

Humboldt County General Plan Update Health Impact Assessment: A Case Study

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Abstract

Health Impact Assessment is an emerging tool that can be used to identify and mitigate impacts on population health by land use projects and policies. This case study describes the application of HIA in the General Plan Update process in Humboldt County, a rural Northern California county that is considering three alternatives to future growth. The HIA analyzes some of the potential health outcomes associated with these alternatives. The General Plan Update process is not yet complete, but the HIA has already been effective in building awareness of health impacts related to planning decisions among County agencies, project decision-makers, participating community members, and the general public. A model for considering health in development decisions was developed specifically for rural jurisdictions.

Introduction

Since the end of World War II, there has been tremendous development in non-urban areas of the United States. Agricultural lands, forest lands and open space have been replaced by suburbs and exurbs, while suburban migration and the loss of manufacturing industries have meant stagnation, disinvestment and neglect for urban areas. This growth pattern has both necessitated and been fueled by the building of more infrastructure - highways and roads, sewer and water systems, schools and parks. Other drivers of these patterns include economic growth, zoning practices, the unmet demand for housing, fear of crime, and discriminatory banking practices such as mortgage lending discrimination (also known as “redlining”) on the basis of race. The recognized impacts of non-urban development are many and include the loss of agricultural and timberlands, increased reliance on cars, increased social isolation, and segregation by class and/or race.^{1 2}

Recently, environmentalists, active living advocates and others have been trying to change this pattern of development. They are advocating for more development in urban areas, so-called “infill” development, on the grounds of environmental and social sustainability, reducing global warming, and the protection of the natural habitats of non-human species. They argue that non-urban development is not an efficient use of resources and that it is associated with activities that harm the environment, such as increased vehicle use and destruction of fertile soil and wetlands. Furthermore, they argue that denser development will lead to construction of fewer roads, less driving, increased use of other modes of transportation, such as walking and biking, and increased availability of parks and open space.^{3 4}

Changes in patterns of health and disease have also occurred during the last 30 years. Chronic diseases such as diabetes, cardiovascular disease, and obesity, are more prevalent,^{5 6} environmentally-related illnesses such as asthma are on the rise, and health disparities between different classes and races, including the life-expectancy gap, have widened.⁷

Many argue that suburban and exurban growth patterns contribute to changing patterns of health and disease. For example, routine physical activity is facilitated by the availability of walkable and bikable streets that connect homes, schools, parks, jobs and/or shopping areas.⁸ Yet new neighborhood developments are often isolated from jobs, schools, and services, and require the use of private automobiles for most if not all trips. Non-urban development often happens without sufficient infrastructure development; one example of this is the construction of roads without shoulders or bike lanes in areas where public transit is not practical.⁹ This can contribute to a lack of physical activity, which increases risks of heart disease, diabetes, obesity, blood pressure, osteoporosis, symptoms of depression, and anxiety, and to increased risk for those who must walk or bike.

Urban reinvestment and development are being reinvigorated with consideration of environmental, health and equity concerns. Yet, unless infill development is done with foresight, it will also be associated with unexpected health outcomes. For example, building housing near freeways will potentially expose residents to poor air quality and noise and their associated health risks;¹⁰ increased traffic can potentially lead to increased

pedestrian injury;¹¹ and lack of access to parks and open space could reduce options for children to exercise.^{12 13}

Despite potential impacts on health, decisions about city, county, regional or statewide land use plans are frequently made without regard for their often-substantial health consequences. The critical impacts on health need to be taken into account as land use plans and decisions are made. There are several emerging methods that allow this to be done.

One set of tools that can be used to identify and mitigate adverse impacts on health is Health Impact Assessment (HIA). HIA is an emerging discipline that evaluates the impact of specific policies and projects on health. HIA analyses provide insights that can enable decision makers to make informed decisions affecting the health of communities. HIA has the potential to identify projects and policies that may impact the health of a population significantly so that the harmful effects may be reduced and the positive effects increased. The current context of growth and development in California provides an important opportunity to use HIA constructively and proactively to improve health and reduce health disparities. It has been suggested that for this to happen, additional practical examples of the application of HIA to land use issues must be carried out and documented.¹⁴

This paper describes the application of HIA in the General Plan Update process in Humboldt County, a rural county in Northern California that is currently considering three alternatives to future growth. The HIA described here analyzes some of the potential health outcomes associated with each of these alternatives. The HIA was conducted with the intent of using a framework of participatory democracy for informing the decision-making process and, in turn, improving the health outcomes associated with the chosen plan. Unlike those conducted in urban settings, this HIA was unique in that it analyzed and prioritized health impacts to a rural community. As a result of this project, a rural HIA tool is currently being developed for future use.

