

Humboldt County General Plan Update Health Impact Assessment

March 2008

By:
Humboldt County Public Health Branch
Humboldt Partnership for Active Living
Human Impact Partners



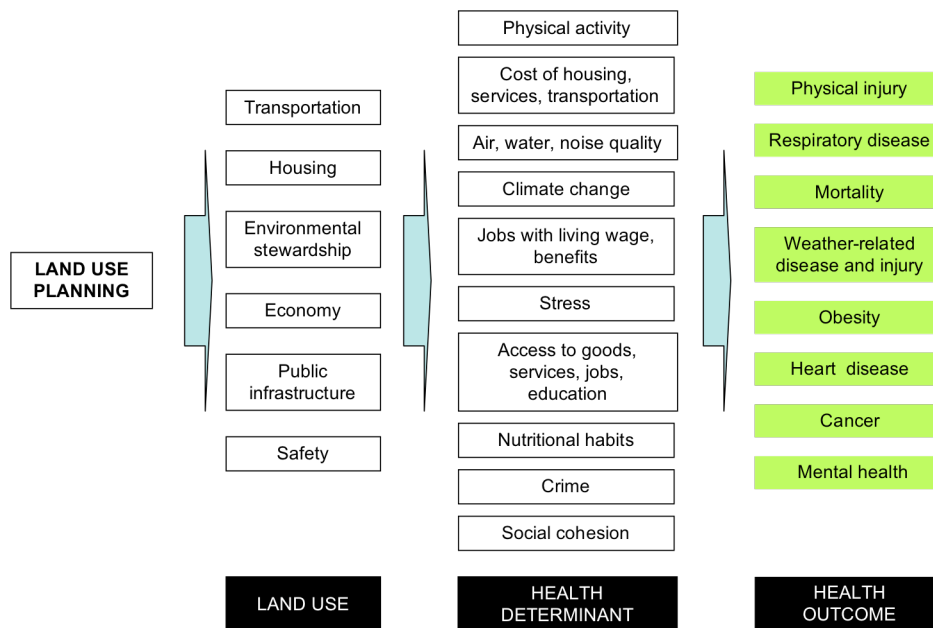
Funded by:
The California Endowment



Introduction and Description of Methodology

Land use planning decisions are often made based on population projections, economic considerations, political realities, and community input. A substantial and growing body of evidence suggests that the way we build the world around us and the policies we implement through land use planning processes have significant impacts on public health. The goal of this report is to make the health impacts of these decisions explicit.

Planning impacts health by affecting the community determinants of health - the social, economic and environmental factors that influence well-being including for example: housing, livelihood, access to fresh produce, education, air quality, access to parks, and transportation. Economic inequality, residential segregation, substandard housing, lack of supermarkets, poor schools, insufficient public transit, and disruptions to family and social networks all have been shown to affect health negatively.



For example:

- Proximity to and mix of retail, quality destinations, and transportation mode choices are the most influential factors in people’s decisions to walk.¹
- Housing affordability is related to homelessness, overcrowding, displacement and residential segregation, all of which have important health and mental health consequences.^{2 3 4}
- Access and proximity to places for physical activity, including parks, are significant predictors of physical activity levels.^{5 6}
- Accessible neighborhood grocery stores reduce diet-related diseases and the distance to a full service grocery store is related to body mass index.^{7 8}

Land Use Planning and Health in Humboldt County

In 1998, Humboldt County commenced upon a General Plan Update (GPU) to guide building and growth in Humboldt County over the next 20 years. In 2007, with the support of the Board of Supervisors, the Public Health Branch began working with the Community Development Services

Humboldt General Plan Update Health Impact Assessment: Summary

Planning Division (CDS) in an effort to make sure that the General Plan would bring about the best health outcomes for current and future residents. With the encouragement of CDS and a grant from The California Endowment, the Humboldt County Public Health Branch commissioned a Health Impact Assessment (HIA) to look at how the various land use and development scenarios under consideration for the GPU would affect health.

Health Impact Assessment (HIA) is a set of tools, methods and procedures that examines a development project, a general plan, or a policy on the basis of its potential health impacts. HIA aims to make decisions accountable for their effects on health, where health is defined broadly as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. HIA brings together evidence for decision-makers to understand how their decisions on programs, projects, plans, or policies affect health, positively or negatively. HIA also offers recommendations to enhance the positive health impacts of policy-making and development projects and to eliminate, reduce, or mitigate negative impacts.

Participating organizations:

- Humboldt County Department of Health and Human Services, Public Health Branch, including Environmental Health
- Humboldt Partnership for Active Living (HumPAL)
- Community Development Services Planning Division
- Human Impact Partners
- Community based organizations (see Appendix A for participants)

Plan Alternatives analyzed in the HIA

The Humboldt County GPU HIA evaluated how a variety of land use indicators would change as a result of the three Plan Alternatives (A, B, and C) being considered in the GPU. These alternatives are described in detail below.

The exact number of housing units provided for in each Plan Alternative is still under discussion. The HIA used estimates (detailed below) based on information from the Community Development Services Planning Division for the number of housing units in each Plan Alternative. Based on US Census 2000 figures for the County, the HIA also assumed that, on average, 2.4 persons would live in each housing unit. For example, if 6,000 new housing units are being proposed, then it was assumed that 14,400 (6,000 X 2.4) more people would be able to live in the County.

Plan Alternative A⁹: This plan provides for “focused growth.” Plan Alternative A encourages all new units to be built in existing areas that are already supported by public sewage and utilities, i.e., encouraging higher residential density and infill development. Infill development is the use of vacant land, or restoration or rehabilitation of existing structures or infrastructure in already urbanized areas, where water, sewer, and other public services are in place. Infill development maintains the continuity of the original community fabric.

Plan Alternative A provides for 6,000 additional units over the course of 25 years. Of those, 6,000 are urban and, therefore the urban population would increase by 14,400. In this Plan Alternative, non-urban development will require conditional approval. This Alternative would require additional work in implementation since it would need to deal with existing property rights.

Humboldt General Plan Update Health Impact Assessment: Summary

Plan Alternative B: This plan 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 ex-urban development as well with modest expansion of existing water service areas, focusing on areas adjoining the city centers.

Plan Alternative B provides for 12,000 additional units over the course of 25 years and would therefore provide housing for approximately 28,800 people. Of those, 6,000 (50%) are urban and the urban population would increase by 14,400. The remaining 6000 units (50%) are non-urban and the non-urban population would also increase by 14,400.

Plan Alternative C: This plan 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; it also expands water service areas beyond present boundaries to expand opportunities for housing in outlying parts of communities.

Plan Alternative C provides for 18,000 additional units over the course of the 25 years and would therefore provide housing for approximately 43,200 people. Of those, 6,000 (33%) are urban and the urban population would increase by 14,400. The remaining 12,000 units (67%) are non-urban and the non-urban population would also increase by 28,800.

Methods:

Humboldt County Public Health Branch, in an ongoing effort to insure that land use decisions are made through the lens of public health and well being, used San Francisco Department of Public Health’s (SFDPH’s) Healthy Development Measurement Tool (HDMT; www.thehdmtool.org) as a starting point for this Health Impact Assessment. The HDMT is a new approach for evaluating land use planning and development with regard to the achievement of human health needs. The HDMT was created through a collaboration spearheaded by SFDPH with development stakeholders and public agencies. The HDMT uses public health to explicitly connect the needs of health and human development to physical and environmental conditions, and provides a systematic assessment approach to consider environmental stewardship, transportation, housing, public infrastructure, public safety, and the economy. The HDMT identifies indicators of – or ways of measuring the effects of – land use planning, an evidence base of how these indicators impact a community’s health, and policies to encourage healthy land use decisions.

Humboldt County’s Public Health Branch and Human Impact Partners revised the HDMT, which was developed in an urban setting, to create a rural HDMT that more accurately reflects the reality of Humboldt County. This Rural HDMT will have over 60 health and land use related indicators and the Public Health Branch will be making it available on their website.

The next step in the GPU HIA involved engaging residents, mostly from community-based organizations, in a series of focus groups about the General Plan Update and health. Based on input from the focus groups, the Humboldt County Public Health Branch and HumPAL, with guidance from Human Impact Partners, collaboratively chose 35 of the HDMT’s 65 indicators to be studied in this HIA. Indicators chosen were those that have the most impact on health and are most likely to be influenced by policies likely to be part of the General Plan.

Humboldt General Plan Update Health Impact Assessment: Summary

Indicators were divided into 6 categories: Housing, Transportation, Public Infrastructure, Economy, Public Safety, and Environmental Stewardship. Each of these topics is discussed in the HIA report. For each category of indicator, a four to five page summary is available as well as a longer in-depth analysis.

Definition of Urban, Non-urban, and Rural Character

Most of the analyses performed in the HIA rely on a comparison between “urban” and “non-urban” areas of Humboldt County. The US Census defines “urban” as all territory, population, and housing units in urbanized areas and in places of more than 2,500 persons outside of urbanized areas. Rural is basically all territory, population, and housing units not classified as urban. According to the US Census 2000, there are 126,518 people in Humboldt County. By their definitions, 88,127 of those people live in urban areas (70 percent), and 38,391 live in rural areas (30 percent).

However, estimations required assumptions based on access to urban resources that are typically in residentially dense areas, such as access to public water systems, sewer systems and proximity to necessary goods and services. Thus urban and non-urban estimates used here are different from the US Census. The definition of urban used in this report includes areas where the residential density is above 1,000 people per square mile. The shaded regions in the table below are the urban areas for this HIA analysis. Every urban area is included in the table below; not every non-urban area is.

Figure 1. Residential density / US Census population

<i>Area</i>	<i>People per square mile*</i>	<i>US Census 2000 population (and their categories for urban/rural)</i>
Bayview CDP (outside Eureka)	3203 - average	2,359 (urban)
Cutten CDP (outside Eureka)	2249 - low	2,933 (urban)
Humboldt Hill CDP (outside Eureka)	778 - low	3,246 (urban)
Hydesville CDP (south of Fortuna)	164 - very low	1,209 (rural)
McKinleyville CDP	651 - low	13,599 (12,552 urban, 1,047 rural)
Myrtle town CDP (outside Eureka)	2097 - low	4,459 (urban)
Pine Hills CDP (outside Eureka)	305 - low	3,108 (1731 urban, 1377 rural)
Redway CDP (southeast, off 101)	951 - low	1,188 (rural)
Westhaven-Moonstone CDP (N of McKinleyville near Trinidad)	129 - very low	1,044 (rural)
Willow Creek CDP (near Blue Lake)	8.5 - very low	1,743 (rural)
Arcata	1841 - low	16651 (urban)
Eureka	2707 - average	26128 (urban)
Ferndale	1355 - low	1382 (rural)
Fortuna	2317 - low	10497 (urban)
Garberville	14 - very low	12194- (3763 urban, 8431 rural)
North Coastal CCD Remainder (between McKinleyville & Trinidad, inland)	39 - very low	20415- (12,963 urban, 7,452 rural)
Trinity-Klamath CCD Remainder	6 - very low	5437- (all rural)
Total County		126,518

*Source for densities: <http://www.city-data.com/>

The assignment of areas to urban and non-urban classes is imperfect. For example, the assignment classifies McKinleyville as a non-urban area and this does not account for the fact that it does have an urban core. Analyzing the County at the level of detail required to account for these

Humboldt General Plan Update Health Impact Assessment: Summary

discrepancies would be prohibitively time consuming. Overall, this classification system described above is a reasonable approximation of existing conditions.

Since some data was only available at the zip code level and/or more detailed analysis would be prohibitively time consuming, zip codes were assigned as either urban and non-urban. For this analysis, the following zip codes were considered to be urban: 95501, 95503, 95521, 95534, 95536, 95540. Again, this classification system is imperfect, but it is a reasonable approximation of existing conditions. This zip code based classification system does not completely match with the population density based classification system described above.

Using the standard of residential density of 1,000 people per square mile as living in an “urban environment” for Humboldt County 51% (64,409) is urban (shaded boxes) and 49% (62,109) is non-urban (total population minus urban).

In this HIA, the phrase “rural character” is used to mean a landscape in which the features of the natural environment and agriculture predominate.

