



## **Establishing Mixed Method Research Design Guidelines in Health Impact Assessment (HIA) Investigations**

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### Introduction

In the last decade planners have become more aware of the possible health impacts of existing and proposed plans and projects. The most common strategy planners use to assess the health impacts of their planning decisions is through a Health Impact Assessment (HIAs) strategy. HIAs are founded on “the ethical use of evidence, emphasizing the use of quantitative and qualitative evidence ... to get as comprehensive assessment as possible of the expected impacts” (European Center for Health Policy, 1999, p.4). As much as HIAs are based on a mixed method research design strategy (quantitative and qualitative data sets combined in one research project), the HIA literature since the Gothenberg Consensus Papers in 1999 has yet to provide any guidelines on how planners should conduct a mixed method HIA research project. Research methodology has become the Achilles heel of HIAs, in turn, limiting their planning and policy impact.

In this paper we conducted a content analysis of 149 HIAs conducted around the world starting from 1999 to 2011 and analyzed their research methodologies. Observations generated from the analyzed HIAs are used to establish a series of mixed method design guidelines to help planners improve the analytical capabilities in future HIA investigations.

The paper is organized into four sections. The paper begins with a simple overview about HIAs. Here, we discuss its assumptions and the different approaches they are applied. This is followed with a brief discussion about mixed method research design. In our discussion about mixed method design, we identify the most common applications (“reasons”) when planners typically use a mixed method research design. The third section is a discussion of our HIA data. This section concludes with an analysis of the mixed method HIAs to develop a working “HIA model for mixed method research design.” The paper concludes with a discussion on next-steps planners can take to improve their future HIA investigations via a mixed method research design approach.

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## The World of HIAs

Health Impact Assessments (HIAs) are assessment strategies used by planners that combine community input with a series of data sets to evaluate the health impact of proposed and existing projects. In 1999, the World Health Organization European Regional Office in collaboration with the European Health Policy Centre developed the “Gothenberg Consensus Papers” that established an international framework by which planners and policy makers can operate from a common understanding in the application of HIAs.

An HIA is a community-based approach to addressing local health issues. It:

- provides a broad definition of health that includes economic, environmental, social and psychological factors
- particularly concerned with disadvantaged populations
- takes a multi-disciplinary approach to “evidence” that includes quantitative and qualitative data slices to inform decision-making

The act of conducting an HIA is very much like going through the rational planning process. It is in part the similarity between the HIA process and the plan making process that draws planners to HIAs. The HIA process is divided into five sequential steps. They are:

- 1.) Screening -- The selection process that determines whether a particular policy, plan, or project has a potential health impact. Is an HIA needed?
- 2.) Scoping -- If the screening has determined that an HIA is to be carried out, this is the process that identifies the steering group and establishes a work plan for the HIA.
- 3.) Assessment (research) is -- The “engine” of the HIA where impacts are considered, evidenced gathered, and recommendations are framed.
- 4.) Report -- Formal identification of recommendations and production of the final report.
- 5.) Monitoring -- Assessment of the HIA process: 1.) impact of the process, and 2.) relevance of research.

Before any research is conducted in an HIA, an extensive screening process takes place to determine if an HIA is needed. (See Figure 1 below.)