The Context

Humboldt County is a rural county in northern California that is famous for its redwood forests. The population of the county has been growing in recent decades. According to the census, in 1970, fewer than 100,000 people lived in the county, while in 2000 the number was above 126,500. Based on the State's Department of Finance estimates, county government expects this trend to continue, with the population reaching about 145,000 in 2025. Growth in the number of seniors will be dramatic – from about 16,000 today to over 30,000 in 2030 – while other age groups and populations will remain relatively stable. According to some estimates, about 60,500 acres (roughly 10%) of farmland were converted to other uses between 1985 and 2001, often to accommodate new housing subdivisions,¹⁵ and there was a substantial reduction in forested land over the last 30 years.

In 1998, Humboldt County started a General Plan Update (GPU) to guide building and growth over the next 25 years. In 2008, as part of the environmental review process for the GPU, three development alternatives are being considered:

- *Plan Alternative A* is described as “focused growth.” All new units would be built in areas that are already supported by public sewage and utilities. In other words, higher residential density and infill development would be encouraged, while any development in non-urban areas would be discouraged. The plan allows for the construction of 6,000 new units (which is the future housing need based on projections by the California Department of Finance) over the course of 25 years, all in urban areas.
- *Plan Alternative B* is a compromise between an all-infill development plan and a plan that does not highly regulate the location of new development. Plan Alternative B primarily provides for building in urban centers where there is a good network of utilities, sewage, and transit, but allows for some non-urban development as well, with modest expansion of existing water service in areas adjoining cities. Construction of an additional 12,000 units would be allowed over the course of 25 years. Half of these would be in urban areas and the other half would be in areas on the outskirts of existing urban areas.
- *Plan Alternative C* allows the most unrestricted growth, or an “expanded development pattern.” Plan Alternative C allows the highest number of existing parcels to be developed for housing and it expands water service areas beyond present boundaries to support opportunities for housing in outlying parts of communities. An additional 18,000 units could be constructed under this plan over the course of the next 25 years. Of these, 6,000 would be in urban areas and the remaining 12,000 would not be.

In 2007, with the support of the Board of Supervisors, the County Department of Health and Human Services Public Health Branch (PHB) began working with the Community Development Services Planning Division (CDS) to ensure that the General Plan would bring about the best possible health outcomes for current and future residents. With the encouragement of CDS and a grant from The California Endowment, PHB undertook an HIA to look at how the various land use and development scenarios under consideration for the GPU would affect health.

PHB worked with a coalition with which it was already involved, the Humboldt Partnership for Active Living (HumPAL), as a local partner in the HIA process. HumPAL is a partnership that includes community members, organizations and professionals from diverse disciplines such as public health, transportation engineering, community development, economic development, environmental consultants, social services and others. PHB also contracted with Human Impact Partners (HIP), a California-based non-profit that specializes in working with communities and public health agencies to conduct HIAs. This team then engaged staff of CDS, the group that is leading the GPU process, and many other members of the Humboldt community, in the HIA. All of these groups will heretofore be collectively referred to as the “project team,” and those based in Humboldt County will be referred to as the “Humboldt HIA team.”

Steps in the HIA Process

HIA is not one single process or tool; rather it describes diverse methods used to inform policy-makers about how policies, plans, programs, or projects can affect health, health behaviors, and social resources necessary for health.¹⁶ Typical steps in HIA include screening, scoping, analysis, reporting, and evaluation/monitoring.

- *Screening* involves determining whether or not an HIA is warranted.
- *Scoping* involves determining which health impacts to evaluate and the methods for analysis.
- *Analysis* of impacts involves using existing data and qualitative and quantitative research methods to determine the magnitude and direction of potential health impacts.
- *Reporting* of the HIA can take many forms including written reports and public testimony.
- *Evaluation and monitoring* describe how the process and findings of the HIA affect the decision and ultimate policy outcomes.