Healthy Housing

Encompassing shelter, home, and neighborhood, housing affects health in diverse ways—positively and negatively. Healthy housing is affordable, physically safe, sufficiently spacious, stable, and located in a setting that provides access to jobs, goods, services, transportation and nature, supporting meaningful social participation. Access to affordable and well-maintained housing that provides shelter against weather is a basic health necessity. Changes in housing stock, location, and affordability can either facilitate or hinder the achievement of adequate housing needs in a city. When housing is scarce, people with the least financial resources are often deprived of adequate and/or affordable housing. According to a Humboldt County community survey, 57.6% of respondents thought that the County should be putting more effort into improving the availability of affordable housing.¹⁰

Examples of how housing can affect health include the following:

- Residential displacements during childhood can result in depression, academic delay, school suspensions, difficult transitions between schools, and loss of health-protective social networks.^{11 12 13}
- Lack of affordable housing leads to segregation of poor and minority communities to areas of concentrated racial inhabitation.¹⁴ Segregated neighborhoods have fewer institutional assets such as schools, libraries, and public transit, and more environmentally burdensome infrastructure such as highways, power plants, factories, and waste sites.^{15 16}
- Spending on housing decreases money available for other basic living needs such as food, medication, and clothing.¹⁷
- Homelessness takes a tremendous toll on one’s health. In a study done in New York City, age-adjusted death rates were four times higher in the homeless population than the general U.S. population.¹⁸
- Sprawling residential development leads to overweight and obesity¹⁹ and increasing rates of diabetes, heart disease, and high blood pressure.^{20 21}
- “Complete neighborhoods” - which are defined here as mixed-use neighborhoods that include commercial services, grocery stores, open space, and public transit within a five minute walking distance, a diversity of housing types (in terms of housing cost, size, and ownership/rental) to meet the needs of its residents, the presence of sidewalks, and connectivity of the street network – are associated with numerous health benefits. Some of the benefits related to complete neighborhoods include healthy bodyweight,^{22 23} higher consumption of fruits and vegetables,^{24 25} increased physical activity,²⁶ less dependence on cars,²⁷ and increased social capital.^{28 29 30}

Updating the Housing Element of the Humboldt County General Plan is potentially a great opportunity for improving health and wellbeing, growth of community ties, and social cohesion. The Healthy Housing section of this HIA evaluates the following housing indicators as they relate to Plan Alternatives A, B and C:

- 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**

Humboldt General Plan Update Health Impact Assessment: Summary

Existing Conditions

Housing production versus housing need. Existing demand for housing in Humboldt County is highest among low-income people. Only 43% of the projected new housing needs for the period between 2001 and 2006 were met by housing construction for people with very low incomes, and 74% of the needs were met for people with low incomes.³¹

Proportion of income spent on housing. Nearly 40% of all households in the county spend 25% or more of gross income on housing.³² Varying by region, between 15 and 60 percent of renter households spend over 50% of income on housing, and between 6 and 24 percent of owner-occupied households spend over 50% of income on housing.³³

Homeless population. Estimates of total homeless persons in Humboldt County throughout the course of one year range from 4,000 to 6,000.^{34 35} It has been estimated that at any point in time, there are between 800 and 1,100 homeless persons in the County,³⁶ and the number is generally higher during summer months than during winter months.³⁷

Summary of Findings

All of the Plan Alternatives share the goal of creating a sufficient quantity of housing to supply the demand of populations moving to Humboldt County by 2025. However, it is essential to clarify that Plan Alternatives A, B and C are designed to meet the housing demand of *future populations only*. Unmet demand of existing populations will not necessarily be met by any of the three proposed plans. While Plan Alternative A is anticipated to provide housing for the projected population growth in the County, it is not expected to meet the demand of existing County residents. Due to their higher quantities of proposed housing units, Plan Alternatives B and C have the potential to meet existing unmet demand; however, their ability to do so depends upon the *affordability* of the housing that is developed. Thus, in addition to a quantitative evaluation comparing housing supply and demand, this assessment analyzes each Plan Alternative's impact on housing costs and proximity to affordable goods and services for current and future residents.

In light of existing and future housing demand in Humboldt County, **the development of multifamily housing in existing urbanized areas and the development of a higher quantity of affordable housing units than would be likely under Plan Alternative A would be best from a health perspective.**

Within the scope outlined by Plan Alternatives A through C, this analysis concludes the following:

Plan Alternative A

Health benefits would accrue because of the following changes in housing indicators:

- If new infill housing developments include multifamily housing and/or a higher number of housing units per unit area, new housing is likely to be more affordable due to lower infrastructure costs associated with infill development. Lower housing costs would allow income to be spent on other basic living needs such as food, medication, and clothing.
- More affordable housing could lead to improvements in housing conditions for low-income people and a reduction in the homeless population.
- An increase in residential density could lead to complete neighborhoods, which are associated with increased exercise, decreased weight, increased social cohesion, and less dependence on cars.

Humboldt General Plan Update Health Impact Assessment: Summary

Health would **remain the same** due to no change in the following indicators:

- The rural character of the county, which is valued by many residents, would virtually remain the same.

Plan Alternative B:

Health benefits would accrue because of the following changes in housing indicators:

- If new infill developments include multifamily housing, 50% of the new housing is likely to be more affordable due to lower infrastructure costs associated with infill development. Although it is the same number of units, this is half the *proportion* of new affordable housing expected under Plan Alternative A. Lower housing costs would allow more income to be spent on other basic living needs such as food, medication, and clothing.
- The proportion (50%) of new housing that is more affordable could lead to a reduction in the homeless population and improvements in housing conditions for low-income people. Access to affordable and well-maintained housing that provides shelter against weather is a basic health necessity.
- Fifty percent of new housing developments may be within existing urbanized areas characterized by complete neighborhoods, which are associated with increased exercise, decreased weight, increased social cohesion, and less dependence on cars.

Health would **remain the same** due to no change in the following indicators:

- The rural character of the county would not be affected in a major way.

Potential health hazards could increase due to changes in the following indicators:

- Fifty percent of the new housing would most likely not be affordable to many people, due to higher infrastructure costs associated with expanding development into non-urban areas. Higher housing costs would lead to a reduction of available funds for other basic living needs such as food, medication, and clothing.
- Fifty percent of new housing developments may be within low-density suburban neighborhoods, which are unlikely to be complete. Relative to people living in more complete neighborhoods, residents in these areas may have increased weight, decreased social cohesion, and more dependence on cars.

Plan Alternative C:

Potential health hazards could increase due to changes in the following indicators:

- Due to higher infrastructure costs and a low likelihood of developers choosing to build multifamily housing outside of urbanized areas, the lowest proportion of new housing would be affordable under Plan Alternative C. Higher housing costs would lead to a reduction of available funds for other basic living needs such as food, medication, and clothing.
- Of the three Plan Alternatives, the lowest proportion of new residents would move into urbanized areas characterized by complete neighborhoods. As a consequence, under Plan Alternative C a greater proportion of new residents would be likely to experience decreased exercise, weight-gain, decreased social cohesion, and more dependence on cars.
- Due to sprawling development, the county's rural character would be most diminished by Plan Alternative C. Maintaining rural character is a priority for many Humboldt County residents.

Potential Health-Promoting Mitigations

- 1) Develop policies to encourage affordable housing:
 - a. Reduce home construction costs through material selection and design to reduce the price for the homebuyer;

Humboldt General Plan Update Health Impact Assessment: Summary

- b. Un-bundle automobile parking from housing units in urban areas to give tenants and owners the opportunity to save money by using fewer parking spaces;
 - c. Offer developer incentives for residential densities between 2.5 and 10 units per acre;
 - d. Offer municipal support for first time and low-income homebuyers;
 - e. Offer density bonuses to developers conditional on the provision of below market rate (BMR) housing;
 - f. Allow single resident occupancy (SRO) units;
 - g. Require a percentage of below market rate (BMR) housing;
 - h. Establish inclusionary zoning policies for all housing development, including development beyond areas currently served by existing water and sewer infrastructure;
 - i. Establish a Community Land Trust (or participate in the already established Humboldt Bay Housing Development Corporation); and
 - j. Establish a Housing Trust Fund to commit public sources of revenue to affordable housing.
- 2) Reduce government constraints to dense residential development:
- a. Reduce local zoning regulations such as parking space requirements; and
 - b. Reduce tax constraints, such as those that discourage upgrading of existing dwellings and conversion of single to multi-family units.
- 3) Establish programs to assist the homeless population:
- a. Offer pre-release permanent housing planning for people discharged from public institutions such as the foster care system, jail, prison, mental health programs, hospital, or drug and alcohol programs;
 - b. Increase emergency, interim, transitional, and permanent housing options and programs; and
 - c. Improve social services offered to the homeless population by the county, such as mental health, domestic abuse, and substance abuse resources.

Sustainable and Safe Transportation

Individual transportation choices can have a major impact on health. For example:

- The more one drives (Vehicle Miles Traveled, or VMT), the higher risk of obesity, motor vehicle collision, musculoskeletal pain³⁸, and stress³⁹, and the less one is physically active⁴⁰, and participates with family, friends and in civic life;
- Limited access to goods and services due to poor land use planning results in decreased ability to access health care⁴¹ ⁴², poor nutritional habits, and increased transportation expenses;
- Vehicle volume and speed predicts pedestrian injury and fatality;⁴³ ⁴⁴
- Proximity to public transportation predicts use of public transportation. Use of public transportation results in higher levels of physical activity and lower greenhouse gas emissions from automobiles. These emissions are the largest source of mobile air pollution in California. Air quality has an impact on respiratory and cardiovascular disease;
- Urban areas where people use cars less show higher rates of walking and lower rates of obesity and hypertension.⁴⁵ Access to safe bike and pedestrian facilities (e.g., sidewalks and wide shoulders on non-urban roads) encourages physical activity.

Individual choices, however, are not made in a vacuum. The policies that municipalities adopt with regard to transportation and circulation limit the options available for individuals to make healthy choices. Humboldt County has the opportunity, in updating the General Plan, to set out standards for transportation that will protect the health of its citizens by expanding and prioritizing options that will discourage driving, encourage physical activity and social cohesion, and provide better access to health care services and healthy retail choices. The Safe and Sustainable Transportation section of this HIA evaluates the following transportation indicators as they relate to Plan Alternatives A, B and C:

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
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.

Existing Conditions

Vehicle Miles Traveled. In 2006, residents of Humboldt County travel 27 vehicle miles per day (VMT) per capita compared to 24 daily miles for Californians as a whole.⁴⁶ In 2001 in California, per capita VMT was 2.7 times higher in rural areas as compared with urban areas.⁴⁷

Travel time to work. Residents of both urban and non-urban areas in the County have travel times to work (17.3 minutes on average) that are lower than the national and statewide average (27 minutes

Humboldt General Plan Update Health Impact Assessment: Summary

on average statewide). However, areas of Humboldt County that have low residential densities have a 26% higher average length of commute time to work than those in higher residential densities.

Public Transit Use. Only 1% of the population of the county overall use public transportation to commute to work.⁴⁸

Income spent on transportation. The average Californian spends about \$7,144 annually on private vehicle expenditure. Expenditures for private vehicles are not known for the County.

Bike lanes. Only 3% of the County roadways have Class I or II bike lanes, (lanes that are set off from highways specifically for bicycling or at least have enough room and signage for safe biking). When surveyed in 2003, 69% of county residents felt that the County should provide walking and biking paths closer to existing communities and 62% stated that closer access to outdoor recreation including bicycling was a major reason why they live in Humboldt.

Pedestrian injuries. There were 163 automobile crashes involving pedestrians in Humboldt County from 1999-2002; 112 of them – or almost 70% - were in either Eureka or Arcata.⁴⁹ 20 of these collisions, or 12% of all of the collisions in the County, were at the intersections of Route 101 in Eureka (4th and 5th Streets).

Multimodal transit hubs: There are few locations in the County that facilitate transferring from one mode of transportation to another, such as a car and/or bicycle parking near bus stops.

Summary of Findings:

In light of inevitable population growth in Humboldt County and the transportation challenges that growth implies, **this analysis concludes that health would be improved most by accommodating future population in areas where residents can most easily access jobs, goods, services, social and cultural events by forms of transportation other than cars, i.e., in the urban areas where there is an existing infrastructure for these root determinants of health. Plan Alternative A best exemplifies this and is the best option for reducing the ill health effects of excess reliance on cars.**

Within the scope outlined by Plan Alternatives A through C, this analysis concludes the following:

Plan Alternative A

Health benefits would accrue because of the following changes in transportation indicators:

- The average travel time to work would *decrease*, leaving more time with family and friends, as well as time to exercise, eat with more intention, be engaged in the community, and relax. Across all working adults in the County, this Alternative would reduce travel time to work by approximately 55,000 hours a year from current levels. This option also decreases per capita Vehicle Miles Traveled. This would also lead to the smallest increase in the volume of greenhouse gases produced by the County and therefore the smallest increase in the County's contribution to climate change and its associated health impacts.
- There would be an *increase* in use of public transportation simply by locating people within existing public transportation routes; the number of people within ¼ mile of a bus stop would increase from current 51% to 59%. People who use public transit spend a median of 19 minutes daily walking to and from transit; 29% achieve at least 30 minutes of physical activity a day solely by walking to and from transit.⁵⁰

Humboldt General Plan Update Health Impact Assessment: Summary

- Expenses for transportation would *decrease*, given that more population would live in proximity to schools, services, cultural offerings, jobs and retail outlets, and thus be more likely to walk, bike or take public transportation. This particularly impacts low income residents.
- There would be a slight *increase* in the percentage of people who walk to work, from the current 5.6% to 6.0%. This would have a potential impact on the number of people getting recommended levels of exercise, which is protective for cardiovascular disease, cancer, and osteoporosis.
- Pedestrian injury due to collisions with motor vehicles may *decrease*, given research that shows that when pedestrian/bike volume increase enough, it causes drivers to either slow down or take other routes.⁵¹ Without reaching this critical point, however, there could be an *increased* risk of pedestrian injury due to the increase in vehicle volume in urban areas. Overall, there would be a *lower risk of pedestrian fatality* as speeds in urban areas are lower; the literature tells us that motor vehicle collisions with pedestrians are more often fatal in rural areas and areas with higher speeds.
- *Increase* in access to pedestrian facilities for residents of Humboldt County, given that all of the population growth will be located in urban areas where sidewalks and pedestrian facilities already exist.

