

**A Health Impact Assessment of Accessory Dwelling Unit Policies
in Rural Benton County, Oregon**

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AN ESSAY

submitted to

Oregon State University

in partial fulfillment of
the requirement for the
degree of

Master of Public Policy

Presented May 5, 2011
Commencement June 11, 2011

ABSTRACT

This study uses the Health Impact Assessment approach to determine the health impacts of allowing accessory dwelling units in Benton County, Oregon. A literature review presents the health benefits of accessory dwelling units in urban areas and identifies the potential negative health effects in rural areas. Five accessory dwelling units policy options, ranging from restricting currently permitted uses to allowing construction of a complete accessory unit, are assessed by measuring community health indicators. The indicators measure impacts related to the issues of healthy housing, access to goods and services, social and family cohesion, and transportation and mobility. Quantitative data from a variety of sources are collected to measure the health indicators. Qualitative data from focus groups, and advisory panel, and local health and planning professionals are collected to measure the indicators where quantitative data is not available. This study provides policy recommendations for which assessed policy option will have the greatest positive benefit to health in the unincorporated areas of Benton County. Conclusions include the successes and limitations of applying the Health Impact Assessment approach to the issue of accessory dwelling units in a rural setting.

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INTRODUCTION

Accessory dwelling units (ADUs) have been accepted in urban areas as an innovative design approach that benefits both the dweller and the community. They provide additional housing without consuming land, place new residents near existing services, provide an affordable housing type and increase the diversity of housing options in established neighborhoods (MRSC, 2005). The units have been popular, in part, because urban development codes and zoning regulations permit the construction of ADUs. In most rural areas, however, accessory dwelling units are not permitted and little is known about their impacts. The Benton County Community Development Department receives requests for ADUs with most citing some medical need such as housing an elderly relative or providing living space for a disabled adult-aged child (Bentley, 2011). For this reason, the assessment focuses specifically on identifying the benefits to health should an ADU policy be adopted. There are numerous methods to identify and assess the impacts of built environment policies. This paper will use the Health Impact Assessment (HIA) approach to determine the impacts ADUs have on the health of rural households in the unincorporated areas of Benton County, Oregon.

Permission to Access and Use of County Collected Data

The HIA project was fully funded and completed by the Benton County Health Promotions Office within the County Health Department. Quantitative and qualitative data was collected under the representation of the County and was supervised by Health Promotions staff members. All data used in this assessment is considered secondary data provided by the County that was not originally collected for the use and purpose of a master's project. Benton County Health Promotions has authorized the release of this data and the HIA report to be discussed and re-released as an Oregon State University master's essay.

Background

In 2007, the Benton County Community Development Department decided to consider adopting an ADU policy in response to frequent requests from residents for ADU

permits. The issue had long been debated within the department and amongst community members. While some requested permits for a medical need, others opposed the units over fears of nuisances near their rural properties. Opponents believed the units would attract disruptive residents, such as college students, multiple working-aged adults, and families with young children. In reality, those requesting permits in Benton County remain homeowners with some medical need to care for an ill, aging, or disabled family member. Having a separate unit on their property allows the family member to live independently while still having constant and immediate care from relatives. Living with relatives is also considered more comfortable and affordable than providing 24-hour in-home care or paying for residency in a convalescent home (HIA Advisory Panel, 2010). There are some permit requests for rent, but among those were elderly homeowners seeking a supplemental income source to remain in their homes.

The County adopted a policy allowing temporary medical hardship dwellings for property owners that have a doctor verified medical hardship. Benton County Development Code 91.545 states that, “manufactured dwelling may be allowed as an accessory use to a dwelling in any zone in order to alleviate a medical hardship.” A manufactured trailer may be placed on the property until the medical need subsides, or the individual passes away. The trailers are expensive and become a liability because they are temporary and must be removed. Residents also consider the trailers uncomfortable and less desirable than permanent units that can be tailored to the family and patients needs. The temporary medical hardship dwelling policy was adopted in response to community members requesting units for care of a loved one. However, because of opposition and concerns over unknown and perceived impacts, the policy was limited in the benefits it granted the ill, aging, and disabled citizens.

Social Construction Theory

The theory of Social Constructionism can be used to explain how ADUs became a policy issue in Benton County. The theory can also explain how misconceptions affect the policy making process that has historically favored anti-ADU rural property owners. Social Construction Theory explains why some groups receive preference in the policy making process over others. These groups are called “target groups” or “target populations” because they are the intended groups to receive the benefits or adverse

impacts of an adopted policy. Actors within the process, such as key stakeholders or government figures, often construct groups in a negative or positive view based on their perceptions or biases toward each group. Policy benefits are allocated based on these constructed views. Views are socially constructed considering two factors: political power and positive or negative perceptions. Groups will either have strong or weak political power, and have positive or negative perceptions. This classification structure separates groups into four categories: advantaged, contenders, dependents, and deviants.

Figure 1 shows the four target groups as identified through Social Construction theory. Constructions range from positive to negative, and power ranges from weak to strong. Some groups have commonly perceived social constructs, such as the construction of the rich as being contenders and the disabled as being dependents.

		<u>Perception</u>	
		Positive	Negative
<u>Power</u>	High	<u>Advantaged</u> Small Business Homeowners The Military Scientists	<u>Contenders</u> Big Business Labor Unions The Radical Right Environmentalists
	Low	<u>Dependents</u> Mothers Children The Poor Homeless	<u>Deviants</u> Criminals Terrorists Illegal Immigrants Drug Dealers

Figure 1: Categories of target groups as described in Social Construction theory (Sabatier, 2007)

Historically, ADUs proponents have been classified as contenders, because they were seen as having relatively high political power as property owners that sought policies with adverse impacts on others. Sabatier (2007) defines contenders as having “substantial political resources but are negatively regarded as relatively selfish, untrustworthy and morally suspect.” Opponents of ADUs—who tend to also be

homeowners with significant political power—fear that ADUs will bring overcrowding and negative neighborhood impacts (Cooper, 2006). Because of this social construct, no ADU policy was adopted and allocations of the target population was limited.

Another indicator of the negative construct of ADUs was the number of complaints received by the Benton County Community Development Department regarding illegally constructed units. Rural property owners had been constructing units illegally without proper permitting and code compliance. Neighbors, rural community members, and County staff continued to see rural ADUs as being negative, in part because of their illegal nature. This illegal activity contributed to the view of ADU owners as being untrustworthy and morally suspect. These complaints drove two efforts that would eventually lead to a reconstruction of ADU policy: increased code enforcement and inclusion of an ADU objective in the County Comprehensive Plan update (Bentley, 2011).

Increased code enforcement led County staff to review the issue of ADUs. During this review, they found that most illegal units were being used to accommodate family members that need some level of care from the property owner. These residents may have had some medical hardship, but do not qualify for a temporary medical hardship dwelling permit. Although these property owners had been constructing units illegally, staff members became aware of the issue of family care accommodations that were not be met through the current medical hardship dwelling policy. The County's comprehensive plan process begins with community member input and involvement. Accessory dwelling units were identified as an issue because of concern regarding illegally constructed units. Public participants included language in the comprehensive plan, as cited in the background section, which would guide staff to develop ADU policies. This goal would eventually lead to the commissioning of the Health Impact Assessment report to identify potential impacts of ADUs. Through increased enforcement efforts and increased public concern of ADUs, the units became an issue added to the political agenda.

The group was reconstructed in a more positive light once staff and community members began to understand the driving factors for ADU requests and illegal constructions. This changing view was also aided by studies providing data on the demographics of accessory units and primary dwellings. Research in Seattle found that

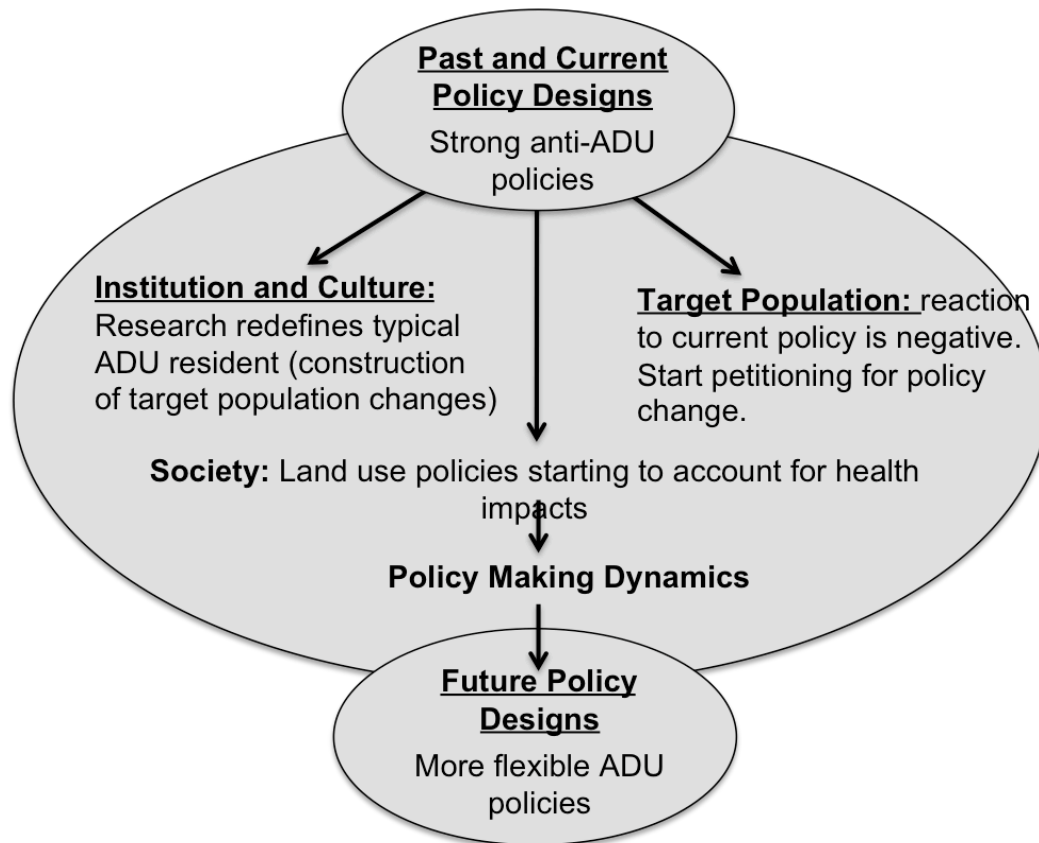
on average only 2.16 persons lived in the main unit and 1.2 persons lived in the accessory unit (Cooper, 2006). Another study by Rudel (1984) found that homes with conversions had fewer children than conventional homes, which was viewed as another nuisance as overcrowding was the primary concern for opponents. Thus, with these new understandings of ADUs and their residents, the policy process responded by reconstructing the perceptions of ADUs. The group then becomes reclassified as dependents. Sabatier (2007) defines dependents as “positively constructed as deserving, at least in terms of sympathy and pity.” Common dependent groups are children, mothers, the poor and homeless.