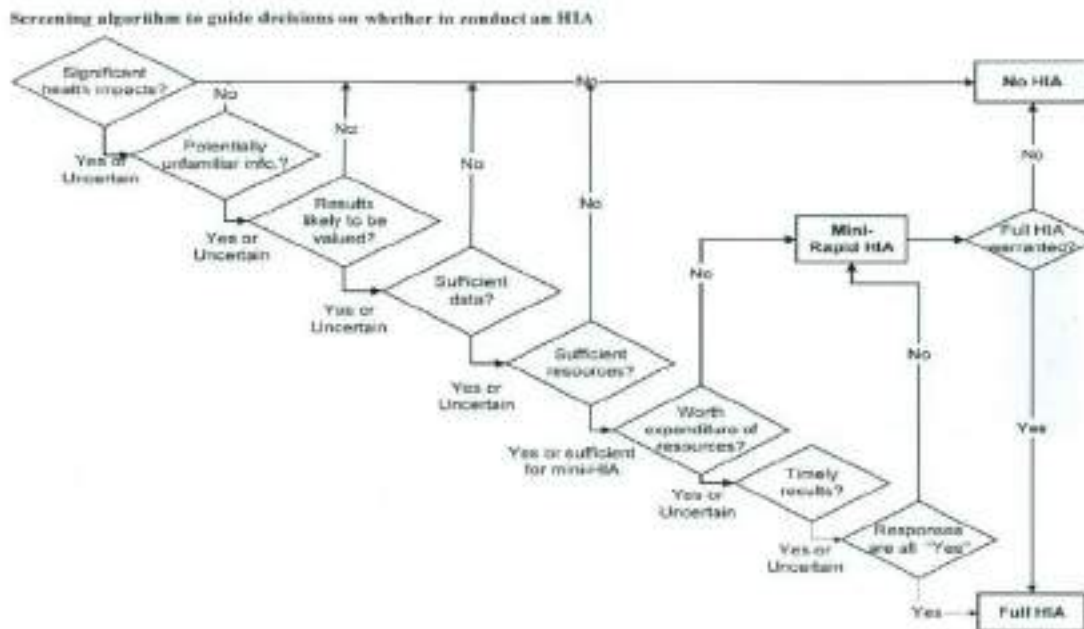


Figure 1. Source, UCLA, (2004) Health Impact Assessment, p.4.

There are three types of HIAs depending on the amount of time needed to execute the process: *rapid* (also called “tabletop”) --the shortest study (one to two days), *intermediate* – a more detailed investigation (several weeks), and *comprehensive* -- an intensive investigation (several months up to a year).

### Mixed Method Research Design

Mixed method research designs help planners better understand the complexities of life. In most situations, there is not one singular perspective. There are multiple perspectives. In working in a mixed method investigation, the planner is required to combine more than one research method to generate multiple data slices that are organized into a single research project. Mixed method research projects involve the integration of quantitative methods (the collection of numbers) and qualitative methods (the collection of words and images). An example would be the combination of census data with participant observation field research data to learn more about a particular community.

Mixed method research design is further broken down into two kinds of strategies: *within-method* and *between-method* triangulation. In a within-method investigation, the planner takes one method and use different strategies within it, such as using a survey that asks closed-ended questions for quantitative data and open-ended questions for qualitative data. Between-method



investigation combines dissimilar methods to examine a particular situation, such as using census data research and a focus group investigation to figure out the best location for a new neighborhood park. Between-method designs are the most common mixed method approach used with HIAs.

The mixed method literature five identifies “purposes” (more easily understood as *reasons* why researchers use this technique) for a planner to employ a mixed method research design. They are: convergence (triangulation), development, complementarity, expansion, and initiation. *Convergence*, also known in the literature as triangulation, is the most sought after process in mixed method research. The goal is to use several different methods to analyze a single phenomenon in order to increase the validity and credibility of the results (Cook 1985, p. 46, Bryman 1992, p. 131).

Mixed method research strategies can be classified as simultaneous or parallel/sequential (Greswell, 1994, p. 182). A simultaneous mixed method investigation uses multiple research methods at the same time. In sequential mixed method research, the results of one method are essential for developing the next. Mixing methods for the purpose of *development* involves the sequential use of quantitative and qualitative strategies where results from the first method are used to inform the second method. The goal of development is to increase the strength and sensitivity of additional research methods.

*Complementarity* combines methods to measure overlapping, as well as different aspects of a situation, in order to get an enriched enhancement of that situation. The goal of complementarity differs from the goal of convergence in that the focus of convergence requires that different methods assess the same conceptual phenomenon, while the methods used in complementarity address *different* phenomena (Greene, et. al. 1989, p. 258).