Plan Alternative B:

Health would **remain the same due** to no change in the following indicators:

- The proportion of people taking public transportation would *remain the same* since the proportion of people living near bus stops likely remain 51%.
- Expenses for transportation would on average *stay the same or increase*, given a moderate increase in people who live in settings encouraging automobile use.
- The number of people walking to work would *remain the same*.
- The proportion of residents living on roads with lower speed limits would not change, thus injury and fatality due to motor vehicle collisions would not change.
- The proportion of residents with access to pedestrian facilities would not change. Thus there would be little change in the number of people who walk.

And potential **health hazards would increase** due to changes in the following indicators:

- The time it takes to travel to work would increase. Across all working adults in the County, this Alternative would increase travel time by approximately 55,000 hours a year from current levels. People would have about the same amount of time for exercise, family, friends, relaxation, and better nutrition.
- Vehicle Miles Traveled would increase by 16% - approximately 200 million extra miles per year traveled in the County - leading to higher rates of obesity, more cardiovascular disease, less physical activity, less time spent in civic activities or with family, and higher rates of stress. Greenhouse gas emissions and climate change contributions by the County would increase as a result.
- *Slightly lower ratio* of bike/pedestrian facilities to road miles due to some *increase* in number of road miles with development.
- Pedestrian injury and fatality would *not change significantly*, but there may be a slight increase due to a population increase. More people, no matter where they are, imply more cars, more driving, and more accidents.
- More people living in non-urban areas means more automobile travel overall and increased traffic in urban areas.

Humboldt General Plan Update Health Impact Assessment: Summary

Plan Alternative C:

Potential health hazards could increase due to changes in the following indicators:

- VMT would *increase* by 32% - approximately 400 million extra miles per year traveled in the County - with potential increase in obesity, cardiovascular disease, and stress and decrease in physical activity and social cohesion. Greenhouse gas emissions and climate change contributions by the County would increase the most under this Plan Alternative.
- Travel time to work would *increase*, leaving slightly less time for exercise, family, friends, relaxation, and better nutrition. Across all working adults in the County, this Alternative would increase travel time by approximately 110,000 hours a year from current levels.
- Public transit use is likely to *decrease* as the proportion of the population within ¼ mile of a bus stop will decrease from 51% to 46%.
- Average expenses for transportation would likely *increase*, since there will be more dependence on cars. Families would thus have less money to spend on health insurance/health care, healthy food, education, and other healthful priorities.
- The proportion of bike/pedestrian facilities to road miles would *decrease* due to an *increase* in miles of road.
- There would be a *decrease* in the percentage of people who walk to work, thus less physical activity and increased risk of obesity, cancer, heart disease, and osteoporosis.
- Pedestrian injury would potentially *increase* due to the increased traffic from non-urban areas traveling in to cities for goods and services. There may also be an *increase* in pedestrian fatality as there will be more people driving in non-urban areas at higher speeds.
- The proportion of people living on roads with higher speeds would *increase*.
- The proportion of Humboldt's population that has access to pedestrian facilities would *decrease* due to population growth in non-urban areas where pedestrian facilities are uncommon.

Potential Health-Promoting Mitigations

- 1) Develop policies to increase public transit use:
 - a. Encourage employer-based incentive programs for use of public transit and improve awareness of such programs;
 - b. Increase bus and paratransit routes;
 - c. Increase frequency and connections and hours of operation;
 - d. Improve coordination between public transit agencies;
 - e. Increase service to non-urban areas;
 - f. Increase public education about public transit options;
 - g. Increase proportion of funding for public transit and bike/ped relative to single occupant vehicle travel;
 - h. Promote transit routes to employment locations;
 - i. Consider a variety of transit vehicle types to serve different types of needs;
 - j. Evaluate locations of bus stops;
 - k. Develop standards for transit shelter amenities (seating, schedules, etc) tailored to local conditions/resources.
- 2) Develop policies to encourage walking and biking:
 - a. Redirect money that goes to automobile travel to support alternative forms of transportation;
 - b. Reduce speed limits on arterials, collectors, and local roads in non-urban areas;
 - c. Establish a seat on HCAOG representing human-powered transport;

Humboldt General Plan Update Health Impact Assessment: Summary

- d. Raise priority of non-motorized modes of transport in land use planning. For example, develop building design standards and revise zoning codes to emphasize pedestrian/bike safety, especially on key pedestrian, bike and transit corridors. Zoning codes to consider include those that look at: mixed use zoning, human activity presence, the building/sidewalk interface, parking design, and lighting.
 - e. Develop streetscape standards that emphasize pedestrian and bike safety (lighting, trees, greenery, traffic calming measures, etc.);
 - f. Collect data about pedestrian facilities throughout Humboldt County, much like information is tracked about the amount and condition of road surfaces; make this data public and use this data to guide development of pedestrian facilities;
 - g. Promote and publish safe pedestrian and bike routes;
 - h. Fund a bicycle and pedestrian safety staff position for the County, in HCAOG for example;
 - i. Complete, build out and connect bike and pedestrian networks;
 - j. Institute traffic calming measures, including clearly marked bike and pedestrian routes, bike boulevards, bulb outs, median islands on two or more lane streets, in urban areas to decrease speeds and firmly separate pedestrians/bikers from motor vehicles;
 - k. Include paved shoulders on all roads in non-urban areas that can be used by bicyclists and pedestrians;
 - l. Improve signalization of crossing and routes;
 - m. Raise priority for funding for trails and active recreation infrastructure and facilities;
 - n. Teach bicycle and pedestrian safety in schools and workplaces and educate residents about the benefits of walking and biking.
- 3) Establish multimodal transit hubs with co-located businesses, childcare, senior services and housing with priority for transportation disadvantaged.
 - 4) Encourage retail, business, and industry to grow within urban boundaries, perhaps establishing Central Business Districts with incentives for businesses to locate in them.
 - 5) Encourage larger employers to adopt Transportation Demand Management programs such as encouraging flex time and incentives for carpooling.
 - 6) Extend the usefulness of privately-funded shuttles (casinos, social service providers, etc.) to make additional loops/stops to supplement and coordinate fixed-route transit.
 - 7) Create parking restrictions to support taking public transit:
 - a. Establish workplace and retail fees for parking;
 - b. Unbundle cost of parking from housing units;
 - c. Reduce parking requirements for new developments;
 - d. Limit availability of parking except proximal to transit hubs.
 - 8) Create school-based incentives:
 - a. Designate safe walking and biking routes to school;
 - b. Require that schools establish and support walking groups to school (“walking school buses”);
 - c. Develop policies to reduce car trips to school;
 - d. Establish a task force for school citing (including school closures) and safe routes decisions including public works, city, county, CALTRANS, law enforcement, school staff, public health, community groups and others;
 - e. Promote student attendance at their local neighborhood school.
 - 9) Develop transit-oriented streetscape and building design standards for key transit nodes and corridors, partially funded via development impact fees.

Humboldt General Plan Update Health Impact Assessment:
Summary

10) Improve locally-based programs and mechanisms to help people take transit and self-organize for ridesharing, walking school buses, bike buddies, paratransit etc.

Public Infrastructure

Public Infrastructure includes resources and amenities that residents can use – things like childcare, schools, parks, medical facilities, grocery stores, banks, sidewalks, roads, and sewer systems. The location of these resources and their proximity to where people live help determine whether people use them, how often, and how they access them (e.g., by walking or driving).

The General Plan will decide where future housing will be developed in the County. Depending on the Plan Alternative selected, housing may be available in areas that already have public infrastructure – that are already complete neighborhoods – or in areas where little or no infrastructure exists. This decision impacts health in several ways. When a neighborhood is ‘complete’, that is it contains most of the public infrastructure people need in their daily lives, people tend to:

- drive less and walk or bike more;
- exercise more;
- have fewer car accidents;
- have decreased social isolation;
- be less stressed.

These health benefits are described further in the introduction to the transportation section.

The Public Infrastructure section of this HIA evaluates the following housing indicators as they relate to Plan Alternatives A, B and C:

- PI.1.d** Proportion of zipcodes without childcare facilities
- PI.2.a** Accessibility of full-service grocery store/supermarket or store carrying produce
- PI.2.b** Proportion of households within ½ mile of a public elementary school
- PI.2.d** Fast food establishments within ½ mile of high schools and middle schools
- PI.3.a** Proportion of population within ¼ 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 ½ mile of senior center
- PI.6.a** Residential density

Existing Conditions

Proximity to elementary schools, public parks, senior centers and medical centers: The following table details existing conditions in Humboldt County.

Area	% of households within ½ mile of one of the 48 public elementary schools	% of population within ¼ mile of one of the 86 public parks	% of seniors within ½ mile of one of the 20 senior centers	% of population within 2 miles of one of the 20 medical facilities
Humboldt County	35.3%	21.0%	21.4%	72.2%
Areas with urban zip codes	41.4%	28.9%	24.7%	82.6%
Areas with non-urban zip codes	24.1%	6.6%	14.9%	53.5%

Humboldt General Plan Update Health Impact Assessment: Summary

Eureka and Arcata	43.6%	33.8%	24.5%	83.2%
McKinleyville	21.4%	9.9%	21.5%	85.4%

Childcare facilities. One in five labor force participants in Humboldt County is a parent living in a household in which all parents work.⁵² There are approximately 274 formal child care facilities in Humboldt County, including:

- 159 licensed family child care homes
- 26 licensed child care centers
- 21 Head Start and Early Head Start Programs
- 30 child development programs funded by the California Department of Education
- 38 license-exempt before- and after-school programs.⁵³

Of the 40 Humboldt zip codes, 18 (45%) had no licensed childcare facilities listed and 24 (60%) had no licensed family child care homes listed. Rural areas of Humboldt County include fewer childcare facilities than urban areas. In the 2005 Child Care Needs Assessment, only 25% of licensed childcare providers are located in “outlying rural areas”. This report stated that 21 of 29 zip codes (72%) had no licensed family child care homes.⁵⁴

Fast food establishments near schools. The following table details the number of fast food establishments (defined as restaurants that prepare and serve food quickly) near middle and high schools in Humboldt County.

City	Number of fast food restaurants within ½ mile of high schools and middle schools
Arcata	6
Eureka	4
Fortuna	4
Hoopa	0
McKinleyville	6

Grocery Stores. Most grocery stores are concentrated in the western region of the County, near Highway 101. Cities that are more densely populated, such as Eureka, Arcata, McKinleyville, and Fortuna, have more grocery stores than non-urban towns such as Trinidad and Ferndale.

Residential Density. The average density of permitted new development in Humboldt County for the period 1985-2000 was 1 unit per 10 acres.⁵⁵

Summary of Findings:

Given the necessity of future development in Humboldt County, the impact that development will have on health and the ability to plan for that development, **accommodating future population in areas that currently have the necessary infrastructure would be best from a health perspective. Plan Alternative A best exemplifies this and is the best option for reducing the ill health effects of residents living far from important goods and services.**

Within the scope outlined by Plan Alternatives A through C, this analysis concludes the following:

Plan Alternative A

Humboldt General Plan Update Health Impact Assessment: Summary

Health benefits would accrue because of the following changes in infrastructure indicators:

- The proportion of households within 0.5 miles of a public elementary school would *increase* to 36.0%, allowing more children to engage in physical activity by walking to school and leading to less school-related driving.
- The proportion of the population within 0.25 miles of a park would *increase* to 21.8%, allowing more people to engage in physical activity at those parks and allowing more people to enjoy other health benefits from being near them (e.g., mental health).
- The proportion of seniors (62 or older) within 0.5 miles of a senior center would *increase* to 22.0%, allowing more seniors to engage in health beneficial activities at those centers and decreasing isolation of seniors.
- The proportion of the population within 2 miles of a medical center would *increase* to 73.4% allowing more people to get medical care, including preventative care, more easily.
- The proportion of residents within ½ a mile of a grocery store would increase, allowing for improved nutrition.
- The greatest proportion of County residents would live in dense, complete neighborhoods which are associated with the health benefit of access to goods and services, as well as other benefits such as increased physical activity, reduced levels of overweight and obesity, and better social cohesion.