The reconstructed view led the political actors, or the County Development Department staff and County Planning Commission, to reconsider the policies requested from the target population. In 2007 the Director of the County Planning Department wrote a memo informing the Planning Commission that ADU policies would be reassessed for the possible impacts on neighborhoods in rural areas and benefits to families and individuals. The director sought to adopt an option for more flexible “family living arrangements” and provide clarity on what is and what is not allowed. The memo states, “We receive many requests from property owners to establish an apartment for my mother-in-law or separate living quarters for my aging parents, etc.” These are not cases of medical necessity where a medical hardship temporary dwelling could be approved; rather, people are wanting flexible arrangements for extended family to live close by but with some degree of independence” (Benton County HIA, 2010).

Steps towards rewriting development code to accommodate ADUs show a shift from viewing them as contenders to being dependents worthy of allocations from the policy making process. They are currently classified as dependents because they are most commonly elderly or disabled individuals in need of representation within the policy making process.

Figure 2 shows the process of ADUs developing from a negative social construct to a more positive one. The process includes both activities occurring within the institution and culture, and the actions from the target population. In this case, institutional and cultural activities include the County staff’s review of ADUs, public awareness of ADU issues as seen in the comprehensive plan update, and research being conducting from the academic and professional fields. Target population activities include continued

requests for ADU permits and increased complaints about not having an implemented ADU policy. The process is also aided by societal changes such as health becoming a more prominent issue in community development and policy making. Changing demographics with the aging of the “baby boomer” generation and the increasing need for elderly housing options can also be considered part of these societal impacts on the policy making process. This process, along with policy-making dynamics, leads to the



reconstruction of target populations. Social Construction Theory can be used as a lens through which to view the development of this policy issue and changing perceptions of ADUs.

Figure 2: Policy design process as explained by the Social Constructionism theory. (Sabatier, 2007)

LITERATURE REVIEW

This study focuses on understanding the health impacts of accessory dwelling units. There are a variety of definitions for ADUs but generally the term refers to a self-contained dwelling unit within or attached to a single-family dwelling (MRSC, 1995). A unit is considered self-contained if it has bathroom and kitchen facilities separate from the main dwelling. ADUs can be classified into three categories: interior, attached, and detached. Interior units are built within the primary residence such as converted basements and attics. Attached units are constructed on the side or rear of the primary dwelling and have a separate entrance. Detached units are constructed on the same lot as the main residence such as a carriage or guesthouse and are sometimes considered secondary units rather than an accessory unit. Common terms used to describe a specific type of accessory dwelling unit include accessory apartments, elder cottages, accessory cottages, granny units, mother-in-law apartments and garage apartments. These terms vary in some characteristics, but overall represent an accessory dwelling unit (Sage, 2008).

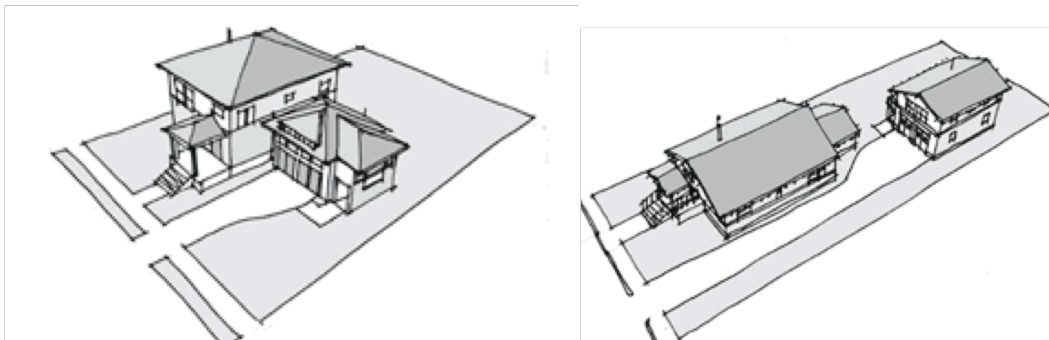


Figure 3: Images of attached (left) and detached (right) accessory dwelling units (RACE Studio and the City of Santa Cruz, California, 2007)

Construction of Accessory Dwelling Units

There are a variety of reasons why homeowners construct ADUs. According to literature and experiences at the Benton County Planning Department, common reasons for constructing ADUs include generating an additional income source when property owners operate the unit as a rental. The income generated assists homeowners with mortgage payments, property upkeep, and provides a supplemental income source. ADUs are also constructed to house an elderly, ill, or disabled family member. Adult children may better or more conveniently care for their aging parent when their relative is closer to their own dwelling units. Transportation is more easily arranged, care could be given more frequently, and often in-home family-administered care is more affordable than full-time convalescent housing (Liebeg, 2006). These same benefits also are considerations for ill or disabled children or other relatives. As a mentally or physically disabled child matures, their parents may choose to construct an ADU on their property so their child can live semi-independently as an adult but still be close enough for frequent care. ADUs have also been constructed for social purposes, such as providing more private housing for other family members such as college-age children or adult children. ADUs are also used as temporary accommodations for guests and visiting relatives. (Sage Computing, 2008)

Chapman and Howe (2001) point out that although there are significant benefits for elderly residents, elderly individuals are more likely to own a home with an ADU than to live in one. Their study in Seattle, Washington found that the primary reason for elderly homeowners to add a secondary unit was for income assistance from renting and to increase housing affordability. Financial incentives were also cited in studies in Boulder, Colorado and Toronto, Canada (Hare & Williams, 1998; Murdie & Northrup, 1990). Despite this research in urban areas, experiences in Benton County still suggest that ADUs are requested by homeowners seeking to house an elderly parent in the unit. Figure 4 shows that younger populations are more likely to be renters of ADUs than owners. Middle-aged adults between the ages of 40 and 79 are more likely to be owners of ADUs than renters. However, the oldest age cohort surveyed shows that those 80 to 89 years of age are more likely to be renters than owners, suggesting a need for affordable rental housing and assisted housing among elderly individuals.

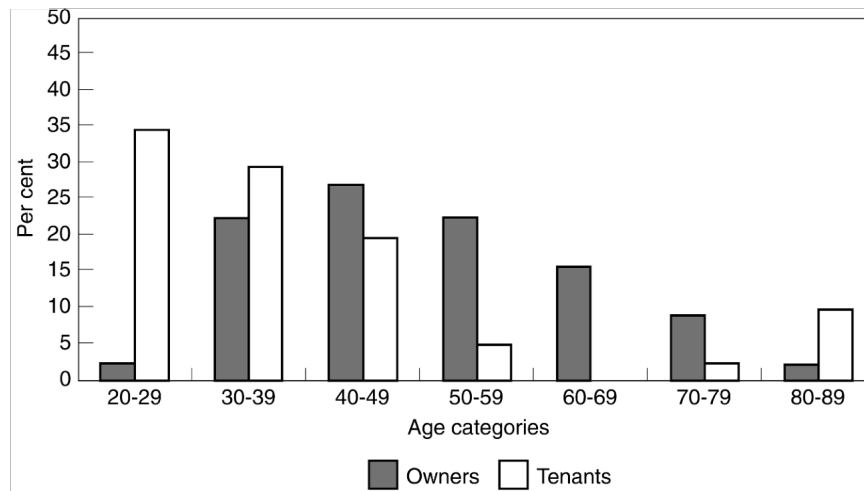


Figure 4: Age Distribution of owners and tenants of accessory apartment units. (Howe & Chapman, 2001)

Communities are hesitant to adopt ADU policies fearing an uncontrollable increase in population and the number of permits requested. However, Chapman and Howe suggest that in Seattle on average 1.2 individuals reside in ADUs and 2.16 individuals live in primary units with an accessory unit (Chapman & Howe, 2001). King (1979) also found that one permit request can be expected for every 1,000 single-family residential housing units within the housing stock. In a housing stock such as unincorporated Benton County, this results in a projected 12 permit requests annually, or less than 1 percent of the total housing stock.

Positive Benefits of ADUs on Health

Research shows that ADUs have positive health benefits for ill, disabled, or aging individuals. An impact is considered a health benefit if it improves any of the conditions associated with individual health, such as decreased occurrence of disease, improved body weight and BMI, or an increase in lifespan. If rented, ADUs provide additional income for homeowners, making homes more affordable. Elderly and ill homeowners are better able to afford mortgage payments and property taxes as they transition into fixed or reduced incomes (Hare, 1991). This allows them to “age in place” or remain in their home towards the end of their lives. The units can also be used to provide housing for a live-in caregiver for the aging homeowners (Caro, 2006). “Aging in Place”

significantly reduces stress and improves the quality of mental health as one approaches the end of life. They are able to stay at home near their established social network, which also contributes their mental and overall health (Aging in Place Initiative, 2010; King 2008). Remaining at home is also more affordable than relocating to a care facility, freeing income for other uses such as healthy food options, transportation, utilities and recreational purposes.