Within this general framework, approaches to HIA vary greatly with regard to the breadth of issues analyzed, the research methods employed, their relationship to regulatory impact assessment requirements, the role of policy-makers, stakeholders and the public in the analysis, and the ways the assessment is used to influence policy. Each step of the HIA process for this project is described below.

Screening

In the screening stage, reasons for conducting an HIA on a particular project, plan or policy are articulated with the purpose of deciding whether to conduct an HIA and how it could be used. Screening was conducted informally in the context of securing funding for this project by the County of Humboldt, HumPAL, and HIP. Collectively, these groups reasoned that an HIA could be useful because:

- There was a clearly defined decision to be made around the GPU alternatives;
- The decision would certainly impact the health of residents in the county and could lead to greater changes in health for particular populations (e.g., seniors);
- PHB was invited to be involved, and therefore it was expected that their input would be considered in the decision-making process;
- There were resources available to conduct the HIA;
- A wide variety of stakeholders were interested in participating;
- PHB was interested in using the HIA findings to inform decision makers (i.e. city planners, the planning commission, and county supervisors) and the general public about the health outcomes associated with the alternatives under consideration, as well as making recommendations that would improve those health outcomes.

Scoping

The focus of the HIA is determined in the scoping phase. After delineating roles for the organizations involved, research questions and priorities are decided.

While there are many ways to outline an HIA's research direction, the coalition of groups carrying out this assessment decided to first create a set of health-related indicators, and then evaluate the three GPU alternatives based on how they would affect these indicators. Based on the capacity of the organizations involved, the roles in Table 1 were delineated.

The project team used the San Francisco Department of Public Health's (SFDPH) Healthy Development Measurement Tool¹⁷ (HDMT), which contains over 100 health-related indicators, benchmark goals for healthy planning, baseline data, and references, as a starting point in scoping. Because San Francisco and Humboldt Counties are very different places, the first step in the process involved modifying the HDMT indicators for the rural environment: irrelevant indicators were eliminated (e.g., percent of tree canopy coverage), relevant indicators were kept but often modified (e.g., distance to a park or school), and new indicators were proposed in areas that were important in the rural context but not in the urban context (e.g., agricultural and timberlands). Approximately 37 local entities contributed data and analysis of the General Plan from their perspective, which built interest and participation in the HIA and in the planning process. Approximately 70 indicators were developed and initial background data was collected for many of those. A website was created to share this list of indicators and other information with stakeholders.¹⁸

The second step in establishing the scope for the HIA was conducting focus groups with stakeholders. Goals for the focus groups included:

- Obtaining information from stakeholders about which indicators were priorities and what was missing from the indicator list;
- Collecting ideas from stakeholders about the impact of the General Plan Alternatives on the indicators;
- Building awareness among stakeholders about the potential health impacts of the General Plan Alternative choice, and about how the built environment affects health in general;
- Engaging the community in the HIA and GPU processes.

HumPAL organized and HIP facilitated three three-hour focus groups in three cities in the county, as well as one two-hour focus group by phone conference. Approximately 50 people attended the focus groups, representing a wide range of populations and interest groups (e.g., seniors, Native Americans, environmentalists, planners, homeless advocates, advocates for active transportation, health professionals, and elected officials). Insight gained from these meetings was used in the final steps of the scoping phase and as qualitative data during the assessment phase. The focus groups were useful in prioritizing indicators (e.g., air quality was not raised as an immediate concern but availability of lands for agriculture and timber was a high priority) and in pointing out gaps in the list of indicators (e.g., indicators of water quality were missing in the initial list).

After the focus groups, the project team created a revised list of indicators, and judged each indicator on that list using the following criteria:

- Was the indicator discussed frequently in the focus groups?

- Would the indicator be useful in evaluating and differentiating the proposed GPU alternatives?
- Would analysis of the indicator highlight disparities?
- Is data for analyzing the indicator available?
- How strong is the evidence relating the indicator to health outcomes?

Using these criteria, 35 indicators were selected. As with SFDPH's HDMT indicators, these indicators were classified into the following six categories:

- Healthy Housing;
- Safe and Sustainable Transportation;
- Environmental Stewardship;
- Public Infrastructure;
- Public Safety and Social Cohesion; and
- Healthy Economy.