Health would **remain the same due** to no change in the following indicators:

- By concentrating both families with children and childcare providers in the same areas, Plan Alternative A would best meet the demand for childcare by working parents. The potential cost of living decrease under this Alternative could also decrease the need for childcare if more parents choose to stay at home with their children rather than feel the necessity to work outside the house for financial reasons. However, Plan Alternative A is expected to result in the highest proportion of zip-codes without childcare facilities. The proportion of the County's population living within non-urban zip-codes may not have access to childcare under Plan Alternative A, which is detrimental to health because it may be difficult for parents to work and earn a sufficient income.
- The number of fast food establishments near high schools would likely *remain about the same* since this alternative includes the development of the least number of new units and would therefore attract the fewest new fast food establishments. The diet of students would likely remain the same.

Plan Alternative B:

Health benefits would accrue because of the following changes in infrastructure indicators:

- Families with children in urban areas would most likely be in close proximity to childcare providers, while families in non-urban communities could have less access to childcare. The overall demand for childcare may not be met as much as it would under Plan Alternative A. However, Plan Alternative B is expected to result in a lower proportion of zip-codes without childcare facilities than Plan Alternative A. Under this Plan Alternative, non-urban populations may have greater access to new childcare facilities in their areas, which is important for the health of working families.

Health would **remain the same due** to no change in the following indicators:

- The proportion of residents within ½ a mile of a grocery store would remain about the same and nutrition would not likely be affected.
- About the same proportion of County residents would live in dense, complete neighborhoods which are associated with the health benefit of access to goods and services, as well as increased physical activity.

Humboldt General Plan Update Health Impact Assessment: Summary

And potential **health hazards would increase** due to changes in the following indicators:

- The proportion of households within 0.5 miles of a public elementary school would *decrease slightly* to 34.9%. Fewer children would engage in physical activity by walking to school and school-related driving would increase slightly.
- The proportion of the population within 0.25 miles of a park would *decrease* to 20.4%, allowing fewer people to engage in physical activity at those parks and allowing fewer people to enjoy other health benefits from being near them (e.g., mental health).
- The proportion of seniors within 0.5 miles of a senior center would *decrease slightly* to 21.0%, allowing slightly fewer seniors to engage in health beneficial activities at those centers and slightly increase isolation of seniors.
- The proportion of the population within 2 miles of a medical center would *decrease slightly* to 71.7% allowing slightly fewer people to get medical care, including preventative care, easily.
- The number of fast food establishments near high schools would likely *increase* since this alternative includes the development of the more new units and would therefore attract the more new fast food establishments. The diet of students could become worse.

Plan Alternative C:

Health benefits would accrue because of the following changes in infrastructure indicators:

- A) Families who do live in urban areas would most likely be in close proximity to childcare providers and public transportation. The overall demand for childcare might not be met by Plan Alternative C as much as it would under Plan Alternatives B or A. On the other hand, Plan Alternative C is expected to result in the lowest proportion of zip-codes without childcare facilities. Non-urban populations would potentially experience the health benefit of having childcare facilities nearby. Access to childcare would enable these non-urban parents to maintain jobs, and it would enable children to gain from development opportunities such as socializing with other children.

Potential health hazards could increase due to changes in the following indicators:

- The proportion of households within 0.5 miles of a public elementary school would *decrease* to 34.0%, allowing fewer children to engage in physical activity by walking to school and leading to more school-related driving.
- The proportion of the population within 0.25 miles of a park would *decrease* to 19.2%, allowing fewer people to engage in physical activity at those parks and allowing fewer people to enjoy other health benefits from being near them (e.g., mental health).
- The proportion of seniors within 0.5 miles of a senior center would *decrease* to 20.6%, allowing fewer seniors to engage in health beneficial activities at those centers and increasing isolation of seniors.
- The proportion of the population within 2 miles of a medical center would *decrease* to 70.0%, making it more difficult for more people to get medical care, including preventative care.
- The number of fast food establishments near high schools would likely *increase most* since this alternative includes the development of the most new units and would therefore attract the most new fast food establishments, including some in non-urban areas. The diet of students could become worse.
- The proportion of residents within ½ a mile of a grocery store would decrease and nutrition would not likely be negatively affected.
- The greatest proportion of new housing built between now and 2025 would be within incomplete neighborhoods with limited access to good and services.

Potential Health-Promoting Mitigations

Humboldt General Plan Update Health Impact Assessment: Summary

- 1) Ensure all new communities that are developed have a public elementary school; include developer fees for new schools.
- 2) Increase access to parks by:
 - a. Ensuring schoolyards are available in off-hours for community use;
 - b. Building new parks in new developments;
 - c. Ensuring funding for parks is maintained;
 - d. Ensuring that forests, parks and wetlands in the County are not being converted to other uses.
- 3) Increase access to senior centers by:
 - a. increasing awareness about existing senior centers;
 - b. building more senior centers;
 - c. increasing funding for senior centers;
 - d. creating other services for seniors;
 - e. increasing transportation services for seniors.
- 4) Increase access to medical facilities by:
 - a. increase transportation available to bring people to medical facilities;
 - b. increase awareness of existing transportation options.
- 5) Increase access to childcare by:
 - a. Continuing to make federal and state subsidies for after-school programs and childcare available;
 - b. Providing incentives for new childcare facilities by easing the process of obtaining and maintaining a childcare license;
 - c. Offering low-interest loans or grants to childcare operators for the establishment and operation of childcare facilities;
 - d. Supporting increased investment in employer-sponsored childcare assistance programs;
 - e. Improving public transportation so that families without vehicles can transport children to childcare;
 - f. Ensuring that all future communities have licensed childcare facilities;
 - g. Including childcare centers and family childcare homes in zoning plans in all communities;
 - h. Allowing childcare centers in all zones besides Open Space and zones that are inappropriate for health and safety reasons;
 - i. Encouraging placement of childcare facilities within office parks, industrial developments, and commercial areas;
 - j. Supporting placement of childcare facilities near commute routes, public transit and multi-modal transportation hubs;
 - k. Encouraging childcare facilities within multi-family housing projects.
- 6) Implement and enforce zoning restrictions against the placement of fast food establishments within ½ mile of a school.
- 7) Provide incentives for grocery stores selling produce to be located in all residential neighborhoods, regardless of resident income levels.
- 8) Implement policies that encourage development of complete neighborhood in non-urban areas.

Healthy Economy

The Humboldt County General Plan clearly recognizes the need for future policies to support economic development practices that “promote and sustain economic prosperity.” This economic prosperity can be achieved by ensuring that the economy provide:

- A minimum standard of living - a living wage;⁵⁶
- Job security;
- High employment rates;
- High numbers of jobs that provide health insurance.

Income is one of the strongest and most consistent predictors of health and disease in public health research literature. The strong relationship between income and health is not limited to a single illness or disease. The adoption of a living wage is associated with:

- A decrease in premature death from all causes for working adults;
- Improved educational outcomes and a reduced risk of early childbirth among the offspring of low-wage workers;⁵⁷
- Better health, improved nutrition, and lower mortality;⁵⁸

Unemployment, on the other hand, is associated with premature mortality⁵⁹, cardiovascular disease, hypertension, depression, and suicide.⁶⁰

Jobs that do not include health insurance contribute to poor health outcomes. Families with at least one full-time, full-year worker are more than twice as likely to have health insurance coverage, compared to families whose wage earners work as part-time employees (less than 35 hours per week), as contingent labor (e.g., on a seasonal or temporary basis, as employees of contractors, self-employed), or in which there is no wage earner.⁶¹ People without health insurance forego timely health care, suffer more severe illness, and are more likely to die a premature death than their insured counterparts⁶². Annually nationwide, 18,000 premature deaths are attributable to lack of health coverage.⁶³

The Healthy Economy section of this HIA evaluates industries according to the following indicators for workers in a healthy economy:

- HE.1.a Proportion of jobs paying a livable wage**
- HE.2.a Proportion of jobs that provide health insurance**
- HE.2.c Number of jobs available with appropriate educational requirements**

This information is compared to baseline trends in the County for:

- **Living wage for family size of one adult and one child;**
- **Unemployment rate;**
- **Percent of population uninsured;**
- **Current education attainment of population 25 years and older;**
- **Current employment.**

The main source of employment information for this Health Impact Assessment came from the *California LaborMarketInfo*⁶⁴, an employment database provided by the State of California. Included in this analysis are occupations identified at the Humboldt County General Plan Update and Health focus groups and with the Humboldt County Public Health Branch, but only those where there was

Humboldt General Plan Update Health Impact Assessment: Summary

sufficient information for Humboldt County, i.e., this analysis does not represent all occupations in each industry, but serves as a sample. Occupations were categorized based on the description as provided by *California LaborMarketInfo*.

Goals, policies, and implementation measures defined in the Humboldt County General Plan Update Chapter 11: Economic Development Element, which can be accessed on the Humboldt County website⁶⁵, reinforce the goal of creating a “healthy economy”, here defined as maintaining a healthy, employed workforce with living wages and health insurance in relation to the analysis of the current economic conditions based on industry. Positive impacts of current goals, policies, investments and partnerships as stated in the Humboldt County General Plan Update in conjunction with current findings of this assessment are:

- Maintaining a diverse, stable, and growing local economy (ED-G1, ED-P19);
- Expanding internet access (ED-G2);
- Supporting education and training of the workforce (ED-G4, ED-P11, ED-P17, ED-P18, ED-IM4);
- Protecting timber lands (ED-G8);
- Revitalizing Brownfields (ED-G9, ED-P6, ED-P7);
- Encouraging partnerships between educational and training institution, employment centers and job searchers (ED-G10);
- Economic Development Assistance Programs for current and future workforce (ED-G11).

Existing Conditions

Living Wage Occupations. A wide range of positions exists in each industry (including managerial, for example) and these positions come with different pay and benefits. The conclusions made below are only a sample provided by the *California LaborMarketInfo* database and are not meant to summarize all living wages by occupations in the entire industry.

Occupations in Humboldt County that can provide a living wage (i.e., an hourly mean wage that can support a family size of one adult and one child: \$15.27 per hour) include:

- Timber;
- Construction;
- Road construction and maintenance;
- Restoration of lands;
- High technology industries.

Industries that often do not provide a living wage include:

- Agriculture, Ranching, Fishing;
- Tourism including restaurants, hotel, outdoor recreation;
- Retail;
- Government;
- Gaming.

Industries that sometimes provide a living wage include:

- Green industry;
- Healthcare.

Hourly mean wages for those employed in *education* could not be suitably estimated due to the seasonal work period.

Humboldt General Plan Update Health Impact Assessment: Summary

Significant Employment Providers. The population employed in the industries mentioned above varies, but employment sectors providing the most jobs include:

- educational institutions, health and social services (26.6%)
- retail trade (12.5%).

Those in retail trade often earn wages below the living wage according to the *California LaborMarketInfo* database.

Educational Attainment/Training. Of the population in the County 25 years and older, approximately 74% have finished junior high but do not have more than an Associate's Degree. This level of education qualifies them for several industries with living wages:

- Timber;
- Construction (excluding managerial);
- Healthcare;
- Some education occupations.

Many of these industries do require additional on the job training ranging from 30 days to one year.

Occupations not often compensating employees with a living wage based on this level of educational attainment are (all excluding managerial and supervisor positions):

- Agriculture, Ranching, Fishing;
- Restaurants;
- Hotel;
- Outdoor tourism;
- Retail;
- Government;
- Gaming.

Projected Employment Growth (2004-2014). *California LaborMarketInfo* forecasts an increase in employment need in industries from 2004-2014. The growth industries often providing living wages include:

- High technology (20-40% growth);
- Registered nurses and some other health care professions (22.5%);
- Some construction occupations (19.1%).

These occupations educational/training prerequisites range from an Associate's or Bachelor's Degree to on the job training.

Occupations with projected growth that infrequently supply living wages include:

- Gaming dealers and service workers (33% growth);
- Retail salespersons (21.9%);
- Recreation attendants in the outdoor tourism industry (18.8%);
- Preschool teachers (15.6%);
- Hotel clerks (13.6%).

Many of the occupations require a minimum of on the job training or vocational education.

Health Insurance Benefits. Information on health insurance benefits provided categorized by industry is limited and therefore not used in this analysis.

Summary of Findings

From a public health perspective, preserving and promoting growing industries that pay living wages, provide health insurance and meet existing levels of education would be best. Jobs that meet these needs include timber, construction of housing, roads and other structures, some jobs within healthcare and education. Industries that do not frequently meet these needs include retail, agriculture and tourism. Each Plan Alternative has strengths and weaknesses with regard to the jobs that would be created or preserved.

Below is a limited analysis of the Plan Alternatives based on descriptions in the Humboldt General Plan Update. There will be exceptions in these alternatives based on various industry and economic circumstances and trends.