Accessory units may also be constructed in a manner that accommodates the physical limitations of elderly or physically disabled residents. The Municipal Research and Services Center of Washington (1990) found in their research that handicapped people often face limited opportunities for housing that can meet their special needs. ADUs can provide many handicapped individuals with the opportunity to live independently in their own home but close enough to others to provide needed assistance. “Adaptable” ADUs can be tailored to the specific needs of the resident’s disability. (Municipal Research Service Center, 1990; King, 2008). These adjustments reduce the risk of injury and increases comfort within their home.

As individuals age, children usually become the primary caregiver. A child may choose to construct an ADU on their property to better care for an aging parent. Disabled children also benefit from having a relative, or parent nearby acting as a caregiver (housingpolicy.org, 2010). Having constant care decreases the risk of isolation and depression by providing companionship and frequent attention. Elderly and physically or mentally disabled individuals often have mobility limitations that restrict trips outside of the home or their interactions with other people. Companionship reduces stress, and maintains a healthy mental state. Frequent visitation also reduces the risks of chronic diseases and hospitalizations because of preventative care and consultation provided by a caregiver (Jasper, 2010; House and Landis, 1988).

Having relatives close also promotes multi-generational housing situations, which increases social cohesion within a family unit (Liebig, 2006). A grandparent may provide care for a young child where care may not otherwise be provided. This “cooperative” living amongst multi-generations within the same family frees income for other uses such as health care, healthier food options, transportation, utilities and recreations. All of these alternative uses are associated with improved overall physical and mental health.

Residents of ADUs are expected to be persons with some sort of medical hardship needing constant care. However, it is likely that if no restrictions are adopted, ADUs may be used as rental units for low and very low income families (EDAW, 2002; MRSC, 1995; Atlanta Regional Commission, 2007). ADUs may provide positive health benefits to other individuals and households in rural areas of Benton County where affordable housing is limited and lack a diversity of housing types. Affordable housing reduces a household's dependency on monthly rent and frees income for other uses. When additional income is available, households are more capable of purchasing more nutritious foods, receiving health care, paying for childcare, providing transportation for basic services and opportunities for recreational activities. All these alternative goods and activities are beneficial to overall health and preventing chronic diseases in adults and children (Cohen, 2007).

Possible Health Impacts of ADUs in Rural Areas

The health benefits of ADUs are well documented within urban areas, but the benefits of rural ADUs are not well defined. Dwellers of rural ADUs would not benefit from living within dense urban environments where they can walk to services and activities. These close amenities and opportunities for daily physical activity have associations with improved individual health. Should an ADU be constructed in a rural setting, amenities and services are further away. Residents would not likely have an opportunity for daily exercise to these services, and may face greater barriers to medical, recreational, social, and job activities (HIA Advisory Panel, 2010). However, rural ADU dwellers would still benefit from the social connections and family cohesion benefits of living near family members or caregivers.

Living in rural and remote areas is associated with reduced levels of public health (Schur & Franco, 1999). Research shows that non-urban residents have shorter life-expectancies, higher death rates, are more likely to have a disability, be overweight, smoke and drink alcohol excessively, live below the poverty line, and be involved in a fatal automobile accident (National Rural Health Association, 2011). These impacts are associated with the poor availability of health services in rural areas, increased poverty rates, and fewer medical professionals practicing in rural communities (Moates, 2005). According to the National Rural Health Association (2011), approximately 10% of physicians serve rural areas though about a quarter of the population lives in these

areas. The lack of dentists serving rural communities is also significant; there are 60 dentists practicing for every 100,000 residents in urban areas but only 40 for every 100,000 residents in rural areas. Some illnesses and chronic diseases, such as asthma, also go undiagnosed and untreated more frequently when compared to urban areas because of a lack of healthcare professionals, and training and education of illnesses (Smith, 2010; Ownby, 2005).

Rural communities also experience higher rates of obesity. Studies show that 20.4% of rural participants were considered obese compared to 17.8% of urban participants. Physical limitations are more prevalent among rural dwellers with 18.5% reporting a physical limitation compared to 14.1% in urban dwellers. Rural residents also had lower levels of physical activity. Twenty-one percent of rural respondents considered themselves to be inactive compared to 19.4% of urban respondents (Patterson et. al, 2006).

Accessibility to formal mental health services in rural areas is limited by geographic distance and travel time, the absence of public transportation, limited mental health service outreach, and problems of service reimbursement and program financing (Carscaddon, George, & Wells; Hargrove & Melton, 1987; Sommers, 1989). Buckwalter (1991) concluded, *“Little is known about the chronically mental ill elderly in rural areas, in part because of the lack of services designed to identify and treat community-dwelling rural elderly with long-term mental illness.”* If ADUs were permitted in rural areas, residents would lack mental health services more accessible in urban areas. Research also shows that rural elderly need more assistance from caregivers, and those receiving the care and the caregiver experience more burden for daily activities. Rural caregivers have fewer opportunities to health services for their patients and greater barriers to providing adequate and immediate care. Rural caregivers are also more likely to use informal support systems than their urban counterparts (Goins, 2008).

These barriers and burdens associated with basic services and medical care in rural areas is a consideration when assessing health levels in rural areas. Allowing ADUs in rural Benton County would subject individuals, though some willing, to these negative health impacts identified by previous research and literature. Studies showing higher levels of obesity, inactivity, physical limitations, and larger proportions of elderly

residents indicate a need to consider accessory dwelling units and other possible health promoting services and opportunities.

The Health Impact Assessment Approach

This assessment uses the Health Impact Assessment Approach to answer the broader research question of what impacts do ADUs have on rural health. HIAs are defined as a combination of procedures, methods, and tools by which a policy, program, or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population (WHO, 2005). Most HIAs are prospective and provide findings helpful to decision-makers in selecting options that most benefit health. Assessments are often multi-disciplinary efforts in that stakeholders and professionals from different backgrounds collaborate in identifying issues, determining impacts, developing mitigations and making final recommendations. The initial stages of the process also heavily encourage public involvement, usually in the form of focus groups, town hall meetings and citizen advisory boards (Lock, 2000). Figure 2 from Quimby (2004) shows the procedures of the HIA approach.

The HIA approach recognizes that there are many considerations that go into decision-making aside from health impacts. Reports are intended to inform decision makers about health promoting policy options through mitigations and recommendations. HIAs also look at how projects and policies affect certain disadvantaged populations and identify potential social inequities in existing conditions and proposed alternatives. A primary understanding amongst all HIAs is that “people’s income, their access to education, their conditions of work and leisure, their home, community, town or city environment

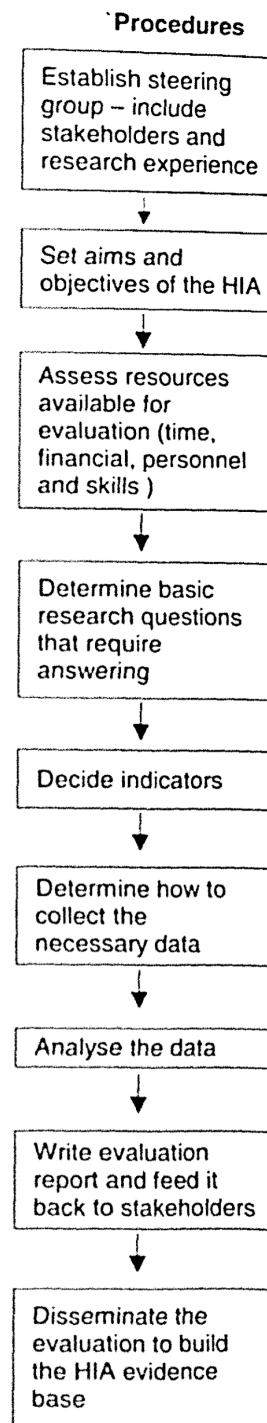


Figure 5:
Procedures of the
HIA process
(Quigley, 2004)

all influence their opportunity for a healthy lifestyle” (Metcalf and Higgins, 2009). The potential impacts identified by HIA are based on evidence collected from a variety of resources including peer-reviewed literature, professional expertise and accepted best practices (Human Impact Partners, 2010). Community participation is also a major component of the process and the public should be involved from identifying the problem to the project’s evaluation. Community members are seen as key stakeholders in public health and invaluable resources for guidance and local knowledge. Much of the data collected from the public is used as qualitative assumptions and considerations about health and the local policy. However, HIA is praised as a way to quantify health impacts by identifying health determinants and modeling impacts when several projects, plans, or policies are input into the model (Lerer, 1999). HIA can be completed for local, state, regional, national, or multinational projects and policies. They can also vary in their depth of analysis from looking at one aspect of health to every identifiable aspect of health. Some HIA examples are determining the health impacts of large dams, airports, watershed management, community redevelopment, or local jurisdiction budget plans (Lerer, 1999).

HIAs have been used more frequently in Europe than in the United States and much of the research on the effectiveness of the process comes from European studies. Some criticisms of HIA suggest that the influence that health impact assessment has on policy is more important than the accuracy of the predicted impacts (Quigley, 2004). The results of the models are also heavily dependent on the underpinning assumptions, raising concerns to test the robustness of the assumptions as new evidence becomes available (Gareth, 2009). Joffe and Mindell (2005) explains that HIA need “to be conducted with democracy and the ethical (that is, impartial and robust) use of evidence as central principles, as well as using equity and sustainable development to judge the impacts of the proposal; these four criteria are the “core values” of HIA. These values are particularly important when decision makers need to trade off benefits and dis-benefits, or when the former accrue to one.” However, HIA has been shown to be effective in supporting healthier decision-making (O’Connell & Hurley, 2009).