All of the indicators that were developed as part of this project, whether or not they were ultimately selected for this HIA, have been incorporated into a Rural Healthy Development Measurement Tool (Rural HDMT) created by PHB. The Rural HDMT is posted on the HumPAL website¹⁹ for use in future HIAs in Humboldt County.

Assessment

The assessment stage of an HIA includes analyzing health impacts of a given project in terms of the chosen health indicators. For each of the 35 indicators chosen in this project, data about how each Plan Alternative would impact health was collected and conclusions were drawn based on that data. The analysis included:

1. A review of the public health literature to document how the indicator impacts health.
2. The collection of baseline data. Sources for baseline data included data available from PHB, HumPAL and CDS, documents found on the World Wide Web, and contributions by over 30 residents/professionals in the county. Most often, baseline data specific to Humboldt County was found, but if no such data existed, California or National data was used. For many indicators, Geographic Information System (GIS) mapping was used to analyze existing conditions.
3. A quantitative analysis of how the indicator would be impacted under the three GPU plan alternatives, when possible. Due to lack of data and/or a lack of robust analysis methods, only 10 of the 35 indicators were analyzed quantitatively. The most common quantitative analysis method was the use of weighted averages based on urban and rural statistics and populations.
4. A qualitative analysis based on discussion at the focus groups and/or on surveys conducted during the GPU process.²⁰
5. An assessment of how the changes in the indicator would impact the population, especially specific populations that face health disparities (e.g., seniors, youth, Native Americans, low-income communities). With the prediction of rising numbers of seniors in the county in the coming years, this population was considered in many of the analyses.

6. Strategies and potential mitigations that could be put in place to benefit and protect health for each indicator. Mitigations implemented or proposed in other locations were researched and recommended when applicable.

Analyses of two of the 35 health indicators assessed in this HIA will be described in the following section. The first example, analysis of vehicle miles traveled (VMT) by Humboldt County residents, can be summarized by the following steps:

1. VMT is related to health because:
 - a. VMT is directly proportional to air pollution and greenhouse gas emissions.²¹ Air pollution is a causal factor in cardiovascular mortality and respiratory disease.²² Greenhouse gases contribute to climate change, which may increase heat-related illness and death, health effects related to extreme weather events, health effects related to air pollution, water- and food-borne disease and vector- and rodent-borne disease.^{23 24}
 - b. Areas with higher VMT tend to have higher accident and injury rates.²⁵
 - c. VMT has a direct relationship with an individual's participation in physical activities.²⁶
 - d. VMT correlates with obesity.²⁷
 - e. How much one drives has an impact on the amount of money available for health needs, such as nutritious food and health care.
2. In 2006, Humboldt residents traveled 27 vehicle miles per capita per day.²⁸ According to the Federal Highway Administration, in 2001 in California, per capita VMT was 2.7 times higher in rural areas as compared with urban areas (58.8 daily vehicle miles traveled per capita versus 21.8).²⁹
3. Using the statistics above, the current populations in urban and non-urban areas, and the expected change in population in urban and non-urban areas, it can be calculated that, using Plan Alternative A as a baseline, Plan Alternative B would generate 16% (corresponding to over 200 million miles) more VMT annually in the county, and Plan Alternative C would generate 32% (corresponding to over 400 million miles) more VMT annually.
4. Focus group participants and participants in HumPAL's August 2007 Policy Charrette, "Defining Healthy Community Design in Humboldt County," raised the issue of walkability and bikability numerous times and there was a desire among participants to analyze and minimize VMT.
5. Low-income populations that must drive greater distances due to poor development policies and plans will be more adversely affected by the cost of driving than other populations. Nearly 9 percent of Humboldt County households do not own cars.³⁰ Residents of these households might have less money available for health-care or for healthy food. Seniors who may be unable to drive will also be adversely affected by such policies and plans.
6. Potential health-promoting mitigations that could be implemented to reduce VMT include, for example: encouraging large employers to adopt Transportation Demand Management programs; increasing public education about public transit options; and designing multi-modal transit hubs with co-located businesses and housing.