Plan Alternative A

- With the protection of prime employment and industrial reuse, this land use alternative preserves and promotes some industries that provide employees with living wages and appropriate education requirements, such as timber.
- Housing construction jobs, which often can pay living wages, may increase least in this Alternative, since the fewest number of housing units would be built. However other constructions jobs, such as construction of walking trails, may increase.
- Some industries that infrequently provide jobs with living wages would also remain relatively stable (e.g., tourism and agriculture) or grow slightly given the population growth (e.g., retail). Other industries that also infrequently provide living wages, such as big box retail, would be less likely given the limited development opportunities.
- There is also a possibility that the cost of living may decrease in this Alternative since, for example, people may be less dependent on owning a car, average electricity consumption could decrease and housing prices may be reduced.

Plan Alternative B

- This land use scenario could be slightly detrimental to some industries that can provide employees with living wages and have appropriate education requirements, such as timber.
- Construction jobs, which also can pay living wages, may increase more than in Plan Alternative A.
- Some industries that infrequently provide jobs with living wages would also remain relatively stable (e.g., tourism) or grow given the higher population growth in this Plan Alternative (e.g., retail). Others industries that do not frequently provide jobs with living wages would decrease (e.g., agriculture). Plan Alternative B is slightly more hospitable to other industries that also do not always provide living wages, such as big box retail.

Plan Alternative C

- This land use alternative would be detrimental to some industries that can often provide employees with living wages and have appropriate education requirements, such as timber.
- Construction jobs, which also can pay living wages, would increase most in this Plan Alternative.
- Some industries that infrequently provide jobs with living wages would also remain relatively stable (e.g., tourism) or grow given the higher population growth in this Plan Alternative (e.g., retail). Other industries that infrequently provide for living wages would decrease (e.g.,

Humboldt General Plan Update Health Impact Assessment: Summary

agriculture). This Plan Alternative is most likely to promote other industries that also do not always provide living wages, such as big box retail.

- There is also a possibility that the cost of living may increase in this Alternative since, for example, people may be more dependent on owning a car, average electricity consumption could increase and housing prices may increase.

Potential Health-Promoting Mitigations

- 1) Develop policies to attract and retain industries which:
 - a. Can provide a living wage;
 - b. Provide health insurance benefits;
 - c. Meet existing levels of workforce education.
- 2) Develop policies to solidify collaborations that can provide employees the opportunity for advancement, possibly resulting in earning a living wage, including those with:
 - a. Educational institutions;
 - b. Labor training centers;
 - c. Other labor organizations.
- 3) Ensure that a trained and qualified workforce is available to meet the needs of projected growing industries that can often provide living wages.
- 4) Assure availability of substance abuse treatment services to decrease the number of people disqualified for continued employment based on positive drug tests, absenteeism or poor performance.

Public Safety, Social Cohesion and Health

Humboldt County decisions on public safety and social cohesion will have an impact on health. For example:

- First responder (fire, paramedics, EMTs) response times can have an impact on mortality and morbidity both due to fire hazard and medical emergency;^{66 67 68}
- The state of California expects its residents to be able to self-sufficient for the first 72 hours after an emergency, and those trained in emergency preparedness are more likely to be, thus to avoid injury and care for injuries. Those trained in first aid are 2.4 times more likely to use their first aid skills in an emergency;^{69 70}
- Humboldt County residents have much higher arrest rates for driving under the influence (DUI) and for alcohol violations than in California as a whole.⁷¹ Fatal crashes and traffic fatalities in rural areas are 3.5 times more prevalent than expected on the basis of the percentage of total population, and the risk that the driver behavior of DUI is attributed to a fatal crash is 10% higher in rural areas than urban.⁷²
- Isolation, or lack of social connection, is associated with depression, anxiety, suicide, slower recovery from illness, as well as other health outcomes.⁷³

The General Plan Update has many opportunities to impact these indicators. The policies that municipalities adopt with regard to safety and location of new population can make a grave difference in regard to proximity to hospitals and first responders such as fire stations, how often people will have to drive on winding or potentially dangerous roads, emergency preparedness training and drunk driving, and very simply, how close people live to each other. The Public Safety, Social Cohesion and Health section of this HIA evaluates the following indicators as they relate to Plan Alternatives A, B and C:

SC.1.c	Rates of driving under the influence (DUI)
SC.2.a	First responder response times - Fire response times
SC.2.b	Emergency preparedness sites/ training for citizens
SC.4.a	Isolation index

Existing Conditions

First Responder Response Times. Currently, rural fire response times are approximately 11 minutes, and urban response times are 7 minutes.⁷⁴

Emergency Preparedness of the Citizenry. In 2006-2007, Humboldt County's chapter of the American Red Cross trained approximately 9,000 people in Health & Safety trainings and 13,000 people attended disaster preparedness trainings or workshops.⁷⁵ 2,000 county employees have received training, including 200 Public Health Branch employees. All incorporated municipal employees are required to be trained, and schools must have an emergency operations plan.⁷⁶

Rates of DUI. Humboldt County has one of the highest rates of deaths due to alcohol and drug use in the State of California.⁷⁷ Adult arrest rates for DUI in 2001 were 15.2 per 1,000 compared to 8.3 per 1,000 in the state of California. In 2000, the rate of fatalities and injuries from motor vehicle accidents in Humboldt County was 153.5 per 100,000 licensed drivers compared to 98.1 per 100,000 in California.⁷⁸

Humboldt General Plan Update Health Impact Assessment: Summary

Isolation. There is no one measure for isolation that has been used in Humboldt County, so this HIA used an “index”, or a conglomeration of multiple measures: psychological distress, suicide, mental health treatment, substance abuse treatment, crime and civic engagement. In 2005, 10.2% of Humboldt County residents, or 1 out of every 10, stated they had spent between 10 – 20 days in the last month in poor mental health and 20.3% felt that they needed help for an emotional/mental problem⁷⁹ From 2001-2004, Humboldt County’s rough suicide rate was 22.3 per 100,000, over three times Los Angeles’s rate of 7.1 per 100,000. The most recent statistic for California is 9.4 per 100,000.⁸⁰ 11.2% had seen a mental health professional.⁸¹ Humboldt County has higher rates of admission for drug and alcohol treatment than California, and also has over double the rate of death due to alcohol and drugs.⁸² Crime rates are higher in Humboldt (46.3 per 1000 people in 2001) than in California overall (39.4 per 1000 people in 2001).

Some measures of civic engagement find Humboldt County faring better than the California as a whole. The County has between 5-11 percent higher voter registration rates than California since 1996. In 2000, 73% of those registered cast a ballot, slightly higher than California’s rate of 71%. Many people feel that residents of the County are active in their communities, know their neighbors and enjoy this aspect of living in the County.

Proximity to schools and community centers are important aspects of isolation and are addressed in the Public Infrastructure section.

Summary of Findings:

There are avoidable and unavoidable safety issues that any municipality faces. Humboldt County has the opportunity for prophylaxis in designing its General Plan. **Accommodate future population in areas where residents will have better access to emergency services, have less chance of fatality if in a motor vehicle accident, will have a higher rate of enforcement of DUI laws, and will have greater social connections would enhance health in the County. The land use maps of Plan Alternative A will best protect Humboldt County’s residents in terms of public safety and social cohesion.**

Within the scope outlined by Plan Alternatives A through C, this analysis concludes the following:

Plan Alternative A

Health benefits would accrue because of the following changes in Public Safety and Social Cohesion indicators:

- Response times from first responders would, on average, be slightly lower. For certain emergency medical situations such as cardiovascular events, quicker response times would signify better health outcomes.
- Emergency preparedness currently has focused on the coastal areas, which is where infill is slated to take place. If current outreach and training remains the same, emergency preparedness would improve as more people would live in the targeted areas. Thus, mortality as well as the affects of injuries such as musculoskeletal injuries, broken bones, and abrasions (the most common injuries in natural disasters) would decrease due to an increase in residents knowing how to take care of themselves and others.
- Isolation would likely decrease. Health benefits due to greater social connection include decreased rates of depression and suicide, more social support leading to greater access to resources, better recovery from illness, and greater ability to advocate for positive change.

Humboldt General Plan Update Health Impact Assessment: Summary

Health benefits are mixed due to changes in the following indicator:

- If all population growth is accommodated in urban areas, fatality rates from driving under the influence of alcohol would likely decrease while accident and injury from DUI accidents would likely increase. Urban and rural rates of drinking are similar in the existing literature about DUI, but prevalence statistics show higher rates of arrest for driving while intoxicated and fatality as well as use of substance abuse treatment in Humboldt County. While it is unclear if a causal relationship between alcohol intake and living in a rural area is implicated, injury and fatality from DUI would likely decrease due to lower speed limits and less dangerous conditions (such as curved roads, cliffs, poorly lit roads).

Plan Alternative B:

Health benefits would remain the same due to no change in the following indicators:

- First responder response times would likely remain similar.
- Fatalities and injuries from DUI would likely remain similar.
- The proportion of residents who are socially isolated would likely remain the same, given that Plan Alternative B allows for growth in both urban and non-urban areas that reflects the current proportion of residents in the county. Thus, suicide, depression, anxiety, and illness recovery times would be similar to current conditions.

And **potential health hazards would increase** due to changes in the following indicators:

- Unless the Red Cross and other agencies charged with training citizens in emergency preparedness increase programming, the proportion of citizens ready for a natural disaster would decrease.

Plan Alternative C:

Potential health hazards would increase due to changes in the following indicators:

- First responder response times would increase slightly, and more people would be served by the lower-capacity fire departments in rural areas..
- The proportion of residents trained in case of a natural disaster would decrease, leaving more people in Humboldt County unprepared and vulnerable to death, injury, and disease in the aftermath of a disaster.
- Injury and death due to traffic fatality from DUI would likely increase.
- Isolation would increase, given that more of the population growth would be accommodated in rural areas. Potentially that could lead to higher rates of depression and suicide; less social support; less access to health resources, networks, and information; and higher rates of substance abuse.

Potential Health-Promoting Mitigations

- 1) Incentivize employers to encourage volunteering and voting.
- 2) Require construction or renovation of community centers with funding for staff and programs with large rural or urban development projects.
- 3) As part of a community benefits package, require developers to fund programs to engage the community, such as community concerts, parades, festivals.
- 4) Support programming to build retiree/student partnerships or other mentoring relationships.
- 5) Expand outreach for Citizen Advisory Committees on various types of municipal projects.
- 6) Measure isolation and social cohesion in Humboldt County using a validated tool such as the Saguaro Index⁸³ or the Petris Scale⁸⁴ in order to have an indicator to measure.

Humboldt General Plan Update Health Impact Assessment: Summary

- 7) Support community building activities such as parades and events that showcase local artisans.
- 8) Support clustered development in regions where water supply is adequate for fighting fires.
- 9) Establish a uniform measurement system county-wide to track response times.
- 10) Encourage currently trained EMT's to gain paramedic training.
- 11) The DRAFT Safety Element of the GPU has very little to say about improving emergency preparedness among Humboldt County's citizenry, beyond implementing the Emergency Operations Plan, which also does not go into detail. Increase the importance of emergency preparedness by highlighting it more in the General Plan.
- 12) Have schools communicate their Emergency Operations Plans to parents.
- 13) Expand funding for trainings and publicity about emergency preparedness.
- 14) Set benchmarks on how many citizens are trained in each area. Designate a public agency responsible.
- 15) Support the Humboldt Red Cross in outreach efforts to bring people into their CERT training (Community Emergency Response Team).
- 16) Set up a Rural Emergency Preparedness outreach team to specifically address the readiness and concerns of rural residents in case of emergency.
- 17) Implement evidence-based interventions and policies against alcohol-impaired driving:
 - a) Implement 0.08% blood alcohol concentration (BAC) laws. These are state laws that lower the illegal BAC for drivers from 0.10% to 0.08%. These have been shown to reduce alcohol-related fatalities by a median of 7 percent;
 - b) Implement minimum legal drinking age laws and lower BAC laws specific to young or inexperienced drivers (zero tolerance laws);
 - c) Increase the use of sobriety checkpoints;
 - d) Fund mass media campaigns to educate the population about the dangers of drunk driving;
 - e) Increase school-based education programs to educate students about the dangers of drunk driving and of riding with a drinking driver;
 - f) Train alcohol servers on intervening with people who have been drinking and intend to drive;
 - g) Decrease alcohol outlets and their hours of operation.

Environmental Stewardship & Health

According to an EPA report from 2000⁸⁵:

Direct environmental impacts of current development patterns include habitat loss and fragmentation, and degradation of water resources and water quality. Building on undeveloped land destroys and fragments habitat and thus displaces or eliminates wildlife communities. The construction of impervious surfaces such as roads and rooftops leads to degradation of water quality by increasing runoff volume, altering regular stream flow and watershed hydrology, reducing groundwater recharge, and increasing stream sedimentation and water acidity. A one-acre parking lot produces a runoff volume almost 16 times as large as the runoff volume produced by an undeveloped meadow. Development claimed more than half of the wetlands in the lower 48 states between the late 1700s and the mid-1980s.