METHODOLOGY

This assessment uses a combination of quantitative and qualitative methods. The primary method is the use of the Health Impact Assessment Approach, commonly referred to as the Health Impact Assessment Framework, which was previously discussed in the literature review section. This methodological approach involves using the Healthy Development Measurement Tool (HDMT) to assess health impacts of multiple policy options. The HDMT is a set of community health indicators that have been proven through research and practice to measure community health levels (San Francisco Public Health Department, 2010). These indicators are measured with available secondary data such as census information and geospatial information system data. The unit of analysis in this assessment is the “community” as the available data represents the community level and no individual data is available.

Certain qualitative data is needed to better understand the assessment’s target population because the available quantitative data measures characteristics from the entire community. The target population includes those who would likely construct or dwell within an ADU. This necessary qualitative data was collected through several methods and is used where secondary quantitative data does not capture true health impacts of the policy options.

Study Area

The study area for this assessment is the unincorporated area of Benton County, including the communities of Alsea, Bellfountain, Blodgett, Wren, Kings Valley and Glenbrook. The area has a population of 24,611 residents, and represents 30.34 percent of the County’s total population (Census, 2006). The incorporated communities of Corvallis, Philomath, North Albany, Adair Village and Monroe are not included because these are not within the County’s jurisdiction. However, some information used to determine health levels and analyze policy options may include data from incorporated cities because alternative sources of information are not currently available. Figure 6 shows the unincorporated community within Benton County that is considered in this assessment.

If approved, ADUs would only be allowed on parcels with rural residential or urban residential zoning. Oregon state land use laws prohibit second dwelling units on certain

land uses outside of urban areas. These state laws are not easily changed and an amendment to the Benton County zoning code would require continued compliance with state laws. Therefore, this assessment only considers the parcels in the unincorporated county that are zoned for residential uses and may construct an accessory unit—not a secondary unit—in compliance with state law.

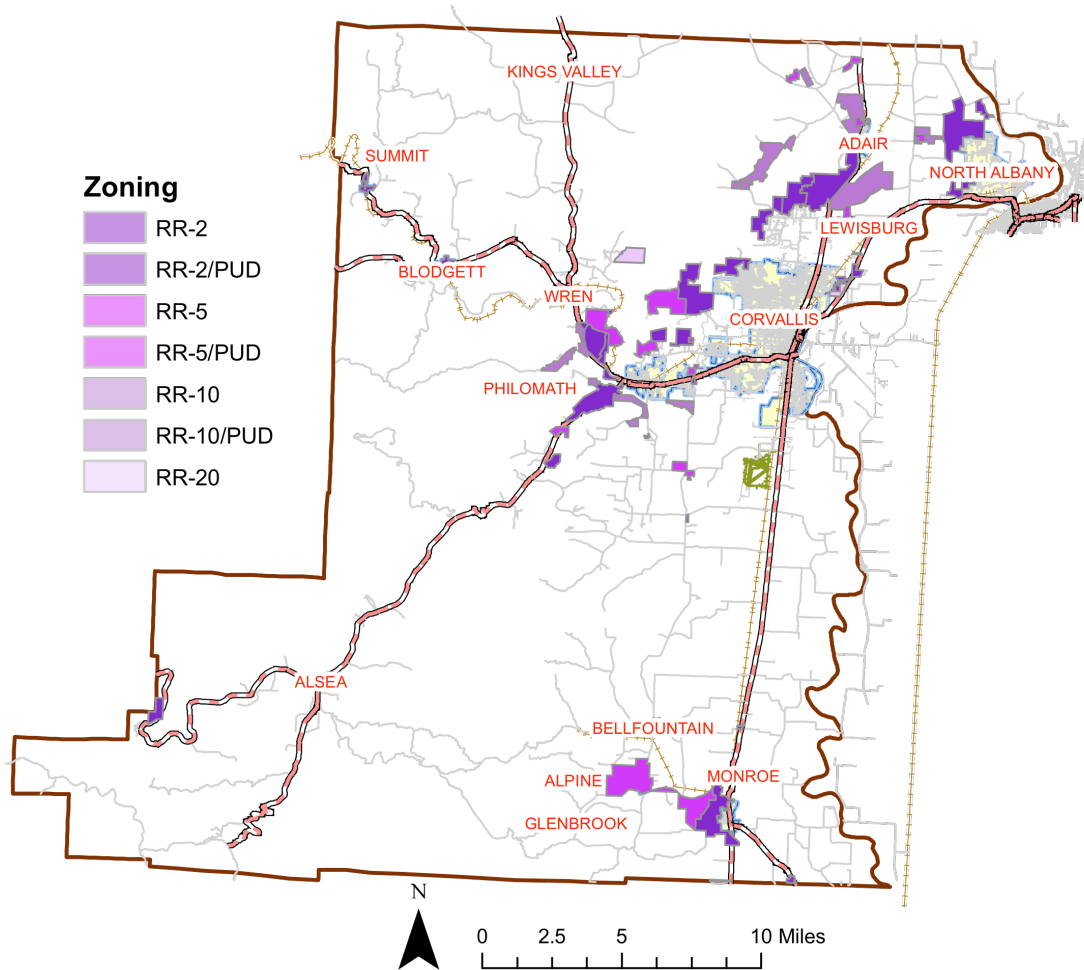


Figure 6: Map of the Benton County study area showing rural residential zones (Benton County Community Development Department, 2011)

Healthy Development Measurement Tool

The analysis stage of the HIA process is where policy impacts are measured and quantified. For this HIA, the Health Development Measurement Tool (HDMT) is used to collect the data necessary to measure and quantify the impacts. The HDMT was developed by the City of San Francisco Health Department in 2007 as a way to assess the impacts of land use plans and development projects on human health (San Francisco Department of Public Health, 2010). The tool is a set of metrics and indicators used to determine baseline levels of community health and the potential impacts of proposed plans and policies on those baseline levels. There are six elements of the tool that comprise what is considered to be a healthy city: environmental stewardship, sustainable and safe transportation, public infrastructure, social cohesion, adequate and healthy housing and health economy.

Each of the six healthy city elements has a set of measureable indicators that are accompanied with health-based rationales and potential health promoting mitigations. The health-based rationales are grounded in medical research and widely accepted medical theories of how the built environment affects human health. This assessment does not use all the indicators from each of the six HDMT elements, but rather focuses on four elements that captured the possible impacts of ADUs in Benton County. The elements used are healthy housing, access to goods and services, social and family cohesion, and transportation and mobility. Accessory dwelling units likely have impacts related to the other unused impact elements of environmental stewardship, public infrastructure and healthy economy. However, because of the scope and intent of the assessment the most relevant and impactful indicators were used.

The Healthy Development Measurement Tool was initially developed as a tool for identifying impacts in urban areas such as the San Francisco Bay Area. No similar tool has been developed for application in rural settings like Benton County. To adjust for the differences in location, modifications to the indicators were made to better reflect health impacts in a rural setting. These modifications were made in collaboration with Benton County Health Department Staff, Community Planners, and other local medical professionals through the qualitative data collection methods described in this section.

Accessory Dwelling Unit Policies Assessed

Five ADU policy options were created by the advisory panel that represent a range of permitted uses from restricting current regulations to allowing a complete accessory dwelling unit. The options are compliant with greater statewide land use regulations that the County does not have jurisdictional authority to change or dismiss. The options were selected because they are feasible in their implementation and enforcement by current county staff time and resources, and they capture the concerns and requests of staff and the public. The selected HDMT element indicators will be identified considering each of the five options to determine which policy options would have the greatest positive and negative impacts on health. Decision makers may decide to adopt one of the proposed policy options as is, or adopt an option with additional mitigations and alterations. The proposed policy options assessed are described below.

Policy Option One: No Policy Change

The first policy option is to take no action, or maintain the currently implemented development code allowing temporary medical hardship dwellings. Aside from being an option for decision makers, a “no change” is necessary to establish current baseline levels of health from which to compare other proposed policy alternatives. There are two elements to this policy:

Element A:

- Manufactured units allowed with documented medical hardship;
- Unit must be occupied by family members or a caretaker;
- Must be removed from the property once the need related to the hardship subsides.

Element B:

- Allow permanent attached or detached “guest house” or “satellite bedroom” unit;
- Does not contain complete kitchen and living facilities;
- The unit cannot be offered as a rental unit.

Policy Option Two: Restriction of Current Rules

The second option is a restriction of the currently implemented policy (option one) allowing temporary medical hardship dwellings and “satellite bedrooms” or “guest houses.” In this option, temporary medical hardship dwellings would still be allowed through the current permitting process but “satellite bedrooms” and “guest houses” would no longer be allowed. This option would not require removal of existing

secondary bedroom structures but rather would prohibit their approval and construction in the future.

Policy Option Three: Dependent Accessory Dwelling Unit

The third option to be assessed is an expansion of the current development code by allowing “dependent” accessory dwelling units. Under this alternative, the elements of option one would still be allowed and ADUs would be permitted with the following characteristics:

- Allow permanent attached or detached accessory unit;
- Either the primary dwelling or the ADU shall be occupied by the property owner;
- The unit may be offered for rent as approved through a conditional use permit (CUP) process;
- May contain kitchen, bathroom and sleeping areas that are completely independent from the primary dwelling.
- Unit considered secondary and subordinate to the primary dwelling, and together they are considered a single dwelling unit.

Policy Option Four: Independent Accessory Dwelling Unit

Policy option four is similar to policy option three; however, the allowed unit has fewer restrictions and is considered more “independent” in its allowed features and relationship with the primary dwelling. This option is considered the most liberal on the spectrum of options allowing the most freedom from current development code restrictions. Specifics of this policy alternative are:

- Allow permanent attached or detached accessory unit;
- Either the primary dwelling or the ADU shall be occupied by the property owner;
- The unit may be offered for rent as approved through a CUP process;
- May contain kitchen, bathroom and sleeping areas that are completely independent from the primary dwelling.