Based on all of the above information, for the VMT indicator, Plan Alternative A would be best for health and Plan Alternative C would have the most negative impacts on health. Health benefits of Plan A include fewer injuries from accidents, lower cardiovascular disease and respiratory disease rates, and less diabetes and obesity.

The second example of the HIA analysis, proportion of households within ½ mile of a public elementary school, can be summarized by the following steps:

1. Proximity to public schools is related to health because:
 - a. When schools are located closer to home, vehicle pollution emissions fall as a result of more children walking and/or bicycling to school rather than being transported by vehicles.³¹
 - b. Walking to and from school can be an important source of exercise for children. However, many children are not currently getting enough exercise: nationally, only 13% of children aged 5 to 15 walk to school.³²
 - c. Schoolyards are places where children and others can play and socialize when schools are not in session, and they are more accessible when close to home.
 - d. Walking to school is safer when schools are close. The more children are exposed to traffic on their way to school, as measured by the number of intersections they have to cross, the higher their risk of being hit by a car.³³
2. GIS mapping showed that approximately thirty-five percent of Humboldt County households are within a ½ mile of one of the 48 public elementary schools in the county. In areas with urban zip codes, approximately 41% of households are within a ½ mile of a public school, while in areas with non-urban zip codes, about 24% of households are within a ½ mile of a public elementary school.
3. Assuming the percentages above stay constant in both urban and non-urban areas, and based on the expected number and locations of households associated with each Plan Alternative, it was calculated that Plan Alternative A would lead to nearly 36% of total households in the county being within a ½ mile of a public elementary school. Using a similar analysis, it was determined that for Plan Alternative B, just under 35% of total households in the county would be within ½ mile of an elementary school, and if Plan Alternative C was adopted, 34% of total households in the county would be within a ½ mile of the closest school. The number of total future households associated with these three alternatives ranges from 57,238 to 69,238. Thus, a difference of just one percentage point in the number of households within a ½ mile of a public elementary school amounts to between 572 and 692 households. This is not an insignificant number, given that some households include multiple school-age children.

Percentages of households within a ½ mile of an elementary school could be even lower when taking into account school siting decisions. Numbers of school-age children will likely decrease in future years.³⁴ A resulting decline in school enrollment may lead to closing and consolidating some of the older schools. Because many of these older schools are also the most centrally located, many children may end up walking farther to get to school.

4. Accessible childcare and schools were repeatedly raised as issues of concern to Humboldt residents in the focus groups.

5. A disparity inherent to this analysis is that rural populations, such as the Native American tribes, would likely not see a change in their proximity to schools.
6. One potential health-promoting mitigation that could be implemented is to ensure all new large communities that are developed have a public elementary school. Developers could be required to pay a fee for the construction of a local school.

Based on this information, Plan Alternative A is again the healthiest option. It would result in the highest percentage of children living in close proximity to their elementary school, encouraging higher levels of physical activity and social interaction due to walking to school and using schoolyards for off-hours activities. Plan Alternative A may also result in less school-related driving and consequent air pollution. On the other hand, Plan Alternative C would result in reducing the percentage of children gaining those health benefits of living within walking distance from a public elementary school.

Table 2 summarizes the HIA analysis for all 35 indicators, indicating whether each alternative would lead to positive health outcomes, no significant change in health outcomes, or negative health outcomes. As shown in the table, Plan Alternative A offers the greatest number of positive potential health outcomes, while Plan Alternative C contributes the most negative potential health outcomes. It is important to note, however, that Plan Alternative A may not lead to the construction of enough affordable housing to meet future demand and that an important mitigation to consider is the development of more housing (e.g., 12,000 units rather than 6,000 units) in urban areas.

Reporting

The HIA analysis was reported in both a written report and a PowerPoint presentation.

The report included a 40- page summary of all the indicators and six detailed analysis sections, each between 15 and 50 pages. The report was drafted by HIP, edited by PHB and HumPAL, and reviewed by CDS before its release. The final report was made available on HumPAL's website³⁵ as well as HIP's website,³⁶ and will be incorporated into the Environmental Impact Report for the GPU.