In the Humboldt General Plan Update survey, 86.4% of respondents said that the surrounding natural environment was extremely important to the quality of life in Humboldt County and 85.1% said that quality of the natural environment was a major factor in why they decided to live in the county.⁸⁶ In this section of the Health Impact Assessment, development impacts on health through changes to the environment are considered. Development anywhere tends to degrade the environment, but the aim is to control the degree of degradation through better land use policy. Examples of how land use affects environment and health include:

- Further declines in agricultural lands, timber production, forestland fragmentation, and property improvements for development reduce the viability of the local farming and forest industry, diminish economic productivity and result in job losses. Income and unemployment impact health and well-being greatly (see the Healthy Economy section). Timber lands also contain culturally significant resources, wildlife habitats, sensitive watersheds (i.e., critical water supply areas), and protect the land from erosion, all of which also contribute to health.
- Consumption of locally produced foods can: reduce consumption of fossil fuels and reduce potential for pollution and for global warming⁸⁷; increase consumption of fruits and vegetables; reduce consumption of processed foods; and have economic benefits including local farmers receiving more of the money spent on food⁸⁸ and keeping money in the community.⁸⁹
- Parks and open space areas promote physical activity⁹⁰ and social interaction. Living in proximity to green space is associated with better self-rated health and higher scores on general health questionnaires.⁹¹ Access to parks and open spaces also has a positive impact on stress, depression, and mental functioning.
- Watersheds (regions of land within which water flows down into rivers, lakes, or ocean; drainage basins) have been harmed by development. The increase in impervious areas (most notably, roads and parking lots) leads to reduction of water supplies and to increased flooding. Stormwater runoff, which is often polluted from household landscaping or agricultural pesticides, herbicides and fertilizers and from heavy metals from industry, has increased. Access to clean drinking water is vital for health.
- Electricity generation contributes to greenhouse gas emissions and indirectly to climate change which threatens health through more extreme weather events, increased air pollution, limitations on food production, increased water-borne and food-borne illnesses, and increased infectious disease vectors. The benefits of decreased energy consumption also include economic benefits through lower utility bills.

Humboldt General Plan Update Health Impact Assessment: Summary

The environment offers resources and carries out valuable services for us. For example, it purifies water and air and gives us space for physical activity. When these resources and services are not available or the environmental systems go awry, technologies are developed, and financial and health costs are paid. For example, water purifiers must be purchased, asthma rates increase, and memberships at gyms must be bought. Protecting the environment takes advantage of this ‘natural capital’ and will improve health and lower the cost of living.

The Environmental Stewardship section of this HIA evaluates the following environmental indicators as they relate to Plan Alternatives A, B and C:

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.c	Percent of households using municipal water system
ES.5.a	Total impervious area in County

Existing Conditions

Agricultural and timber lands. In 2002, there were 633,931 acres of farm land, 28% of Humboldt acreage. According to the California Department of Forestry and Fire Protection, in 1996 the County had 1,487,000 acres of forest land (65% of total acreage), 20% less than the amount in 1967.⁹²

Parks and open space. There are 7.5 square miles of public open space per 1000 persons in Humboldt County. Seventeen percent of land in Humboldt is publicly owned. Of the 2,287,000 acres of land in the county, 262,000 are national forests and 15,000 are other public lands.⁹³ Urban areas of the County also have a good number of parks. In Eureka, there are 4.5 acres of park per 1000 residents; Arcata has 6.2 acres per 1000 residents; and Fortuna has 6.5 acres of park per 1000 residents.

Public water supply. In Humboldt County there are 21 community Public Water Systems (PWS) with greater than 200 service connections and 25 PWS with fewer than 200 service connections. The larger PWSs tend to be used in more urban areas with denser populations. The numbers of coliform and turbidity failure are far lower in the larger PWS in the County.⁹⁴

Impervious area. Data on current Total Impervious Area (TIA) in Humboldt County is only available around Arcata. All but one of the watersheds in Arcata is more developed than the amount recommended for stability (10%).⁹⁵ Some, like the Campbell Creek and Sunset Creek watersheds are significantly more developed (over 30%).

Electricity use per capita in the County, ~7300 kWh/year, is similar to use in California and about half the use in the US.⁹⁶ Electricity use in the County increased about 1.3% per year between 1990 and 2000, while population growth was about 0.6% per year. Due to decreased use in industry (mainly timber), energy use in the County decreased significantly (~24%) between 2000 and 2003. According to the Humboldt County Energy Element Appendices: Technical Report, currently, the County produces locally 73% of electricity and 11% of natural gas consumed.⁹⁷

Humboldt General Plan Update Health Impact Assessment: Summary

Local food. According to one source, around 85% of Humboldt's food is brought in by trucks.⁹⁸ In the US, on average, an item of food travels 1500 miles between the farm and the plate.⁹⁹ Opportunities for access to local produce include: 13 farmers markets, 6 local Community Supported Agricultural Farms programs, local grocery stores that highlight locally grown food, and a Farm-to-School program for education.

Summary of Findings:

In light of the predicted population growth in the County and the potential harm to the environment that could accompany that growth, **the best health outcomes would be achieved by accommodating future population in the urban areas that are currently developed and by protecting productive lands and other open space from development. Plan Alternative A best exemplifies this and is the best option for promoting health through environmental protection.**

Within the scope outlined by Plan Alternatives A through C, this analysis concludes the following:

Plan Alternative A

Health benefits would accrue because of the following changes in environmental indicators:

- The proportion of households that have access to large municipal water systems would increase and thereby more people would have access to safer drinking water.
- Per capita electricity consumption would decrease since urban housing tends to be smaller. This will help minimize pollution and global warming and their associated health effects and leave more money available for other necessities, such as food.

Health would **remain the same due** to no change in the following indicators:

- Productive agricultural and timber land would be preserved and thereby jobs, culturally significant resources, habitats of threatened species, sensitive watersheds, or critical water supply areas would be maintained. The amount of locally produced food would also not be impacted and therefore local consumption may be at least maintained.
- Total Impervious Area (TIA) would increase least since urban development will not require new road and parking construction and has the potential to build multi-family units with smaller roof areas. However, urban watersheds could be negatively affected and policies to account for this are needed. The health benefits of less TIA include less flooding, less water pollution, and preservation of water resources.

And potential **health hazards would increase** due to changes in the following indicators:

- The acres of park per 1000 residents in urban areas would decrease unless policies are adopted to increase the number or size of parks as more people move into these areas. Parks contribute to health by providing opportunities for physical activity and social interactions and because views of natural spaces improve mental health.

Plan Alternative B:

Health would **remain the same due** to no change in the following indicators:

- The proportion of households that have access to large municipal water systems would remain about the same as would the number of people who have access to safer drinking water.
- Per capita electricity consumption would remain about the same since new housing will be evenly distributed in urban and non-urban areas. This will not change the amount of pollution being generated and will contribute to global warming, both of which have negative health consequences. Additionally, people will spend about the same amount of

Humboldt General Plan Update Health Impact Assessment: Summary

money on electricity and will not have more available for other necessities.

And potential **health hazards would increase** due to changes in the following indicators:

- Some productive agricultural and timber land could be lost and thereby jobs, culturally significant resources, habitats of threatened species, sensitive watersheds, or critical water supply areas may be lost. The amount of locally produced food could also decrease and therefore local consumption may be reduced.
- As above, the acres of park per 1000 residents in urban areas would decrease unless policies are adopted to increase the number or size of parks as more people move into these areas.
- Total Impervious Area would increase due to the non-urban development which will require new road and parking construction. Urban watersheds could be negatively affected, as in the other Plan Alternatives and policies to account for this are needed. Flooding and water pollution will increase, and water resources will be lost.

Plan Alternative C:

And potential **health hazards would increase** due to changes in the following indicators:

- The greatest amount of productive agricultural and timber land would be lost and thereby jobs, culturally significant resources, habitats of threatened species, sensitive watersheds, or critical water supply areas will be negatively affected. The amount of locally produced food would also decrease and therefore local consumption may be reduced.
- As above, the acres of park per 1000 residents in urban areas would decrease unless policies are adopted to increase the number or size of parks as more people move into these areas.
- The proportion of households that have access to large municipal water systems would likely decrease as would the number of people who have access to safer drinking water.
- Total Impervious Area would increase due to the non-urban development, which will require new road and parking construction. Urban watersheds will also be negatively affected, as in the other Plan Alternatives and policies to account for this are needed. Flooding and water pollution will increase, and water resources will be lost.
- Per capita electricity consumption would likely increase since more new housing will be built in non-urban areas. This will increase the amount of pollution being generated and will increase global warming, both of which have negative health consequences. Additionally, people will spend more money on electricity and will not have less available for other necessities.

Potential Health-Promoting Mitigations

- 1) Selectively preserve agricultural land and timber land if scenarios B or C are chosen.
- 2) Restrict housing placement to the periphery of agriculturally zoned land to maintain contiguous acreage for future farming use.
- 3) Maintain existing and build new urban parks by:
 - a. Enacting a Humboldt County discount for national, state, and county parks;
 - b. Ensuring funding for parks is maintained;
 - c. Ensuring that forests, parks and wetlands in the County are not being converted to other uses;
 - d. Building parks in urban areas to increase acreage of parks available;
 - e. Increasing funding and protection for national, state, and county parks.
- 4) Reduce impact on TIA by:
 - a. Building more densely and building fewer roads and parking lots;

Humboldt General Plan Update Health Impact Assessment: Summary

- b. Implementing policies that decrease parking requirements for retail establishments in non-urban areas, decrease parking for office buildings, and encourage parking garages instead of large parking lots;
 - c. Encourage development in areas near existing roads;
 - d. Incentivizing the use of more porous materials for new roads and parking lots;
 - e. Incorporating the Ahwahnee Water Principles into the General Plan: “City and County officials, the watershed council, LAFCO, special districts and other stakeholders sharing watersheds should collaborate to take advantage of the benefits and synergies of water resource planning at the watershed level;”
 - f. Set limits on TIA for each watershed;
 - g. Encouraging roofing partially or completely covered with vegetation and soil that can absorb water.
- 5) Decrease per capita electricity consumption by:
- a. Increasing energy efficiency of housing;
 - b. Encouraging construction of multi-unit buildings and smaller houses;
 - c. Encouraging construction of buildings that follow environmental standards such as those proposed by Leadership in Energy and Environmental Design (LEED);
 - d. Regulating electricity use by industry and businesses (e.g., turning lights off in office buildings at night);
 - e. Promoting solar and other locally produced energy production and consumption;
 - f. Reducing the County’s carbon footprint by following the recommendations of groups like the International Council for Local Environmental Initiatives (ICLEI);
 - g. Implementing outdoor lighting efficiency standards to decrease public and private use of electricity.
- 6) Encourage consumption of locally produced food by:
- a. Increasing incentives to produce food locally and consume locally produced food;
 - b. Increasing programs and incentives for locally grown food businesses (e.g., see: <http://guide.buylocalca.org/> and http://www.caff.org/programs/eco_index.shtml);
 - c. Encouraging County institutions (e.g., hospitals) to use locally grown foods;
 - d. Supporting of food incubator businesses in the County.

Conclusions

In the process of updating its General Plan, Humboldt County is currently evaluating 3 Plan Alternatives. In this Health Impact Assessment, these alternatives were analyzed from a health perspective using 35 indicators prioritized by stakeholders in focus groups, by Humboldt Partnership for Active Living, and by the Humboldt County Public Health Branch. In looking at data on existing conditions for each indicator and analyzing how each Plan Alternative would likely change each indicator quantitatively and/or qualitatively, conclusions were reached about the likely health impacts of each Plan Alternative.

Briefly, Plan Alternative A provides for “focused growth.” It encourages all new units to be built in existing areas that are already supported by public sewage and utilities, i.e., encouraging higher residential density and infill development. Alternative A provides for 6,000 additional units over the course of 25 years. 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. It primarily provides for building in urban centers where there is a good network of utilities, sewage, and transit, but allows for some ex-urban development as well with modest expansion of existing water service areas, focusing on areas adjoining the city centers. Alternative B provides for 12,000 additional units over the course of 25 years. 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; it also expands water service areas beyond present boundaries to expand opportunities for housing in outlying parts of communities. Alternative C provides for 18,000 additional units over the course of the 25 years.

Many of the predicted changes in indicators, such as the proportion of the population living near parks, are only predicted to change by less than two percent. While this may seem like an insignificant amount, few other decisions about land use in the County could make changes of this magnitude. Given the current trends in health, everything possible must be done to change the built environment in ways to promote health.

One of the goals of HIA is to judge a plan for its potential health effects on a population, and the distribution of those effects within the population. In Humboldt, seniors, children, Native Americans, and those living close to the poverty line are vulnerable populations that currently often have more significant health issues. The decisions made in this general plan will affect those populations and those effects should be considered when choosing between the Plan Alternatives. In most cases, the policies associated with Plan Alternative A reduce this disparity most. For example, the poor, seniors and children have less access to private motor vehicle travel. By placing future development in urban areas, Plan Alternative A would make non-motorized forms of transit a more viable alternative for accessing parks, medical center, senior centers and grocery stores.