Policy Option Five: Independent Accessory Dwelling Unit with UGB Restriction

Policy option five is similar to policy option three in the type and uses allowed of independent ADUs. However, in this option independent units are only allowed within urban growth boundaries (UGB) and rural unincorporated communities. These areas are closer to existing urban services that are not available in the outer unincorporated parts of the County. This option is expected to have fewer negative impacts related to

accessibility of goods, services and public amenities compared to options two and three that do not restrict the location of units.

Quantitative Data Collection

Measureable indicators have been successfully used as a means to assess the health impacts of policy change. The health of each individual cannot reasonably be collected to show the overall health of a community. Individual health is also difficult to track over time as projects and policies are implemented within a community. Therefore, community-level information that is available and reliable can be used to predict health levels and temporal changes in health.

Indicators are measureable characteristics of a community that capture the health of that community through evidence-based assumptions and rationales. The indicator itself may not be directly related to health, but medical research has proved some connection between the characteristic and public health. A common example of a health indicator is community poverty levels. The health profession accepts that the more prevalent poverty is in a community, the lower the level of overall community health. Poverty is associated with decreased income for healthy food, safe and healthy housing, and educational opportunities—all of which have proven impacts on health (San Francisco Public Health Department, 2010).

The indicators developed under the Health Development Measurement Tool were used in this assessment because of their previous application on land use policy and built environment HIA projects. All indicator data collected is quantitative and from a secondary source. The sources are reliable, valid, and commonly accepted within the public health and policy-making professions.

The assessment uses seventeen indicators that were selected based on their relevance to the predicted health impacts of accessory dwelling units in Benton County. Data comes from multiple sources including the United States Census and the recently released Benton County Health Status Report. These sources can be accessed publicly on the Census website and the Benton County Health Department Website. Geospatial Information System data was also collected for those indicators that assess the distances of residents from goods and services. GIS layer data was provided by the County GIS services.

Health-Based Rationales for Indicators

Seventeen indicators were selected to determine health impacts for each of the five policy options. These indicators can be measured within the study area and may vary based on the changes in community composition that the policy options would impose if adopted. They are grouped into four impact areas that were selected by the project team and focus group participants. These impact areas were considered the most important to participants and relevant to the possible health impacts of ADUs in rural Benton County. These groups are healthy housing, access to goods and services, social and family cohesion, and transportation and mobility. Below are the health-based rationales explaining how the indicators are reflections of community health. The rationales are based on commonly accepted public health studies and data available through the HDMT. These indicators have been used in other HIAs that have accurately captured policy and project impacts on community and neighborhood health. A complete table of the indicators and health-based rationales is located in the appendices of this report.

Healthy Housing Indicators

There are four indicators that capture the health of the public related to housing opportunities. The project team selected housing as one of the impact areas to assess because current practice and existing literature has proven the positive benefits of ADUs as an affordable and alternative housing option in urban areas. Focus group participants also identified affordable and safe housing as an issue in rural Benton County. The healthy housing indicators measured in the assessment are:

1. Proportion of households paying more than 30% or 50% of their total household income on gross rent or mortgage
2. Proportion of housing unit types to housing need by household size and income
3. Proportion of households living below the poverty line
4. Proportion of households living in overcrowded and substandard conditions

These indicators capture certain aspects of community health affected by the cost and quality of available housing. The cost and quality of a household's housing unit has proven impacts on health. Spending too much on housing results in a loss of income for other uses such as healthy food options, transportation and utilities, health care, and recreational activities (Cohen, 2007). Overpaying for housing can also result in an inability to make mortgage and rent payments, which can cause anxiety and force

households to relocate to more affordable communities. Households paying too much for housing may also accept substandard housing conditions or live with other households resulting in overcrowded conditions (San Francisco Department of Public Health, 2004).

There are several adverse effects associated with households living in housing units that are not appropriate to the household's size and income level. Households residing in too small or unaffordable units because of a lack of single-family affordable housing can experience overcrowded and substandard living conditions. Overcrowding and substandard conditions increase anxiety and conflict between family members, increase the risk of infectious and respiratory diseases, and are associated with decreased academic performance for school aged children. Overcrowding and substandard housing also have a direct relationship to poor mental health, developmental delay, heart disease, and other chronic medical conditions (Bashir, 2002). Lack of affordable housing can also lead to homelessness. Homeless persons have higher risks for other ailments and have age adjusted death rates four times higher than the general population (Barrow, Herman, Cardova , Stuenkel, 1999). Homeless children also face depression, behavioral problem and poor academic performance (Zimba, Wells, Freeman, 2004).

Access to Goods and Services Indicators

Access to goods and services was identified as a concern to community members and a barrier to living in rural areas of Benton County. Distance to goods and services, especially health services, has adverse impacts on health. The five indicators in this group are measured to determine the distance of rural dwellers to basic health-promoting services and amenities. The greater the distance, the greater the imposed burdens on health. Close proximity to goods and services is particularly important to likely residents of ADUs, such as the ill, aging, or disabled, because they have decreased mobility and independence. The indicators measuring access to goods and services are:

1. Proportion of households within ½ mile of a public school
2. Proportion of population within ½ mile of a public park or recreational facility
3. Accessibility of full-service grocery store/supermarket
4. Average distance to the nearest hospital, urgent care clinic, or other medical facility
5. Accessibility to Senior Centers

Schools, parks, supermarkets, and health facilities are basic amenities that promote individual and community health. If a child lives far from their school they are less likely to walk to school and are more likely to be taken in an automobile (Delliger and Staytib, 2002). Children attempting to walk long distances, which include children of lower income families without access to a car, are exposed to the risks of dangerous traffic and outdoor hazards. These become barriers to walking to school, which reduces the opportunity for children to receive their recommended daily physical activity (Ewing, Shroeder, Greene, 2004). The proximity of a child's residence to a park is related to the amount of daily physical activity that child receives (Bauman and Bull, 2007). Physical activity decreases the likelihood of childhood obesity, diabetes, and respiratory illnesses and increases physical development and health. Regular physical activity also increases academic performance (Nelson & Gordon-Larson, 2006).

The food options available in a community greatly influences the diet and overall health of community members. In many rural areas, households must travel long distances to access grocery stores. Having to travel long distances for healthy and affordable food options increases the cost associated with healthy eating. Healthy eating habits reduce the risk of obesity, lowers body mass index (BMI) and improve the overall quality of individual health. Evidence suggests that having a supermarket in a neighborhood increases the fruit and vegetable consumption for individuals in that neighborhood (Morland, Diez, Wing, 2004; Inagami, Cohen, Finch, 2006). Close stores within walking distance also provide opportunities for people to receive daily physical activity by walking to the store instead of driving in an automobile. Research shows that increasing the distance one has to travel to a supermarket increases body mass index (Drewnowski, Darmon, Briand, 2004).

Access to health care services is directly related to the prevention of chronic illnesses, lower hospitalization rates and improved overall individual health (Epstein, 2001). The further the distance from one's home to a medical facility increases the difficulty and costs barriers of receiving care. The elderly, disabled, and lower income households that do not have access to an automobile must rely on public transportation or friends and family to visit a clinic. These burdens may result in disadvantaged populations not receiving regular and needed medical attention. Living closer to hospital and urgent care facilities also decreases the time needed to receive emergency medical attention

which reduces the risk of mortality associated with serious injuries and unexpected illnesses. Very rural areas also have longer first-responder response times that are associated with survival rates for serious medical emergencies (Gonzales, 2009).

Senior centers provide a range of services and activities targeted towards the health and well being of senior citizens. Interaction with other seniors through activities and socializing increases the happiness and quality of life for many seniors who are otherwise isolated in their living situations. Center staff members can also assist seniors with identifying potential medical concerns, accessing housing and transportation options, and identify possible elderly abuse or other serious health risks (Corvallis Senior Center Representative, 2010). Senior centers also provide affordable and healthy meals. For elderly individuals on fixed incomes these meals are important contributors to their healthy diets and eating habits. Wellness classes, counseling, and physical activities also support the mental and physical health of senior citizens. Senior center staff members recognize that wellness programs that keep seniors active contribute to improved overall health, decreased risk of injury, increased mobility, and keeps seniors out of long term care facilities and in their own homes until later in life (Brand, 2010).

Social and Family Cohesion Indicators

Those requesting ADU permits in Benton County cite a need to care for an ill, aging or disabled family member. These residents desire having their relative close to provide care and maintain a family unit while still providing some independence and privacy. The project team selected four indicators intended to capture a need for ADUs in rural areas to accommodate social and family arrangements. These indicators were developed specifically for this assessment and did not originate from the Health Development Measurement Tool. The HDMT did not include any indicators that addressed the specific characteristics of social and family cohesion related to ADUs. The selected indicators come from other research related to family cohesion and through discussions with Benton County Health Department family and mental health specialists. The indicators measured are:

1. Proportion of households with a resident over the age of 65
2. Proportion of households with a disabled resident
3. Proportion of households with grandparents as caregivers of children
4. Mortality rates due to suicide by age and gender

Elderly households and individuals are often immobile, on fixed incomes, and have health conditions that require regular medical attention. High housing costs result in reduced income for other essential needs such as healthy food options, medical care, transportation, heating and utilities and recreational purposes (San Francisco Department of Public Health, 2004). Immobility leads to isolation in one's home; isolation causes depression and increased mortality rates (House, Landis, Umberson, 1988). Not receiving regular social interaction leads to several medical concerns including depression and poor dietary intake (Beauchene, 1991). Permitting ADUs would allow caregiver accommodations to provide constant care and companionship. An elderly individual living in an ADU on a relative's property would reduce isolation and financial barriers to housing and care.