PHB created the PowerPoint presentation based on the written report. The Humboldt County Public Health Officer and the Supervising Environmental Health Specialist for the County Division of Environmental Health presented the HIA to the Humboldt County Planning Commission, which is the body in charge of overseeing the General Plan Update process. The PowerPoint presentation will also be presented to the Board of Supervisors and several City Councils in the county. This presentation is available on HIP's website.

Evaluation

The evaluation of an HIA includes evaluation of both the process (e.g., what was learned by the project team) and the outcomes (e.g., how the HIA affected the decision).³⁷ Since decisions about the General Plan Update have not been made to date and thus not all outcomes have been realized up to this point, this evaluation section examines other outcomes of the HIA as well as the lessons learned during the project process.

To date, outcomes of this HIA include:

- The Humboldt HIA team has developed capacity to conduct an HIA in the future with less technical assistance and facilitation by HIP.
- The CDS had a productive collaboration with the PHB, setting the stage for future work. As a result of this working relationship, the Health Officer was invited to contribute a draft of the GPU Transportation Element incorporating health-promoting concepts and potential mitigations. The CDS forwarded this draft to the Planning Commission for consideration.
- The PHB became aware of the technical capacity of CDS staff (e.g., their extensive GIS capabilities) as well as their data resources.
- Residents and decision makers have increased awareness of the relationships between planning and public health issues in Humboldt County. Approximately 50 people attended the focus groups and an overlapping set of 30 county residents contributed data. The County Planning Commission devoted a regular public meeting to the report and described the report as ‘enlightening.’ The HIA was mentioned in local newspapers three times after the Planning Commission meeting:
 - On the Times-Standard editorial page, a so-called ‘toast’ was awarded to the Public Health Officer for conducting the study.³⁸
 - A complete article in the Eureka Reporter.³⁹ This article included many details about the HIA and extensive quotes from the Public Health Officer.
 - An editorial about the GPU was written in the Times-Standard by someone not associated with the HIA.⁴⁰ The editorial described the HIA and used its findings to make the case for one of the Plan Alternatives.
 - *Community Wheel*, a quarterly newsletter created by the sustainable transportation advocacy organization Green Wheels, ran the Summary of Findings table (Table 2) in its Summer 2008 edition. Twenty-four thousand copies were distributed.
- The Health Officer presented findings:
 - To the local medical community at two hospital grand rounds. Subsequently, in a letter to the Planning Commission and the Board of Supervisors, the Medical Society endorsed the consideration of the health impacts of planning decisions.
 - As part of a panel at a meeting convened by the Chronic Disease Committee of the California County and Local Health Officers Association (CCLHO) and the County Health Executives of California (CHEAC) entitled “Built Environment and Chronic Disease: Examples of Local Health Department Experience.” At this meeting many other Health Officers and Health Executives learned about how to use HIA for assessing built environment issues. The Health Officer also reported on the HIA to the entire CCLHO Board of Directors.
 - To a forum on climate change hosted by the local Bar Association.
- An abstract describing this HIA process was selected for presentation at the 2008 American Public Health Association Annual Meeting and Exposition.
- The project successfully adapted a comprehensive planning evaluation tool, the HDMT, to a rural context. This Rural HDMT is available for use in other projects.

- This is the first HIA conducted in a rural setting. Several other rural counties, including Mendocino, have reached out to the Public Health Officer to learn more about it, and are interested in doing similar analyses in their own areas.
- Healthy Humboldt, a local land-use advocacy group, is currently seeking funding to use the HIA as a public education tool to lobby for Plan Alternative A.

Based on this evaluation, the following *lessons were learned* during this HIA process:

- 1) **Project Team Relationships** - The relationships that were built between the various members of the project team were extremely beneficial for sharing knowledge and information related to the project. The Humboldt HIA team and HIP actively collaborated during the entire HIA process in an exchange of ideas, expertise, project structure, and reporting of results. Local perspective was particularly important in prioritizing the indicators and assessing the indicators from a rural perspective. Working with this type of collaborative project team is anticipated to be advantageous in future HIA projects.
- 2) **Community Engagement** - Engagement with members of the Humboldt County community during all stages of this HIA helped the project team understand the unique concerns and needs of those who will ultimately be impacted by the General Plan Update. During the scoping phase, the expertise of community members was productively used to prioritize issues and select a relevant set of indicators. A large number of local people, including those allied with CDS, contributed data and various sources of evidence.
- 3) **Setting an Appropriate Scope** - Since the project team had difficulty narrowing down the list of indicators due to the value each of them added to the analysis, a larger number of indicators were selected for analysis than was originally expected. This led the team to spend more time on the HIA than was originally anticipated. Baseline research was conducted for many indicators that were not selected for use in this HIA. While this information could be used in future analyses carried out in Humboldt, this experience showed the importance of setting an appropriate scope.
- 4) **Development of Rural HDMT for Future Use** - The flexibility to adapt to the unique needs of a rural setting was crucial for conducting and interpreting HIA analyses relevant to the Humboldt County population. As a result of this flexibility, the newly developed Rural HDMT model can now be applied to other rural locations in the future. Performance of a rural HIA and presentation of the findings to multiple audiences further advances the concept that policy and decisions about development should consider health implications, with mitigations to offset potential negative health impacts. Currently, environmental impact reports may be required for major development projects, but they do not specifically consider health implications.
- 5) **Appropriate Reporting for Audience** - The final report was appropriate for the agency that commissioned it (PHB), and the PowerPoint was effective at conveying information about HIA practice, the rationale for this HIA, the links between the Humboldt County General Plan and health, and HIA findings. The report was released during the decision-making process, in time to be considered by decision-makers.

- 6) **Use of Data to Inform Policy** - This HIA process led to the use of quantitative and qualitative data and analyses to inform policy decisions. Existing health data and data collected during an HIA process can be used to impact policy outcomes in the future.

It should also be noted that, after the release of the HIA report, several constituencies have responded to its findings negatively. These include some community groups that have organized around the issues of rural development rights; local realtors and developers; and those against the regulation of small (i.e., approximately 160 acres or less) parcels of timberland. Some of these community members are fearful that the county government and the recommendations of this HIA are advocating for the prohibition of any development in rural areas. While this assumption is not accurate, this HIA's findings may have contributed to heightened opposition.

Next Steps in Humboldt County

To continue this effort, members of the project team plan to:

- 1) Present the findings to city councils in Humboldt County, to the County Board of Supervisors, and to other community audiences.
- 2) Continue their involvement in built environment-related policy implementation.
- 3) Continue joint trainings on issues raised in the HIA, to be held by PHB, CDS, HumPAL, and Humboldt County Public Works.
- 4) Participate in climate change forums in Humboldt County by presenting relevant findings of the GPU HIA.
- 5) Work with the County union to promote transportation demand management for County employees and reduce traffic congestion, promote physical activity and increase ridership for public transportation, which will improve service for individuals who do not drive.
- 6) Apply for foundation or other funding to support future use of the Rural HDMT for HIA on large built environment projects, e.g., port development.
- 7) Apply for foundation funding to research, produce and publish a technical, quantitatively-based Development Checklist to be used by planners, developers, and other professionals.
- 8) Encourage the legal requirement for county developers to commission and fund HIAs in an early phase of land-use planning projects. Focus groups conducted during an HIA's scoping and assessment phases are anticipated to address and mitigate community concerns at the outset of future land-use planning projects.

Conclusion

This HIA was groundbreaking – it is the first rural HIA and the first HIA conducted on a General Plan Update in the United States. The HIA process was effective in analyzing the General Plan Update Plan Alternatives using health-based criteria of high priority to residents of Humboldt County, and the findings point to clear differences in those Alternatives. The HIA and its process clearly built awareness among the project team, focus group participants, the Planning Commission, and the general public about how the Humboldt County GPU would impact health. The HIA is currently being considered in

the decision-making process, and therefore its effect on the final decision remains unknown.

The project team started this process without a clear idea of what the findings would be. They now have a deep understanding of specific implications of land use policy in Humboldt County and they have a powerful tool at their disposal. They look forward to building sufficient research capacity to conduct future HIAs on their own or with some support from others.

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Table 1: Organizations Involved in the Humboldt County General Plan Update Health Impact Assessment and Their Roles.

