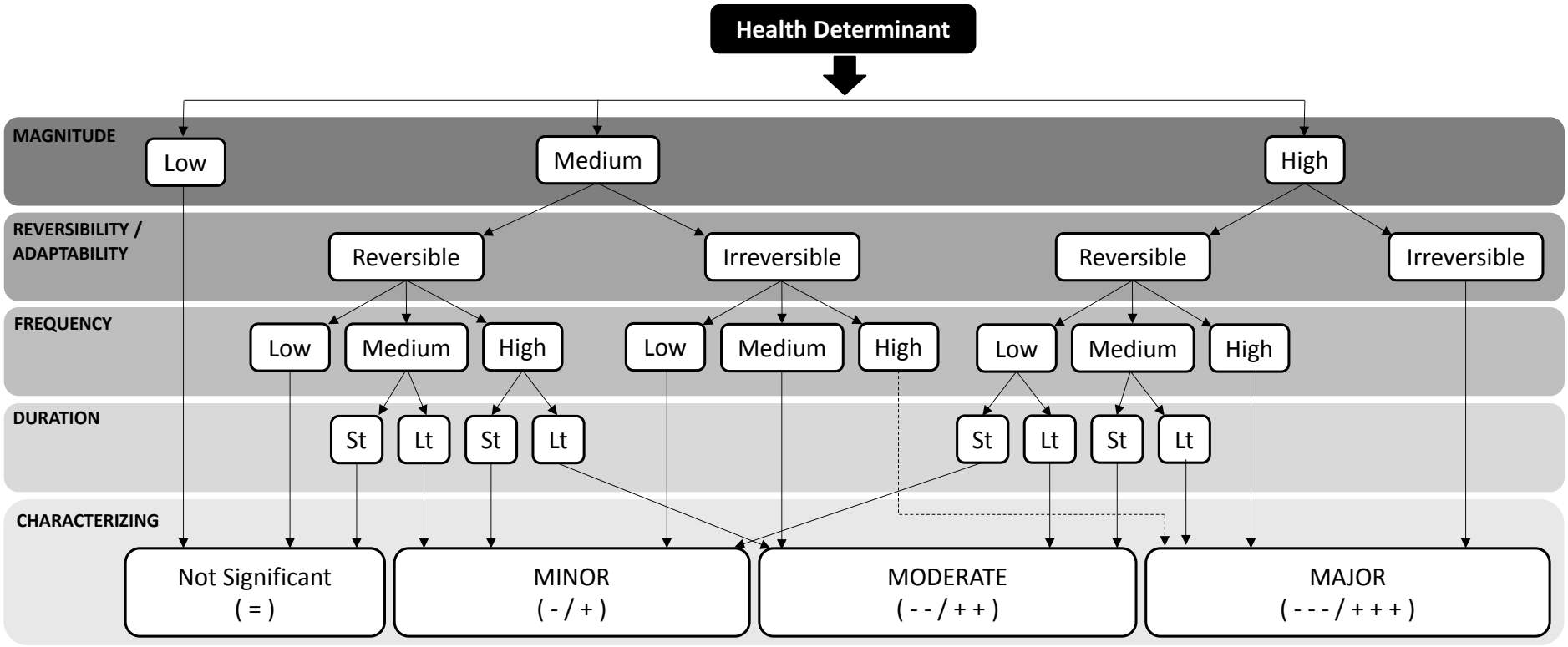
Assessment Framework for EA



Characterizing Effects

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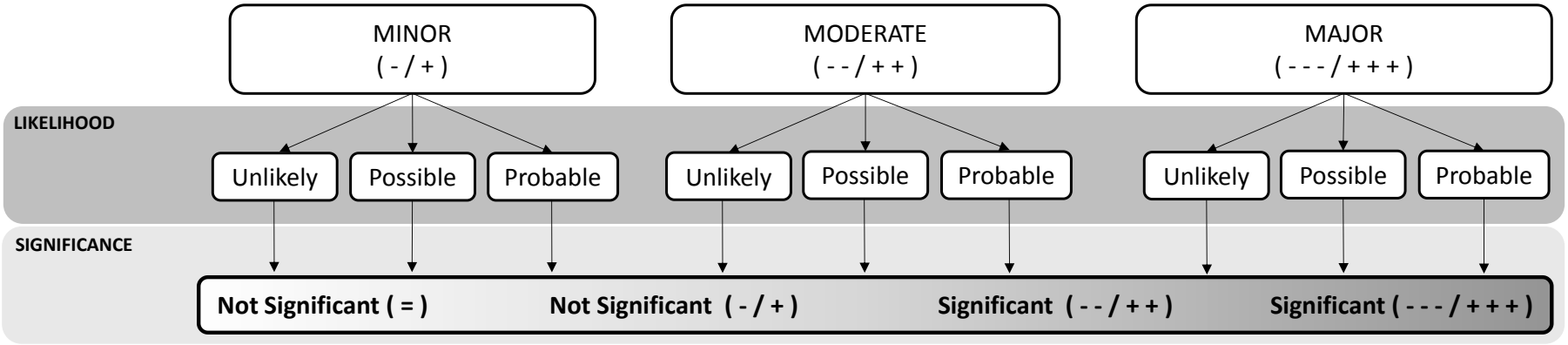
Assessment Framework for EA