Disability encompasses a range of conditions—medical, physical, social, emotional, and societal. Generally, people with disabilities have increased health concerns and susceptibility to secondary conditions. For example, people who have activity limitations report having more days of pain, depression, anxiety, and sleeplessness and fewer days of vitality compared to people who report not having activity limitations. Additionally, people with disabilities may experience disadvantages in health and well being compared to the general population. They may experience lack of access to health services and medical care, which may impact their health status (Benton County Health Status Report, 2010). Households with disabled residents are more likely to benefit from the social cohesion impacts of ADUs. Family members or caretakers can more easily provide the care to keep disabled family members more active, provide transportation assistance to access good and services, provide companionship and socialization, assist in medical care or provide reliable access to medical services (Smith, 2010).

When parents are unable to care for their children, grandparents often become primary caregivers and usually with great physical and financial sacrifice (Carbonell, 2010). Out of home care, such as foster and group homes, is associated with several childhood developmental challenges such as behavioral disorders, aggression and attachment of relationships (Dupree, 2002). Frequent relocation of youth in foster care results in a lack of connection with a place, poor school performance, difficulty making and keeping friends, and stress and anxiety (Crowley, 2008). Research shows that children raised

solely by grandparents do not have significant developmental difference than children raised in traditional households (Solomon and Marx, 1995).

Measuring the suicide rate of the elderly also captures a need for housing that promotes socialization and family. As elderly individuals age, they often lose spouses and long time friends to death or serious illness. This can lead to isolation, anxiety, depression and an overall reduction in the quality of one's mental and physical health. Elderly individuals can also become depressed because of financial struggles to maintain their homes, decrease physical health and mobility, and fear of the end of life process (Smith and Segal, 2010). Elderly individuals are among the largest age groups experiencing high suicide rates; the highest suicide rates occur in those 65 years of age and older (United States Department of Health and Human Services, 2010). Companionship and social interaction is a realistic way to battle isolation and improve the mental health of aging persons. Research shows that widowed elderly living alone where more likely to commit suicide than widowed elderly who do not live alone (El-Nimr, 2010). Accessory dwelling units would provide living spaces for elderly near loved ones or caregivers, reducing isolation, and ultimately depression and potential suicides.

Transportation and Mobility Indicators

Permitting ADUs in rural areas allows increased residential units in areas that have poor access to public transportation and increase reliance on private automobiles. These become significant barriers to likely residents of ADUs that may not have the physical, mental, or financial access to an automobile. For those individuals that are able to drive independently, there are many negative health impacts associated with frequent driving. Community members and project team members considered transportation and mobility areas for assessment. Rural community members identified burdens of long trips to work, medical services, and food stores and a lack of public transit services. The transportation and mobility indicators are:

1. Household access to a private automobile
2. Average vehicle miles travelled by rural Benton County residents per day
3. Average minutes travelled to work per day by rural Benton County residents
4. Access to public transportation services
5. Proportion of commute trips made by driving alone

Research suggests that having an automobile is directly related to increased daily vehicle trips and fewer trips made by public transportation (Golob, 1987). Auto

dependence causes decreased physical mobility, which contributes to the risk of obesity, diabetes, respiratory problems and an overall reduction in one's health. The costs associated with car ownership also consume income that could be used for other health promoting purposes such as healthy foods options, health care, energy and utilities and recreational uses. Spending more time in one's car and driving longer distances also increases the risk of automobile accidents and car related deaths (Lourens, Vissers, Jessurun, (1999). Research also shows that the more time spent in the car increases a person's risk of obesity. Auto-dependence and high driving rates increases vehicle emissions, which is associated with lung and respiratory disease, cardiovascular disease, increased hospitalization rates, and non-fatal heart attacks (United States Environmental Protection Agency, 2001).

Research shows that people who use public transportation are more likely to get their required levels of daily physical activity compared to those that do not use transit (Besser and Dannenberg, 2005). Walking and biking to and from transit stops increases physical activity and reduces time spent in a private automobile. Health benefits of walking and biking include reduced risk of colon cancer, hypertension, heart disease and diabetes. Increased physical activity also decreases one's risk of obesity and improves overall quality of health (Community Preventative Services, 2001).

Qualitative Data Collection

Qualitative data was collected to assess health impacts that could not be identified by the quantitative indicators. Qualitative data was also used where measurable evidence could not accurately or completely explain impacts. The data was collected by gathering public comments from community meetings, interviewing local medical and health professionals, and consulting the project's HIA advisory panel. Qualitative data is presented in the HIA through the "findings and considerations" listed under each indicator analysis. They are formatted as general statements rather than directly quoted comments or transcripts. The statements summarize or reflect the information received from public focus groups, advisory panel discussion, and interviews with local specialists.

Strengthening Rural Families, a local nonprofit agency, was selected to organize two community meetings on rural housing and health issues. The organization was selected

because of its previous work on housing issues and established connections with local community members and stakeholders. The primary purpose of the meetings was not to discuss ADUs, however, portions of both meetings involved the participants in voicing their opinions and ideas related to ADUs. No names or personal identifiable data was collected to link comments to a particular individual. Participants were informed about the purpose of the HIA and that involvement was voluntary and confidential.

Strengthening Rural Families provided general comment lists and results from the meeting's "brainstorming" activities as secondary qualitative data for the assessment.

The first community meeting was held in the City of Monroe in south Benton County. The event was a town hall meeting format, allowing residents to discuss housing related issues including affordable housing, healthy housing, sanitation and sewer services and accessory dwelling units. Those in attendance included County Health Department employees, local homeowners, renters and owners of rental properties in South Benton County. The second community meeting was held in the unincorporated community of Alsea in western Benton County. The meeting followed a "community café" format (HIA Advisory Panel, 2010), which involves assigning small groups discussion topics to identify issues and opportunities for solutions. The topics discussed were the indicator categories used in this assessment: housing, access to goods and services, social and family cohesion and transportation. The housing groups also discussed the benefits and health impacts of ADUs. Because the meetings were not traditional focus groups, individual transcription was not produced. Instead, general notes were taken and overall comments and concerns were generated through the meetings' activities. These notes, comments, and concerns were used in the health impact assessment analysis as qualitative data.

The two meeting locations were selected because of their relative dispersion within the study area. Alsea is an unincorporated community that would be directly impacted by a change in County zoning policies. Monroe is an incorporated city that is not within the jurisdiction of Benton County's zoning regulations. However, this location was selected to reach the residents of the unincorporated parts of South Benton County surrounding the City of Monroe. Meeting locations were also limited because of available meeting venues and both Alsea and Monroe had suitable accommodations for public meetings.

Additional qualitative data was collected through interviews with local professionals and specialists. Some of those professional interviewed include members of the HIA advisory panel, Benton County Health Department staff members, local health workers, and coordinators of community and nonprofit services. These interviews were conducted one-on-one and included detailed transcription and quoting that could be used in the impact assessment where the indicators could not provide quantitative data. The interviewees were not asked personal questions about their opinions or experiences with ADUs. Questions were limited to determining their professional opinions about health impacts related to living in rural areas. All interviewees participated voluntarily and were informed of the project's purpose, how their comments would be used, and that they will likely be quoted or cited within the final report.

Qualitative data collected from the HIA advisory panel meetings was also documented for use in impact assessment and establishment of current health levels. The HIA advisory panel was formed when the project was initially funded. The panel's purpose was to provide guidance on the project's overall direction and professional expertise on local health issues and zoning regulations. Members were informed that their comments and contributions to the assessment would be used and cited within the assessment and its report. No personal comments and experiences were solicited and discussion was limited to the panel's professional opinions about the assessment. Advisors were selected to participate because of their knowledge in public health, rural impacts, and land use regulations. The advisory panel members are:

- Chris Bentley (co-project lead), Senior Planner, Benton County Community Development
- Mac Gillespie (co-project lead), HEAL Coordinator, Benton County Health Department
- Patricia Parsons, Chronic Disease Prevention Coordinator, Benton County Health Department
- Jacqueline Rochefort, Park Planner, City of Corvallis Parks and Recreation
- Robert Richardson, Associate Planner, City of Corvallis Community Development
- Jo Morgan, Bicycle and Pedestrian Coordinator, City of Corvallis Public Works
- Kristin Anderson, Associate Land Use Planner, Benton County Community Development
- Mark Peterson, Engineering Associate, Benton County Public Works
- Holly Fellows, Health Impact Assessment Intern, Benton County Health Department

Ranking Impact Magnitudes

Each indicator is ranked for its potential impact on health once the quantitative and qualitative data have been measured. The rankings order the indicators from having the most impact on health to the least impact on health. Indicator rankings are looked at cumulatively to show which policies have the greatest or lowest positive and negative benefits on health. Policies with high measures of negative health indicators will be considered to have a negative health ranking. The higher the negative measures, the higher the negative ranking. The rankings are also based on the information provided in the existing conditions, considerations and assumptions, and future projections. Therefore, a policy may have very high measures of positive indicators but existing conditions and assumptions show that those specific issues may not be fairly represented in the study area.

The HIA team considered these factors and ranked the impacts on a scale including low impact, moderate impact, and high impact. The impact may be positive or negative, and in some cases there is no impact where the policy would not affect current health levels. While these rankings are based on the informed judgments of the team members, quantitative analysis was used where available.

Measuring Total Projected ADUs Annually

In 2006 there were approximately 20,441 detached single-family dwelling units in Benton County, an estimated 8,437 of which are located in the unincorporated parts of the County. Existing literature suggests that there will be one ADU created per year per 1,000 detached single-family units (Hare, 1991). If this estimate is correct, Benton County can expect to have approximately 8-9 units constructed annually. For the purpose of this assessment, it will be approximated that the County will have 8 units created annually.