Organization	Roles
Humboldt County Public Health Branch (PHB)	Oversee the HIA process Coordinate partners Participate in decision about final set of indicators Contribute to research and analysis Contribute baseline data Edit report Develop presentation of findings Communicate results to decision-makers
Humboldt County Community Development Services Planning Division (CDS)	Contribute baseline data Participate in focus groups Review and edit report
Humboldt Partnership for Active Living (HumPAL)	Organize focus groups Participate in decision about final set of indicators Contribute baseline data Edit report Help PHB develop presentation of findings Provide website host for HDMT and HIA
Human Impact Partners (HIP)	Facilitate the HIA process Plan agenda and conduct the focus groups Participate in decision about final set of indicators Coordinate research Conduct majority of research and analysis Research baseline data Write draft report

Table 2: Summary of Findings for Each Indicator Analyzed.

Indicator	Description	Plan Alternative A Impact	Plan Alternative B Impact	Plan Alternative C Impact
<i>SUSTAINABLE AND SAFE TRANSPORTATION</i>				
ST.1.b	Average vehicle miles traveled by Humboldt residents per day	+	-	-
ST.1.e	Average minutes traveled to work by zip code	+	~	-
ST.2.a	Proportion of commute trips made by public transit	+	~	-
ST.2.b	Proportion of households with 1/4-mile access to local bus	+	~	-
ST.2.c	Proportion of average income spent on transportation expense	+	~	-
ST.3.a	Ratio of miles of bike lanes/ pedestrian facilities to road miles	+	-	-
ST.3.b	Proportion of commute trips and trips to school made by walking or biking	+	~	-
ST.3.c	Number and rate of bicycle/pedestrian injury collisions	TBD	TBD	-
ST.3.e	Proportion of population living on residential streets with <35 mph speed limits	+	~	-
ST.3.f	Percent of population who have access to pedestrian facilities	+	~	-
<i>HEALTHY HOUSING</i>				
HH.1.a	Proportion of housing production to housing need by income category	+	~	-
HH.1.b	Proportion of households paying greater than 30% & 50% of their income on their homes	+	~	-
HH.2.a	Homeless Population	+	~	-
<i>PUBLIC INFRASTRUCTURE</i>				
PI.1.d	Proportion of zipcodes without childcare facilities	-	~	+
PI.2.a	Proportion of residents within 1/2 mile of a grocery store	+	~	-
PI.2.b	Proportion of households within 1/2 mile of a public elementary school	+	~	-
PI.2.d	Fast food establishments within 1/2 mile of high schools and middle schools	~	-	-
PI.3.a	Proportion of population within 1/4 mile of open public parks	+	~	-
PI.4.d	Percentage of population within 2 miles of a medical center	+	~	-
PI.5.a	Percentage of seniors within 1/2 mile of senior center	+	~	-
PI.6.a	Residential density	+	~	-
<i>PUBLIC SAFETY AND SOCIAL COHESION</i>				
SC.1.c	Rates of driving under the influence (DUI)	TBD	TBD	TBD
SC.2.a	First responder response times - Fire response times	+	~	-
SC.2.b	Emergency preparedness sites/ training for citizens	+	~	-
SC.4.a	Isolation index	+	~	-
<i>HEALTHY ECONOMY</i>				
HE.1.a	Proportion of jobs paying a living wage	TBD	TBD	TBD
HE.2.a	Proportion of jobs that provide health insurance	TBD	TBD	TBD
HE.2.c	Number of jobs available with appropriate educational requirements	TBD	TBD	TBD
<i>ENVIRONMENTAL STEWARDSHIP</i>				
ES.1.b	Residential electricity use (kWH) per capita	+	~	-
ES.2.a	Acres of public open space per 1,000 population in Urban areas	-	-	-
ES.3.a	Proportion of County land area retained for active farming uses	~	-	-
ES.3.b	Proportion of County land area retained for timber production	~	-	-
ES.3.c	Percent of food consumption from local sources	~	-	-
ES.5.a	Total impervious area in County	~	-	-
ES.5.c	Percent of households using municipal water system	+	~	-

Notes:

+ = Indicator would change in a positive way for that Plan Alternative, and, therefore, health outcomes related to that indicator are expected to improve.

~ = Indicator and related health outcomes would not be affected significantly by the choice of Plan Alternatives.

- = Both the indicator and health would be negatively affected by that Plan Alternative.

TBD = To Be Determined. Not enough information is currently available to evaluate how the indicator and health would change in response to the Plan Alternatives.