*Expansion* combines the processes of complementarity and development to extend the range of understanding about a situation by using different methods targeting different components of the situation (Greene, et. al. 1989, p. 259). Expansion has two goals. First, similar to the development process, expansion focuses on applying research methods particularly strong in analyzing specific situations. Information generated from one method is not used to help another method in its assigned tasks. The second goal is similar to the complementarity process—the planner applies the images of reality generated by one method to help analyze other sets of images generated by different research methods.

*Initiation* is at the opposite end of the mixed method spectrum from convergence. It looks for situations where research findings do *not* converge. The goal of initiation is “to initiate new interpretations, suggest areas for further exploration, or recast the entire research question” (Rossman and Wilson, 1985, p. 635, Jick, 1983, p. 149).



## HIA Investigation

We conducted a fairly exhaustive internet investigation of all published HIAs (in English) from 1999 to 2011. A total of 149 HIAs were obtained and analyzed. The countries represented in the HIA sample include: Australia, Canada, Germany, India, Italy, Netherlands, New Zealand, Russia, Slovenia, Sweden, UK (England, Ireland, Scotland, Wales), and the US. The HIAs were first found through international collecting HIA websites (e.g. “The HIA Gateway,” maintained by the West Midlands Public Health Observatory). After exhausting these collecting HIA websites, we then looked at specific agencies / organizations that have published HIAs found in the collecting HIA websites to see if they have any more HIAs in their archives. Two examples of this secondary search would be our looking at the US HIA organization “Health Impact Partners (HIP)” and the UK HIA Organization “Impact” at the University of Liverpool to see if they had any additional HIAs.

The HIAs were catalogued and analyzed first by latent content analysis and afterwards by a manifest analysis (Gaber and Gaber, 2007, pp.103-134). The HIAs were read twice through a latent content analysis to obtain comparable bits of information. In the first reading of the HIAs, we collected information on the following variables: date, author, topic (e.g. land use or social services), type of HIA conducted (Rapid, Intermediate, or Comprehensive), location in the planning process (Prospective, Retrospective, or Concurrent), type of research design. In the second reading, we focused on only the research design section of the HIA to determine what type of research design was used (mono method vs. mixed method), and if a mixed method research strategy was used, what type of mixed method research design was carried out. Once all of the comparable data was collected, they were in dropped into a spread sheet, the HIAs were then analyzed via a manifest content analysis to determine thematic trends.

## Mixed Method HIA Investigation

The most surprising observation among the analyzed HIAs was that only 68% of them used mixed method research strategies. As outlined in the *EPHIA HIA Methods Guide (A Guide)*, mixed method research is the foundational research design for all HIAs , so this number should be closer to 100%. A little over quarter of the reviewed HIAs (26%) used a single method investigation. 5% of the HIAs did not even have a methodology. Lastly, less than 1% (0.6%) of the HIAs recognized that they conducted a mixed method investigation. From this overall assessment of the HIAs methodologies, it is very clear that much more work is needed in bolstering the rigor and improving the explanatory capacity in HIAs mixed method research projects.

By looking more closely at the HIAs that actually completed a mixed method research design, we can discover where best to apply mixed method guidelines that generates the easiest and



quickest results for future HIAs. The HIA cohort that clearly executed a mixed method research project are for all extensive purposes are representative to the total population of surveyed HIAs.<sup>i</sup>

Within the mixed method HIAs themselves, they are fairly evenly distributed in terms of the level of detail in their investigations. The largest third (36%) of the HIAs are Rapid investigations, with the middle third (33%) being for Intermediate projects, and the smallest third (31%) are Comprehensive HIAs (Table 1). In an earlier study (Gaber and Overacker, 2011), it appears there is a trend away from more time consuming and expensive comprehensive HIAs and a move to shorter and more affordable HIAs.

Table 1. HIA's by Level

Level	Mixed Method HIA Population
Rapid	36%
Intermediate	33%
Comprehensive	31%
Not Identified	
Total	100%

What dramatically stands out about the mixed method HIA population was the Type of HIA that was conducted (Table 2). More than 60% of the mixed method HIAs were conducted within a Prospective planning calendar. This highlights that mixed method research strategies are actively



used in the HIA process as a way to get as much diverse bits of information as possible to access “possible” health impacts. A little over a third (33%) of the mixed method HIAs focused on Concurrent HIA research.