Determining Significance

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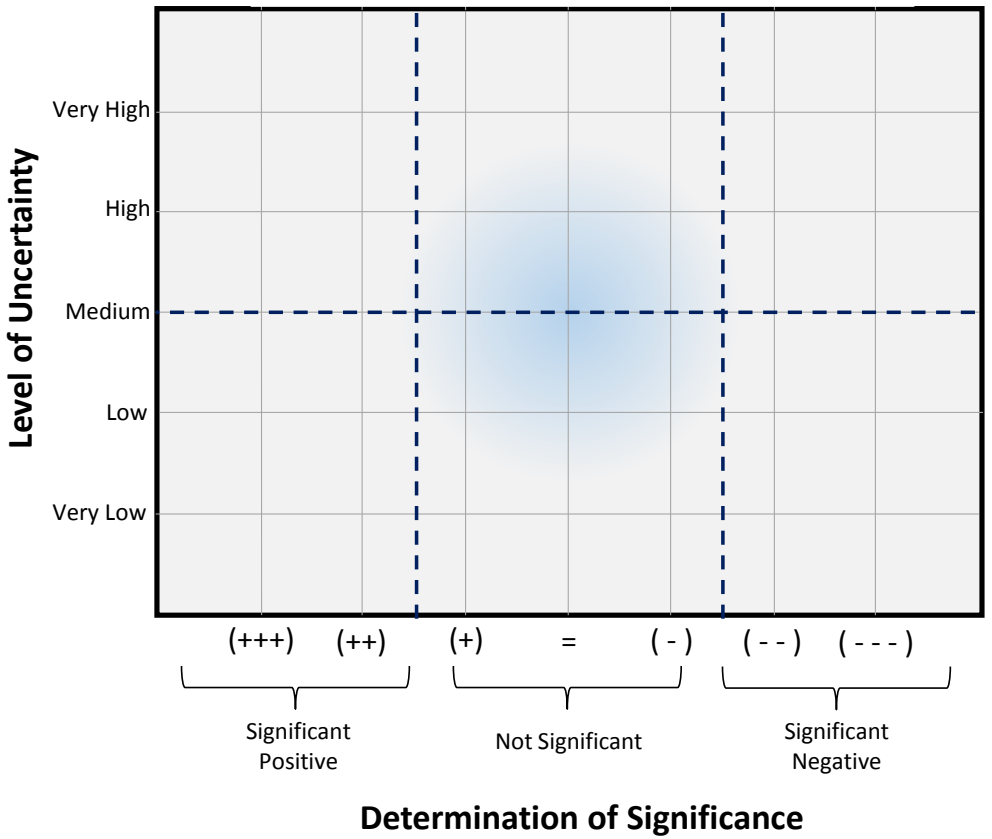
Assessment Framework for EA



Developing Conclusions

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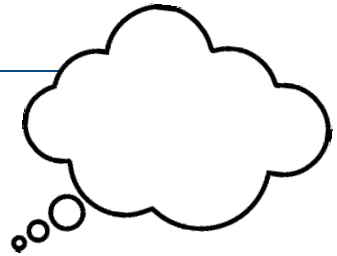
Final Thoughts



- The practice of HIA is based on a holistic model of health; including consideration of physical, social and mental health and well-being
- HIA has been applied to various sectors to inform the decision-making process
- Methods in HIA remain inconsistent, leading to HIA being underutilized as a vehicle for assessing health
- Research and development on HIA focused on development of new methods and tools to make HIA more consistent and transparent
- Overall, HIA facilitates consideration of health in proposed policies and projects and is able to mitigate negatives and enhance positives

References

Health & Community Design Lab. 2013. Integrating Health into Transportation Planning in the Metro Vancouver Region: Context Report. Available at: http://www.translink.ca/~/media/Documents/plans_and_projects/regional_transportation_strategy/Research/Transportation_and_Health.ashx

McCallum, L. C., Souweine, K., McDaniel, M., Koppe, B., McFarland, C., Butler, K., Ollson, C. (2015b). Health impact assessment of an oil drilling project. International Journal of Occupational Medicine and Environmental Health, 29(2), 229-253. https://doi.org/10.13075/ijomeh.1896.00551

McCallum, L. C., Ollson, C. A. & Stefanovic I. L. (2016). Prioritizing health: A systematic approach to scoping determinants in health impact assessment. Frontiers in Public Health. http://dx.doi.org/10.3389/fpubh.2016.00170

McCallum, L. C., Ollson, C. A., & Stefanovic I. L. (2016). Development of a Health Impact Assessment Screening Tool: A Value vs. Investment Approach. *International Journal of Environmental Assessment Policy and Management,* 18(3). http://dx.doi.org/10.1142/S1464333216500198

McCallum, L. C., Ollson, C. A., & Stefanovic, I. L. (2015). Advancing the practice of health impact assessment in Canada: Obstacles and opportunities. *Environmental Impact Assessment Review*, 55, 98–109. http://dx.doi.org/10.1016/j.eiar.2015.07.007

Ottawa Charter for Health Promotion (1986). Geneva: World Health Organization.

Rhodus J., Fulk, F., Autrey, B., O'Shea, S., & Roth, A. (2013). A Review of Health Impact Assessments in the U.S.: Current State-of-Science, Best Practices, and Areas for Improvement. United States Environmental Protection Agency. EPA/600/R-13/354

Waheed et al. (2016). Rapid Health Impact Assessment of HOT/HOV Lanes.

Welsh Assembly Government (2008). Final Strategic Health Impact Assessment. Main Report.

Whitehead M, Dahlgren G. What can be done about inequalities in health? Lancet. 1991;338:1059–63.

WHO (1948). Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19–22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948.

WHO (1999). Gothenburg Consensus Paper. Health Impact Assessment: Main Concepts and Suggested Approach. World Health Organization.

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