One limitation to findings from existing literature is the unknown differences in permit requests among urban and rural places. It is not known whether rural counties like Benton County will have more or fewer requests than the urban jurisdictions where these studies were conducted. To test the reliability of the literature, the projections were compared to permit requests in Douglas County, Oregon where an ADU policy is currently implemented. In 2007, there were 20 ADU permits on file for residences in

resource zones. That number dropped significantly in 2008 and 2009 to 6 and 4 permits on files, respectively (Douglas County Planning Department, 2010). A planner suggested the economic downturn could have contributed to fewer permits and building projects. Douglas County also allows ADUs in rural residential zones that meet density requirements. The number of those permits was not known but estimated to be similar to requests in resource zones. Averaging the three years, and assuming that residential rural ADUs are the same as resource zone permits, Douglas County had approximately 20 permits annually.

Douglas County has approximately 17,807 detached single-family dwelling units. If the literature projections are correct, Douglas County should have around 18 units annually. This comparison suggests that the literature projections are fairly accurate, but perhaps slightly underestimated in rural areas similar to Benton County.

Another way to project future ADU permitting is to look at the number of ADU inquiries from Benton County residents in the past. The County Planning Director estimated 10-15 inquiries annually. It is not known if those parties would have completed a permit if ADUs were allowed, but this figure provides insight into potential demand. The projected 8 permits is below annual requests, however could be feasible assuming that not every homeowner that requested information would build a unit (which is often the case for other projects requiring permits).

Projecting ADUs in Urban Growth Boundary Areas

Option Five allows ADUs in urban growth boundary areas only. This option, if implemented, would have fewer permit requests because of the restricted location and number of units where ADUs would be permitted. There are 3,520 total housing units in UGB areas, of which, approximately 2,816 are single-family detached homes (Census 2000). Using the projection of 1 ADU permit request per 1,000 single-family dwellings, an estimated 2.8, or roughly three units can be expected annually. This projected figure will be used throughout the report when assessing the impacts of Option Five.

Temporary Medical Hardship Trailers

Total County fees for a medical hardship manufactured home is \$455. In 2009, the permitted temporary medical hardship trailers ranged in square footage from 1,248

sq.ft. to 1,848 sq.ft. with an average of 1,670 sq.ft. If the property is in the school excise tax area, there is an additional \$1/sq.ft. The tax applies to properties within the Corvallis, Monroe and Albany school districts. Properties in the Philomath and Alsea school districts are not required to pay an excise fee. With the average manufactured home being 1,670 sq.ft., this would mean a total fee, including the school tax, of \$2,125 (Benton County Development Department, 2010). The costs of constructing and removing the trailers are a consideration when determining the affordability of existing options.

Newly Constructed Accessory Dwelling Units

County fees for new residential units, including ADUs, are based on value but are typically \$1.50/square foot. For example, and 800 square foot would have a total building permit fee of \$1,200 (\$1.50 x 800 square feet). New buildings and additions are also subject to the excise school tax of \$1/square foot where applicable. An 800 square foot ADU in a school district with a school tax would have a total of \$2,000 in taxes and fees (\$1 x 800 sq. ft + \$1,200) (Benton County Development Department, 2010). The costs of constructing ADUs are a consideration when determining their affordability and impacts on affordable housing.

Data Limitations

There are several limitations that may affect the validity, reliability and application of this assessment to other studies. Limitations have been addressed where possible and disclosed to fully inform decision makers of the restrictions of the document.

Limitations include:

- Lack of current data- most existing condition information was collected from 2000 Census Data sets. 2006 Census data was used where available.
- Lack of data on the unincorporated areas of Benton County- most of the data available on existing conditions and health levels is for the County as a whole including the incorporated cities not included in the HIA study area.
- Lack of accessory dwelling unit literature focused on rural areas- literature sources on the benefits of ADUs is generally written from an urban context.
- Lack of quantitative data on policy impacts- policy effects on health indicators can only be estimated because the true number of ADU permit requests is not known. Permit projections are used to quantify impacts where appropriate.
- Dependence on qualitative data- some information used to analyze policy options comes from the qualitative data collected at community meeting and advisory panel meetings. While valuable, qualitative data cannot be used to measure the specific impacts of certain indicators.

RESULTS

Healthy Housing Findings

Accessory dwelling units were determined to have low to moderate positive impacts on health issues related to housing. Indicator measurement show that the unincorporated areas of Benton County have a high portion of households, approximately 30%, that are considered “housing burdened” because they spend more than thirty percent of their total household income on housing costs. This shows a need for more affordable housing, which ADUs can provide. The study area also has significantly higher proportion of single-family homes, 80.1%, compared to other incorporated areas. The unincorporated County also has the highest percentage of mobile homes (13.25%) suggesting a possible need for more affordable housing options. Benton County has a smaller overall poverty rate when compared to the rest of the state. However, in 2000, an estimated 14% of County residents were food insecure, compared to 12.6 percent statewide. In the same year, 5.6% of individual were food insecure with hunger compared to 4.9% in the state (Oregon Rural Communities Explorer, 2010). These figures show a problem of individuals affording basic food and healthy food options on a regular and reliable basis. Over 29% of students in Benton County school districts are eligible for free or reduced lunches with almost half of students in the Monroe School District qualifying for lunches.

These community indicators show that the population would benefit from more affordable housing options. However, after the assessment, ADUs were considered to have only a low to moderate impact on health related to healthy housing because of several other considerations. First, the projected number of units constructed if permitted is only 8 units annually. This represents less than one tenth of a percent of the County’s total housing stock, or 0.0002% annually. Even if the impacts on housing are considered over a ten-year period, permitting ADUs would still have less than one percent impact on the existing housing stock. Another consideration is that the high costs of development and permitting, excludes many-cost burdened homeowners from constructing and renting ADUs for additional income assistance. The small size of ADUs makes them less suitable as rentals for lower income renting families. The public at community meetings discussed the lack of affordable housing, but did not consider ADUs a suitable alternative and many mentioned a concern over neighbors potentially

renting their ADUs to college students or multiple individuals. The units, especially the larger independent ADUs, may improve health if rented, but county staff and most stakeholders do not want ADUs used for rental purposes. For these reasons, ADUs are not a viable solution to affordable housing shortages.

Of the policies assessed, Policy Option Five was determined to have the greatest positive impact on the health issues associated with housing. Option Five allows the largest and most independent unit compared to the other options. It is most likely that a family needing an affordable or safe housing option would dwell in this type of ADU.

Conversely, Option Two would have the greatest negative impact on health. This option would remove current regulation that allows medical hardship trailers and “satellite bedrooms.” These currently allowed units have some positive benefit on health. If no longer permitted, the community would be adversely impacted by the policy.

Access to Goods and Services Findings

Accessory dwelling units were determine to have an overall negative impact on health related to the issues of access to goods and services. If ADUs were permitted, residents would be residing in locations considered outside of a healthy range to basic goods and services. Ill, aging and disabled residents would also have increased barriers to these health-promoting amenities. Figure 7 to Figure 10 are GIS maps generated for this assessment show the indicators of distance to schools, parks, food markets, and medical facilities. Table 1 shows the percentage of rural residential units within 1 mile and ½ a mile from amenities. The percentages are low within the walking distances of ½ a mile, but are considerably larger within 1 mile. Unit percentages are significantly higher when only considering units within urban growth boundaries, as would be the case under policy option five.

Table 1: Percentage of Unincorporated Residential Units within ½ and 1 Mile of Amenities (Benton County GIS Data, 2010)

	All unincorporated areas		Unincorporated areas in UGB	
	½ miles	1 mile	½ mile	1 mile
Schools	11.46%	40.22%	56.1%	80.56%
Parks	5.5%	11.27%	10.8%	19.6%
Food Markets	9.6%	21.3%	22.6%	52.7%
Medical Facilities	12.13%	22.27%	33.6%	58.2%

Option Two, a restriction on currently permitted uses, would have the most positive impact on health. By prohibiting any additional medical hardship trailers or satellite bedrooms, no fewer residents would be living farther from goods and services. If permitted, Option Five would have the greatest negative impact on health because larger, more independent ADUs would accommodate more residents and households with children. This option would encourage an increase in population where access to goods and services are limited when compared to the more urban areas in Benton County.