Table 2. HIAs by Type

Type	Mixed Method HIA Population
Prospective	61%
Concurrent	33%
Retrospective	6%
Total	100%

As seen in Table 3, it is very clear that Mixed Method HIAs are more focused on Human Services and Land Use topics. Topically, the mixed method HIAs were fairly evenly split between Human Services assessments at 48% and Land Use assessments at 44%.

Table 3. HIA’s by Topic

Topic	Mixed Method Population
Human Services	48%
Land Use	44%
Environmental	8%
Total	100%



The authors to the Mixed Method HIA cohort are fairly representative of all the organizations that would normally be interested in assessing the health impact of identified projects. None of the authors are from the private sector. Over half of the authored mixed method HIAs are from the public sector with 33% of them being written by government agencies and 30% by university organizations (all are public universities), or some combination of government, university, or non-government agency at 19%. (See Table 4.) The remaining 18% of the HIAs were conducted by non government agencies.

Table 4. HIA’s by Author

Author	Mixed Method Population
Government	33%
University	30%
Non-Govt. Org. (NGO)	18%
Combination	19%
Total	100%

In looking more closely at how the HIAs conducted their investigations, a very clear image of the HIA model to mixed method research design becomes very distinct. Let us go into more detail on what we discovered in this profile of HIA mixed method design. Straight of out of the gates, the way HIAs approach mixed method research design is very different from what is considered “common” mixed method investigation. Two (out of three) defining aspects to the HIA’s model to mixed method research are shown in Table Y1. First, HIA mixed method research strategies significantly lean to the “expansion” purpose of mixed method investigations. Expansion mixed method investigations are when the researcher uses different research methods to obtain different data sets. This makes sense since HIA investigation are required to obtain very disparate data slices (e.g. health, demographic, traffic, economics) in a single HIA study. What is particular interesting with the HIA model is that an overwhelming majority of them using Expansion mixed method investigation, while in the mixed method literature Triangulation is the

most common use of mixed method investigation. (Source this) As discussed earlier, the primary reason and benefit to a triangulation mixed method design is the added confirmation in internal validity with different research projects converging on the same observation. Only 2% of the reviewed HIA's utilized a mixed method investigation for triangulation. It is very clear among HIA researchers that they are more concerned with the breadth of research observations (the main reason to expansion mixed method projects) than in shoring-up depth in confidence of their research observations with a strong argument for internal validity.

Table 5. Strategy Mixed Method Type and HIA Type

	Prospective	Concurrent	Retrospective
Expansion	69% (42)	88% (29)	50% (3)
Complementarity	5% (3)	0	0
Triangulation	3% (2)	0	17% (1)
Initiation	2 (2)	0	0
Development	0	0	0
Hybrid	20% (12)	12% (4)	33% (2)
Total	100% (61)	100% (33)	100% (6)

The second distinct characteristics to the HIA model to mixed method research is also the second most popular purpose in why HIA researchers used mixed method investigations: Hybrid. The Hybrid purpose for mixed method investigations is when a researcher uses two or more investigative techniques (e.g. survey and focus group investigations) for more than one of the 5 major purposes for mixed method investigations. The Hybrid mixed method approach is the most complicated mixed method purpose because it requires the investigator to be acutely aware of the different purposes for mixed method investigations and that they are combining two (or more) purposes to either achieve a more detailed analysis or greater depth of confidence. In this case of HIA investigations, a more accurate explanation is that the HIA formula to research requires a multi-purpose for their mixed method investigations and that they are executing a Hybrid mixed method study more out of functionality of the investigation than out of other understandings about the basic application of mixed method investigations. Properly grounded in mixed method research strategies, HIA investigators will be better able to take on more Hybrid mixed method projects and be able to expand on the explanatory value of their hybrid mixed method investigations.