Many issues are and should be considered in the choice of Plan Alternatives for the General Plan Update; health is just one of them. If a Plan Alternative is chosen that has negative health impacts, additional health promoting mitigations can and should be implemented to offset these negative impacts. Many of these mitigations are suggested in both the summary documents and the full report.

Humboldt General Plan Update Health Impact Assessment:
Summary

Given the importance of health and current trends such as the increasing rates of type 2 diabetes and heart disease in the County, health should be a primary consideration in the choice of Plan Alternatives. As the table below shows:

- Plan Alternative A will likely have the most positive overall health impacts and require the fewest health related mitigations
- Plan Alternative C will likely have the most negative overall health impacts and require the greatest number of health related mitigations; and
- Plan Alternative B would change health outcomes least.

However, Plan Alternative A also may impact health negatively and other options not under consideration may be still better. For example, the need for affordable housing may not be met under Plan Alternative A. A plan involving the construction of more than 6000 units of housing in the currently urban areas would likely retain or increase most of the positive health impacts described for Plan Alternative A and would mitigate some of the potentially negative health impacts it has.

The table below summarizes conclusions for each indicator analyzed. In the table, a “+” sign indicates that the indicator would change in a positive way for that Plan Alternative, and, therefore, that health outcomes related to that indicator would improve as well. A “~” sign indicates that the indicator would not be affected significantly by the choice of alternatives. A “-” sign indicates that both the indicator and health would be negatively affected by that Plan Alternative. Lastly, a “TBD” (To Be Determined) indicates that not enough information is currently available to evaluate how the indicator and health would be changed.

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	+	~	-

Humboldt General Plan Update Health Impact Assessment:
Summary

	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 ½ mile of a grocery store	+	~	-
PI.2.b	Proportion of households within ½ mile of a public elementary school	+	~	-
PI.2.d	Fast food establishments within ½ mile of high schools and middle schools	~	-	-
PI.3.a	Proportion of population within ¼ 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 ½ 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	~	-	-

Humboldt General Plan Update Health Impact Assessment:
Summary

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	+	~	-

Appendix A: Data Contributors and Focus Group Participants

The following people contributed data to this HIA:

- Tom Matson, Director of Public Works, Humboldt County
- Hugh Scanlon, California Department of Forestry
- Sheila Steinberg PhD, California Center for Rural Policy at Humboldt State University
- Susan Ornelas
- Melanie Williams, HumPAL (Humboldt Partnership for Active Living)
- Jen Rice, Natural Resources Services, Redwood Community Action Agency
- Deborah Giraud, UC Davis Agricultural Extension Service
- Kirk Girard, Alyson Hunter, Cybelle Immett, Martha Spencer, Michael Richardson, Humboldt Community Development Services
- Erica Terrance, Northcoast Environmental Center
- Cathy Bifeier, California Water Resources Board (North Coast Watershed Assessment Program)
- Mark Andre, City of Arcata
- Steve Steinberg, PhD, Department of Environmental and Natural Resource Sciences, Humboldt State University
- Steven Hackett, PhD, Humboldt State University
- Pat Higgins
- Jacqueline Debets, Humboldt County economic Development
- Rob Amerman and Jan Turner, Housing and Homeless Coalition
- Wendy Rowan, First Five Commission
- Julie Sessa, Area 1 Agency on Aging
- Judy Anderson, Local Childcare Planning Council
- Rick Martin, Air Quality Management District
- Luis Bruhnke, North Coast Emergency Medical Services
- Sue Aszman, USDA NRCS Arcata Soil Survey Office
- Kevin O'Neil, California Department of Forestry
- Staff, PG&E
- Connie Stewart, Assemblymember Patty Berg's office
- Spencer Clifton, Humboldt County Association of Governments
- Penny Figas, Director, Humboldt Del Norte County Medical Society
- Maureen Chase, Eureka City Schools
- Staff, Public Health Branch

The following people participated in focus groups:

Arcata Focus Group

- Ken Miller, Salmon Forever
- Mark Lovelace, Healthy Humboldt
- Peggy Martinez, Humboldt Council of the Blind
- Norma McAdams, Hoopa Valley
- Wendy Ring, Mobile Medical Office
- Timothy Daniels, Bigfoot Bicycle Club
- Rick Martin, North Coast Air Quality Management District
- Bill Spencer
- Deborah Giraud, U.C. Cooperative Extension
- Chris Rall, Greenwheels

Humboldt General Plan Update Health Impact Assessment: Summary

- Susan Ornelas, Jacoby Creek Land Trust
- Joyce Houston, Public Health
- Andrea Armin
- Chris Jones, Tri County Independent Living
- Ann Lindsay, Public Health Officer
- Lona Bates, City of Arcata
- Carol McFarland, Foster Avenue Neighbors
- Ingrid Kosek, Friends of the Annie and Mary Rail Trail
- Linda Doerflinger, HumPAL, NAMI
- Robert Boher, Yurok Tribe
- David Mohrman
- Kim Hagans, United Way Switchboard
- Jason Davis, North Coast Air Quality Management District
- Marilyn Foote, Redwoods Rural Health Center
- Michael Atkins, Ridgewood Village
- Ann King Smith, Ex. Arcata Planning Commissioner, North Coast Regional Land Trust
- Michael Richardson, Community Development Services, County of Humboldt

Eureka Focus Group

- Victoria Onstine, Area 1 Agency on Aging
- Paula Yoon
- Susan Penn
- Jay Sooter, Small Business
- Larry Evans, Alliance for Sustainable Jobs and the Environment
- Wendy Rowan, First 5 Humboldt
- Lawrence Wieland, Redwood Family Practice
- Aaron Antrim, Green Wheels
- Ali O. Lee, Lighthouse of the North Coast
- Tressie Word, Winzler and Kelly

Fortuna Focus Group

- Nicole Gans, DHHS PHB Health Education
- Judi Anderson, Local Childcare Planning Council
- Kathleen Adkins, Lighthouse of the North Coast
- Patti Rose, Cedar St. Sr. Apts., So. Hum. Community Healthcare
- Sylvia Jutila, American Cancer Society
- Sharon Latour, Presbyterian Church, Garberville
- Dorina Espinoza, Public Health Branch
- Clif Clendenen, Clendenen's Cider Works
- Estelle Fennell

Appendix B: Map Creation and Data Analysis for Humboldt County

The system used for mapping and various analyses was ArcGIS 9.2 software by ESRI (2007). This software integrated the data for mapping and analysis. The color schemes for the maps were selected by consulting ColorBrewer (<http://www.colorbrewer.org>), an online tool for selecting color schemes.

The maps (population/household/age data) were classified using Jenks Natural Breaks. In this classification method, the data are assigned to classes based upon their position along the data distribution relative to all other data values. The classification is determined by the best arrangement of values into classes by comparing the sum of squared differences of values from the means of their classes.

The projection and coordinate system used for the maps

NAD_1927_StatePlane_California_I_FIPS_0401

Lambert_Conformal_Conic

False_Easting: 2000000.000000

False_Northing: 0.000000

Central_Meridian: -122.000000

Standard_Parallel_1: 40.000000

Standard_Parallel_2: 41.666667

Latitude_Of_Origin: 39.333333

The source of the population, household and age data was the 2000 Census. The data and map file boundaries were retrieved through Geolytics Research Package – using the Census Summary File 1 (SF1), also known as the long form, and Summary File 3 (SF3).

The method to determine the proximity measures (proportion of the population/households/seniors) is the ‘centroid within’ method. Each census block group was converted to a centroid or a point which represents the geographic center of each census block. The block groups which have their geographic center within the study area (in this case the appropriate sized buffer) are counted as being the distance the buffer represents. This method represents a good comprise of extraction techniques and polygons with a majority of its area within the study area will be included. Calculating centroids is not a precise measurement and there is a margin of error.

Humboldt General Plan Update Health Impact Assessment: Summary

References

- ¹ Handy, S. 1996 Understanding the link between urban form and non-work traveling behavior. *Journal of Planning Education and Research*. 15:183-98.
- ² Gilman SE, Kawachi I, Fitzmaurice GM, Buka SL. 2003. Socio-economic status, family disruption and residential stability in childhood: relation to onset, recurrence and remission of major depression. *Psychological Medicine* 33:1341-1355.
- ³ Williams DR, Collins C. 2001. Racial residential segregation: A fundamental cause of racial disparities in health. *Public Health Reports* 116:404-416.
- ⁴ Bhatia R, Guzman C. 2004. The case for housing impacts assessment: The human health and social impacts of inadequate housing and their consideration in CEQA policy and practice. San Francisco Department of Public Health. Occupational and Environmental Health Section. Program on Health, Equity, and Sustainability.
- ⁵ Cohen DA, et. al., 2006. Public parks and physical activity among adolescent girls. *Pediatrics* 118:1381-1389.
- ⁶ Humpel N, Owen N, Leslie E. 2002. Environmental factors associated with adults participation in physical activity: A review. *American Journal of Preventive Medicine* 22(3):188-199.
- ⁷ Drewnowski A, Darmon N, Briend A. 2004. Replacing fats and sweets with vegetables and fruits – a question of cost. *American Journal of Public Health* 94(9):1555-1559.
- ⁸ Basiotis PP. 1992. Validity of the self-reported food sufficiency status item in the U.S. In Haldeman, VA. Paper presented at the American Council on Consumer Interests 38th Annual Conference. US Dept of Agriculture. Colombia, MO.
- ⁹ Dyett & Bhatia. 2004. Humboldt 2025 General Plan Update Sketch Plan Alternatives: A Discussion Paper for Community Workshops. Humboldt County Department of Community Development Services.
- ¹⁰ Humboldt County General Plan Update Survey, 2003. Humboldt County Planning Department. [Available at <http://co.humboldt.ca.us/planning/gp/survey/results.htm>]
- ¹¹ Gilman SE, Kawachi I, Fitzmaurice GM, Buka SL. 2003. Socio-economic status, family disruption and residential stability in childhood: relation to onset, recurrence and remission of major depression. *Psychological Medicine* 33:1341-1355.
- ¹² Cooper M. 2001. Housing affordability: A children's issue. Discussion Paper No. F-11. Canadian Policy Research Networks, Inc. Available at <http://www.cprn.com/en/doc.cfm?doc=176>.
- ¹³ Bhatia R, Guzman C. 2004. The case for housing impacts assessment: The human health and social impacts of inadequate housing and their consideration in CEQA policy and practice. San Francisco Department of Public Health. Occupational and Environmental Health Section. Program on Health, Equity, and Sustainability.
- ¹⁴ Sampson RJ. 1999. What Community Supplies. Chapter 6 in *Urban Problems and Community Development*. Eds. Ronald F. Ferguson, William T. Dickey.
- ¹⁵ Kawachi I, Berkman L. 2003. *Neighborhoods and Health*. New York: Oxford University Press.
- ¹⁶ Bhatia R, Guzman C. 2004. The case for housing impacts assessment: The human health and social impacts of inadequate housing and their consideration in CEQA policy and practice. San Francisco Department of Public Health. Occupational and Environmental Health Section. Program on Health, Equity, and Sustainability.
- ¹⁷ Bhatia R, Guzman C. 2004. The case for housing impacts assessment: The human health and social impacts of inadequate housing and their consideration in CEQA policy and practice. San Francisco Department of Public Health. Occupational and Environmental Health Section. Program on Health, Equity, and Sustainability.
- ¹⁸ Barrow SM, Herman DB, Cordova P, Stuenkel EL. 1999. Mortality among homeless shelter residents in New York City. *American Journal of Public Health* 1999:529-534.
- ¹⁹ McCann B. and Ewing R. 2003. Measuring the health effects of sprawl: A national analysis of physical activity, obesity and chronic disease. Smart Growth America, Surface Transportation Policy Project.
- ²⁰ McCann B. and Ewing R. 2003. Measuring the health effects of sprawl: A national analysis of physical activity, obesity and chronic disease. Smart Growth America, Surface Transportation Policy Project.
- ²¹ Ontario College of Family Physicians. Report on Public Health and Urban Sprawl in Ontario: A review of the pertinent literature. Available at <http://www.ocfp.on.ca/English/OCFP/UrbanSprawl/default.asp?s=1>
- ²² Goldberg D, Frank L, McCann B, Chapman J, Kavage S. 2007. New data for a new era: A summary of the SMARTAQ findings. Linking land use, transportation, air quality, and health in the Atlanta region.
- ²³ Frank L, Pivo G. 1995. Impacts of mixed use and density on utilization of three modes of travel: Single-occupant vehicle, transit, and walking. *Transportation Research Record* 1466-1452.
- ²⁴ Morland K, Diez Roux AV, Wing S. Supermarkets, other food stores, and obesity: the atherosclerosis risk in communities study. *Am J Prev Med*. 2006;30(4):333-9.
- ²⁵ Inagami S, Cohen DA, Finch BK, Asch SM. You are where you shop: grocery store locations, weight, and neighborhoods. *Am J Prev Med*. 2006;31(1):10-7.