As shown in Table 6, Hybrid mixed methods are gaining popularity in the last ten years. 67% of all the Hybrid HIAs were conducted between 2007 and 2011.

Table 6. HIA Mixed Method Research Strategy from 1999 to 2011

	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11
Expansion	1	3	5	7	3	2	3	11	11	12	8	5	3
Complementarity	0	0	0	0	0	1	0	1	0	0	0	1	0
Triangulation	0	0	0	0	0	1	1	0	0	1	0	0	0
Initiation	0	0	0	0	0	0	0	1	0	0	1	0	0
Development	0	0	0	0	0	0	0	0	0	0	0	0	0
Hybrid	0	0	2	0	0	4	0	0	2	4	2	4	0
Total	1	3	7	7	3	8	4	13	13	17	11	10	3

In looking at the type of mixed method research study was applied in relation to the size of the HIA study, the third characteristic of HIAs becomes apparent. (See Table 7.) While Rapid and Intermediate HIAs mostly focus on the Expansion mixed method approach (80%), Comprehensive HIAs are more evenly split between Expansion (46%) and Hybrid (32%) mixed method approaches. Stated differently, more than half (55%) of all Hybrid mixed method HIA studies are conducted within the Comprehensive HIA format. A partial explanation for this can be that the Hybrid mixed method project are particular adept at analyzing complex problems which is the focus of Comprehensive HIAs. In addition, Hybrid mixed method research projects, with their added layer of complexity, tend to require added attention which is made possible through the long-term Comprehensive HIA process.

Table 7. HIA Mixed Method Research Strategy and HIA Level

	Rapid	Intermediate	Comprehensive
Expansion	81% (29)	85% (28)	55% (17)
Complementarity	0	0	10% (3)
Triangulation	5% (2)	3% (1)	0
Initiation	3% (1)	0	3% (1)
Development	0	0	0
Hybrid	11% (4)	12% (4)	32% (10)
Total	100% (36)	100% (33)	100% (31)

At first sight it appears there are very little differentiation in the type of mixed method research used in the substantive topics of the HIAs (Human Services, Land Use, Environmental). (See Table 8.) All three of the substantive HIAs use Expansion mixed method research approach at least 70% of the time (77%, Land Use, 75%, Environmental, and 71%, Human Services). What is important to point out here is that 67% of the Hybrid HIAs (Table Y4) have focused on Human Service issues.

Table 8. HIA Mixed Method Research Strategy and HIA Topic:



	Human Services	Land Use	Environmental
Expansion	71% (34)	78% (34)	75% (6)
Complementarity	0	7% (3)	0
Triangulation	4% (2)	2% (1)	0
Initiation	0	4% (2)	0
Development	0	0	0
Hybrid	25% (12)	9% (4)	25% (2)
Total	100% (48)	100% (44)	100% (8)

When breaking down the mixed method HIAs by author, it is very clear that Expansion investigations are heavily used by government, university, and NGOs. (See Table 9.) Interestingly, although university authored HIAs primary focus are in Expansion mixed method strategies, they did have the second largest number of Hybrid HIAs after Combination authored HIAs. It is not surprisingly that the combination of University and Combined authored HIAs account for 72% of the Hybrid HIAs. In fact, within the Combined authored Hybrid HIAs, University co-authored 100% of the Hybrid authorships. It is fairly safe to assume that more complex and integrated mixed method HIA projects are conducted by or with university researchers.

Table 9. HIA Mixed Method Research Strategy by HIA Author

	Government	University	NGO	Combination
Expansion	79% (26)	77% (23)	83% (15)	53% (10)
Complementarity	6% (2)	3% (1)	0	0
Triangulation	6% (2)	0	0	5% (1)
Initiation	3% (1)	0	0	5% (1)
Development	0	0	0	0
Hybrid	6% (2)	20% (6)	17% (3)	37% (7)
Total	100% (33)	100% (30)	100% (18)	100% (19)

In looking more closer at the Hybrid HIAs (Table 10), it becomes very clear that Universities play a significant role in authoring this type of mixed method investigation. As a single author, University accounts only for 31% of all of the Hybrid HIAs. However, when the single University authorship is combined with joint authorship with other organizations (Government, NGOs, and Government/NGOs), over 70% of the Hybrid HIAs are authored by University.

Table 10. Hybrid Mixed Method by HIA Author

Author	Hybrid Mixed Method HIA
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University	31%	(6)
Government	12%	(2)
NGO	17%	(3)
Combination	40%	(7)
University/Government	17%	(3)
University/NGO	17%	(3)
University/Government/NGO	6%	(1)
<hr/>		
Total	100%	(18)

The Hybrid HIAs focus primarily on two very different mixed method combinations. (See Table 11.) The largest combination at 39% of the mixed method Hybrid HIAs used the Complimentarity/ Expansion Hybrid model. This makes sense that given that Complimentarity and Expansion are very much sister mixed method research strategies and combine different investigations in a very similar fashion. The way the authors apply this particular HIA mixed method approach is that they first start out the investigation according to an Expansion strategy and use the different methods to access different data sets. Once all the data is collected, the authors then jump over to the Complementarity investigation and use the data obtained from one method to then analyze the data generated by a different method. For example, in the “29<sup>th</sup> Street San Pedro Street Health Impact Assessment” conducted by Human Impact Partners (2009), they used “(d)ata from specific survey questions ... alongside census and other data sources to provide additional information about existing health conditions in the community” (HIP, 2009, p. Intro. 5).

Table 11. Most Common Hybrid Mixed Method Combination

Type of Mixed Method Combination	Total
Complimentarity / Expansion	39% (7)
Expansion / Initiation	31% (6)
Expansion / Triangulation	12% (2)
Development /	12% (2)



Expansion

Complimentarity /  
Initiation 6% (1)

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100% (18)

The second popular Hybrid mixed method approach strategy was in the mixture of Expansion/Initiation. This is somewhat unique in that Expansion mixed method investigations are not closely aligned with Initiation as would it would be with Expansion to Triangulation where different methods generate observations that can share on a shared observation. In the Expansion / Initiation Hybrid mixed method investigations, the researchers start off the study in an Expansion strategy and are using different methods to obtain and analyze very different data sets. Once a set of observations are generated from the first round of data gathering work, the authors then analyze the data and discover new realities and take these discoveries and take to a new research project (Initiation) to explore this new empirical path. An example of this Hybrid approach is the “Stopping the Out Case Study,” HIA investigation project conducted by the University of Liverpool in their study of vulnerable young women in South Sefton. In this study, one researcher conducted two additional focus group investigations with “other key informants and stakeholders who are not directly associated with the project as either employees or users” to get a sense of what “people outside of the organization” thinks (University of Liverpool, 2001, p. 18).

Piecing Together the HIA Mixed Method Profile

Through the piecing together of the more dramatic characteristics among the mixed method HIAs, a “HIA Mixed Method Model” can be delineated that stands out from the typical HIA population. Our analysis is able identify four very clear mixed method HIA characteristics. First, mixed method HIAs are much more likely to be for a Prospective application (61%) than either Concurrent (33%) or Retrospective (6%) . Second, mixed method HIAs are less focused on Environmental topics than Human Services and Land Use topics. Methodologically, mixed method HIAs are more commonly based on an Expansion mixed method design. Expansion HIA investigations are more commonly applied in Rapid and Intermediate investigations than in Comprehensive projects. Lastly, and very unanticipated, mixed method HIAs are actively using Hybrid mixed method strategies. Interestingly, the inverse is true with Hybrid mixed method HIAs that are more commonly found in Comprehensive HIA projects than in Rapid and Intermediate studies. Hybrid mixed method HIAs are more likely to be authored or co-authored



by a university and tend to be evenly split between an Expansion / Complimentarity approach or an Expansion / Initiation approach.

Next-steps in HIA Mixed Method Research Strategies and Planning

I will finish this last paragraph by the end of the month. Thank you, John Gaber

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