Humboldt General Plan Update Health Impact Assessment: Summary

- ²⁶ Handy, S. 1996 Understanding the link between urban form and non-work traveling behavior. *Journal of Planning Education and Research*. 15:183-98.
- ²⁷ Holtzclaw J. 1994. Using residential patterns and transit to decrease auto dependence and costs. *Natural Resources Defense Council*. Available at <http://www.smartgrowth.org/library/articles.asp?art=190&res=1024>.
- ²⁸ Ontario College of Family Physicians. Report on Public Health and Urban Sprawl in Ontario: A review of the pertinent literature.
- ²⁹ Leyden KM. Social capital and the built environment: the importance of walkable neighborhoods. *Am J Public Health* 2003 September;93(9):1546-51.
- ³⁰ Jacobs J. *The Death and Life of Great American Cities*. New York: Random; 1961.
- ³¹ 2006 Annual Progress Report on Implementation of the Housing Element, General Plan Report requirement pursuant to Section 65400 of the Government Code.
- ³² 2003 Housing Element Update to Humboldt County General Plan (Approved December 16, 2003).
- ³³ US Census 2000.
- ³⁴ Waxman, Deborah T. *Creating Affordable Housing in Humboldt County* (Master's Thesis)
- ³⁵ 2003 Housing Element Update to Humboldt County General Plan. (Approved December 16, 2003) Amended November 30, 2004)
- ³⁶ 2003 Housing Element Update to Humboldt County General Plan. (Approved December 16, 2003 Amended November 30, 2004)
- ³⁷ City of Arcata, March 7, 2007. Homeless Services Plan: 2007-2016.
- ³⁸ Skov T, Borg V, Orhede E. 1996. Psychosocial and physical risk factors for musculoskeletal disorders of the neck, shoulders, and lower back in salespeople. *Occup Environ Med* 53(5):351-356
- ³⁹ BBC. 2000. Commuting is 'biggest stress'. Available at <http://news.bbc.co.uk/1/hi/health/999961.stm>.
- ⁴⁰ Lopez-Zetina J, Lee H, Friis R. 2006. The link between obesity and the built environment. Evidence from an ecological analysis of obesity and vehicle miles of travel in California. *Health Place*. Dec;12(4):656-64.
- ⁴¹ Guidry J, et. al. 1997. Transportation as a barrier to cancer treatment. *Cancer Practice* 5(6).
- ⁴² Butrick E. 1999. Factors in nonattendance in extended evening clinics in Contra Costa County. Unpublished paper for Contra Costa Health Services.
- ⁴³ Brugge D, Lai Z, Hill C, Rand W. 2002. Traffic injury data, policy, and public health: lessons from Boston Chinatown. *Journal of Urban Health* 79(1):87-103.
- ⁴⁴ Roberts I, Marshall R, Lee-Joe T. 1995. The urban traffic environment and the risk of child pedestrian injury: a case-cross over approach. *Epidemiology* 6:169-171.
- ⁴⁵ Ewing R, Schmid T, Killingsworth R, Zlot A, Raudenbush S. 2003. Relationship between urban sprawl and physical activity, obesity, and morbidity. *Am J Health Promot* 18(1):47-57.
- ⁴⁶ Caltrans, California Motor Vehicle Stock, Travel and Fuel Forecast (MVSTAFF), December, 2006..
- ⁴⁷ FHA. Highway Statistics 2000. Updated March, 2003. Office of Highway Policy Information, Federal Highway Administration, US Dept of Transportation at <http://www.fhwa.dot.gov/ohim/hs00/ps1r.htm>. Accessed on December 28, 2007.
- ⁴⁸ US Census 2000.
- ⁴⁹ HCOAG. 2003. Humboldt County Regional Pedestrian Needs Assessment Study Update. Humboldt county Association of Governments.
- ⁵⁰ Besser LM, Dannenberg AL. 2005. Walking to public transit: Steps to help meeting physical activity recommendations. *American Journal of Preventative Medicine* 29(4):273-280.
- ⁵¹ Jacobsen PL. 2003. Safety in numbers: More walkers and bicyclists, safer walking and bicycling. *Inj Prev* 9:205-9.
- ⁵² National Economic Development and Law Center, 2004. *The Economic Impact of the Child Care Industry in Humboldt County*.
- ⁵³ Humboldt County Office of Education. Local Child Care Planning Council of Humboldt County, May 2005. *Child Care Needs Assessment*.
- ⁵⁴ Humboldt County Office of Education. Local Child Care Planning Council of Humboldt County, May 2005. *Child Care Needs Assessment*.
- ⁵⁵ Smith, MD, and SJ Steinberg, January 2005. Room to Grow? An assessment of the Potential for Unincorporated Humboldt County to Accommodate Future Projected Population Growth.
- ⁵⁶ Poverty in America: Living Wage Calculator. Pennsylvania State University Available at: <http://www.livingwage.geog.psu.edu/index.php>.
- ⁵⁷ Yen I, and Bhatia R. 2002. How Increasing the Minimum Wage Might Affect the Health Status of San Francisco Residents: A Discussion of the Links Between Income and Health, Working Paper, February 27, 2002.

Humboldt General Plan Update Health Impact Assessment: Summary

- Bhatia R, Katz M. 2001. Estimation of the health benefits from a living wage ordinance. *Am J Public Health* 91:1398-1402.
- ⁵⁸ National Academy of Sciences. 2006. Genes, Behavior, and the Social Environment: Moving Beyond the Nature/Nurture Debate. LM Hernandez and DG Blazer, eds. The National Academies Press. Accessed at: http://orsted.nap.edu/openbook.php?record_id=11693&page=25.
- ⁵⁹ Cornwall A, Gaventa J. 2001. From Users and Choosers to Makers and Shapers: Repositioning Participation in Social Policy. Working Paper 127 Sussex: Institute of Development Studies.
- ⁶⁰ Jin RL, Shah CP, Svoboda TJ. 1995 The impact of unemployment on health: a review of the evidence. *The Journal of the Canadian Medical Association* 153:529-540.
- ⁶¹ Institute of Medicine. Committee on the Consequences of Uninsurance. Coverage Matters: Insurance and Health Care (2001), Chapter 3, Who Goes Without Health Insurance? Who Is Most Likely to Be Uninsured? Available at: http://www.nap.edu/html/coverage_matters/ch3.html.
- ⁶² Institute of Medicine, 2004. Project on the Consequences of Uninsurance: An Overview. <http://www.iom.edu/Object.File/Master/17/736/Fact%20sheet%20overview.pdf>.
- ⁶³ Institute of Medicine, 2004. Project on the Consequences of Uninsurance: An Overview. <http://www.iom.edu/Object.File/Master/17/736/Fact%20sheet%20overview.pdf>.
- ⁶⁴ See: <http://www.labormarketinfo.edd.ca.gov/>.
- ⁶⁵ Humboldt County General Plan Update. Available at: <http://co.humboldt.ca.us/planning/gp/>.
- ⁶⁶ Eisenberg MS, Bergner L, Hallstrom A. 1979. Cardiac resuscitation in the community: Importance of rapid provision and implications for program planning. *JAMA* 241:1905-7.
- ⁶⁷ Eisenberg M, Bergner L, Hallstrom A. 1979. *Am J Public Health* 69(1):39-42.
- ⁶⁸ Clark DE, Cushing BM. Predicting regional variations in mortality from motor vehicle crashes. *Acad Emerg Med*. 1999 Feb;6(2):125-30.
- ⁶⁹ Auf der Heide E. 2003. Convergence behavior in disasters. *Annals of Emergency Medicine* 41:463-6.
- ⁷⁰ California Governor's Office of Emergency Preparedness.
- ⁷¹ CARS, Inc. 2004. Community Health Indicators of Alcohol & Drug Abuse Risk: Humboldt County 2004. Center for Applied Research Solutions. Available at http://www.ca-cpi.org/Publications/Community_Indicators/County_Data_Files/Humboldt_04.pdf. Accessed on February 3, 2008.
- ⁷² Raskaukas M. 2007. The culture of traffic safety in rural America. *Intelligent Transportation Systems*. University of Minnesota Center for Transportation Studies. Available at <http://www.its.umn.edu/Publications/ResearchReports/reportdetail.html?pid=1270>. Accessed on February 13, 2008.
- ⁷³ Cacioppo JT, Hawkey LC. Summer 2003. Social isolation and health, with an emphasis on the underlying mechanisms. *Perspectives in Biology and Medicine* 46(3 supplement):S39-S52. Available at http://muse.jhu.edu/journals/perspectives_in_biology_and_medicine/v046/46.3xcacioppo.pdf. Accessed on February 17, 2008.
- ⁷⁴ Humboldt County Fire Safety Council. 2006. Humboldt County Master Fire Protection Plan. Available at http://co.humboldt.ca.us/planning/fire_safe_council/fsc_default.asp. Accessed on February 1, 2008.
- ⁷⁵ Humboldt Red Cross. Annual Report 2006-007. Available at http://humboldtreddcross.org/media/annual_report.pdf. Accessed on January 30, 2008.
- ⁷⁶ Phone conversation with Charlene Pellatze, Emergency Preparedness Coordinator with Humboldt County Public Health Department. February 1, 2008.
- ⁷⁷ 2004 Community Indicators of Alcohol and Drug Abuse/Risk.
- ⁷⁸ CARS, Inc. 2004. Community Health Indicators of Alcohol & Drug Abuse Risk: Humboldt County 2004. Center for Applied Research Solutions. Available at http://www.ca-cpi.org/Publications/Community_Indicators/County_Data_Files/Humboldt_04.pdf. Accessed on February 3, 2008.
- ⁷⁹ California Health Information Survey. Available at <http://www.chis.ucla.edu/>.
- ⁸⁰ Harrison C. Jan. 3, 2008. County posts highest suicide total in 18 years. *The Eureka Reporter*. Available at <http://eureka-reporter.com/article/080103-county-posts-highest-suicide-total-in-18-years>.
- ⁸¹ California Health Information Survey. Available at <http://www.chis.ucla.edu/>.
- ⁸² CARS, Inc. 2004. Community Health Indicators of Alcohol & Drug Abuse Risk, *ibid*.
- ⁸³ <http://www.ksg.harvard.edu/saguaro/communitysurvey/>
- ⁸⁴ <http://www.petriss.org/>
- ⁸⁵ Our Built and Natural Environments: A Technical Review of the Interactions between Land Use, Transportation and Environmental Quality. US Environmental Protection Agency, Development, Community and Environment Division. Jan 2001. Available at: <http://www.epa.gov/smartgrowth/pdf/built.pdf>.
- ⁸⁶ <http://co.humboldt.ca.us/planning/gp/survey/results.htm>

Humboldt General Plan Update Health Impact Assessment: Summary

- ⁸⁷ La Trobe, H. Farmers' markets: consuming local rural produce. *International Journal of Consumer Studies*. 2001; 25;(3): 181-192.
- ⁸⁸ Elitzak H. Food Marketing Costs: A 1990's Retrospective. United States Department of Agriculture Economic Research Service. September-December 2000. Available at <http://www.ers.usda.gov/publications/foodreview/septdec00/FRsept00e.pdf>.
- ⁸⁹ Seyfang G. Local Organic Food: The Social Implications of Sustainable Consumption. CSERGE (Center for Social and Economic Research on the Global Environment) Working Paper EDM 04-09. University of East Anglia, Norwich, UK. 2004.
- ⁹⁰ Kahn EB. The effectiveness of interventions to increase physical activity. *Am J Prev Med*. 2002;22(4):73-107.
- ⁹¹ Vries S, de Verheij RA, Groenewegen PP, Spreeuwenberg P. Natural environments - healthy environments? An exploratory analysis of the relationship between green space and health. *Environment and Planning A*. 2003;35(10):1717-1731.
- ⁹² Fire and Resource Assessment Program – California Dept of Forestry and Fire Protection.
- ⁹³ NW California Resource Conservation and development Council Area Plan 2008-2013
- ⁹⁴ Craig M. Bunas, P. E., Associate Sanitary Engineer, Drinking Water Field Operations Branch. California Department of Public Health.
- ⁹⁵ Mark Andre, Environmental Services, City of Arcata.
- ⁹⁶ Zoellick, J. Humboldt County's Energy Picture. Presented on Sept 29, 2005 at Humboldt State University. Author is from Schatz Energy Research Center.
- ⁹⁷ Humboldt County Energy Element Appendices: Technical Report. Prepared for Redwood Coast Energy Authority by Schatz Energy Research Center, Humboldt State University. October, 2005.
- ⁹⁸ <http://www.culturechange.org/HumboldtEcon.html>.
- ⁹⁹ Pirog R. Food, Fuel, and Freeways: An Iowa Perspective on How Far Food Travels, Fuel Usage, and Greenhouse Gas Emissions. Ames, Iowa. Leopold Center for Sustainable Agriculture. Iowa State University. 2001.