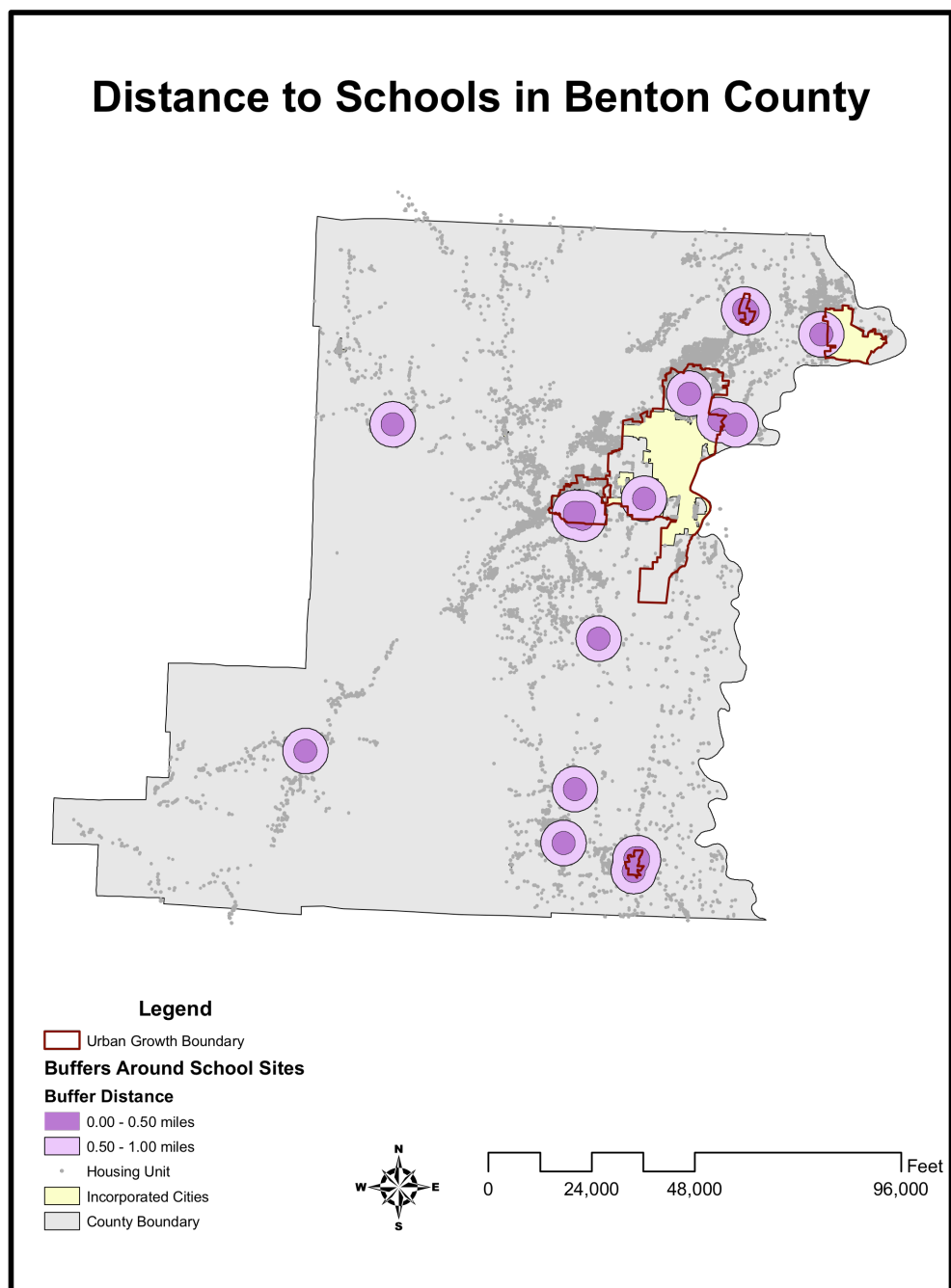


Figure 7: Distance of rural residential units from schools (Benton County GIS Data, 2010)

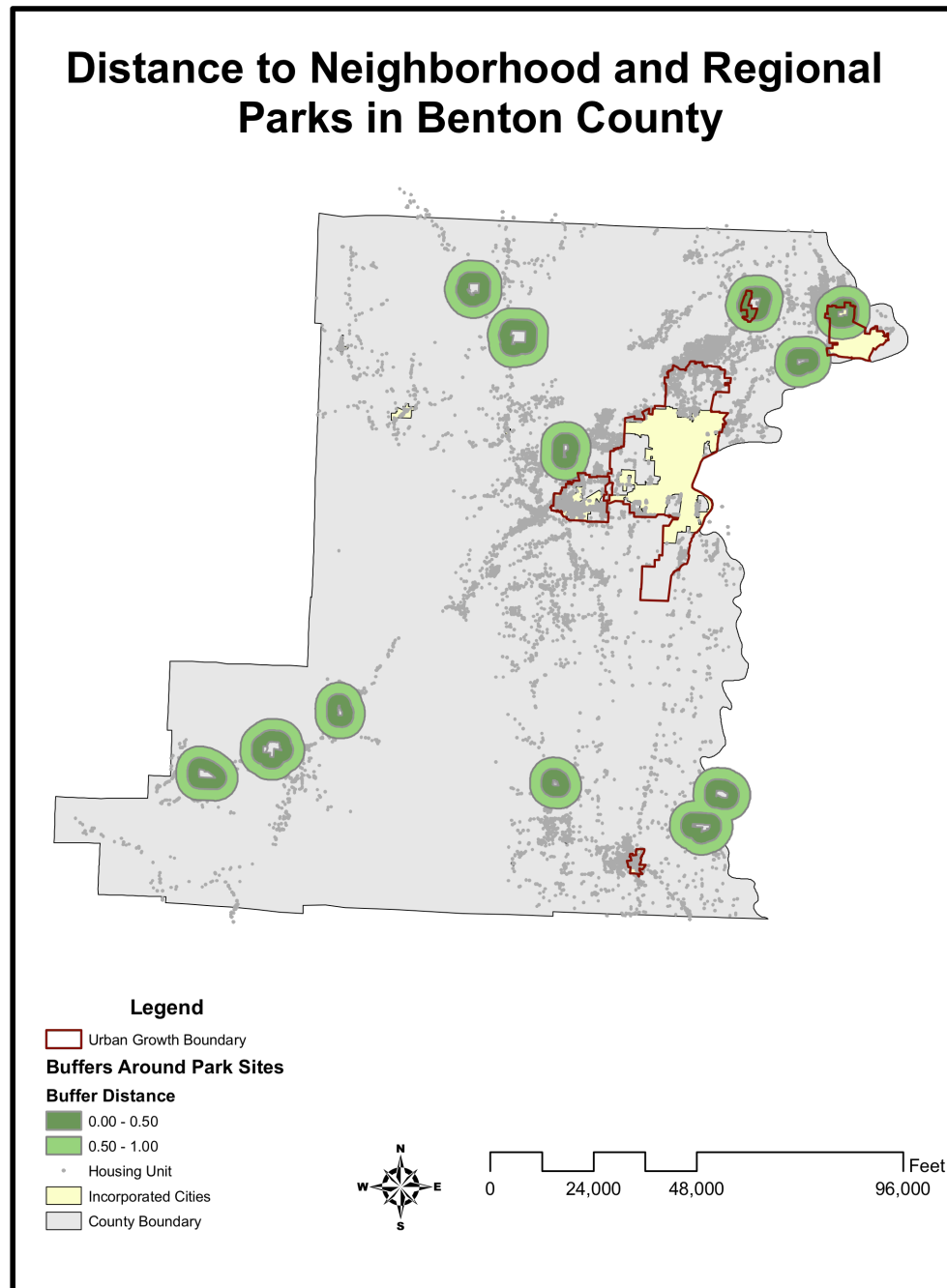


Figure 8: Distance of rural residential units from regional and community parks (Benton County GIS Data, 2010)

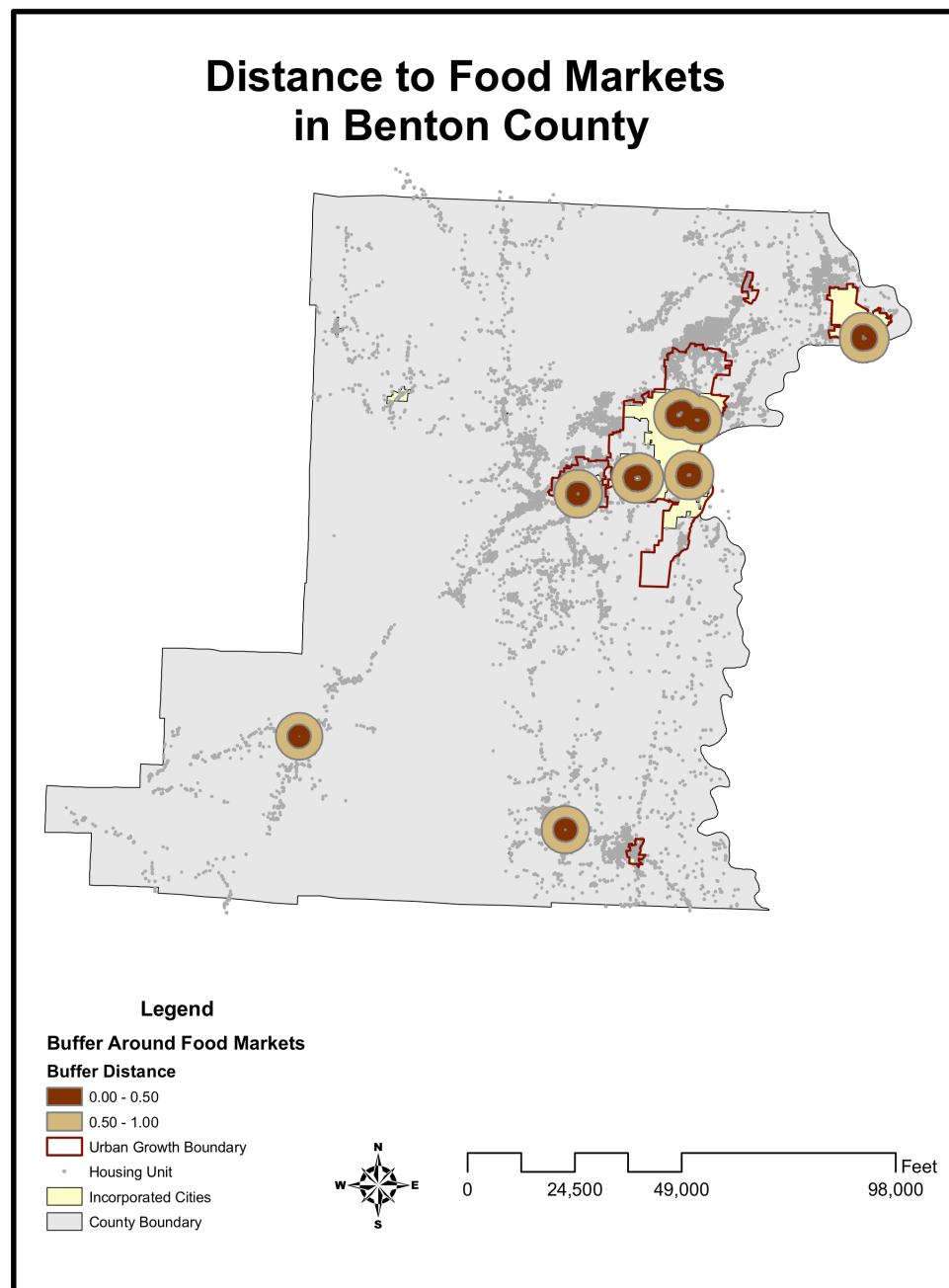


Figure 9: Distance of rural residential units from food markets (Benton County GIS Data, 2010)

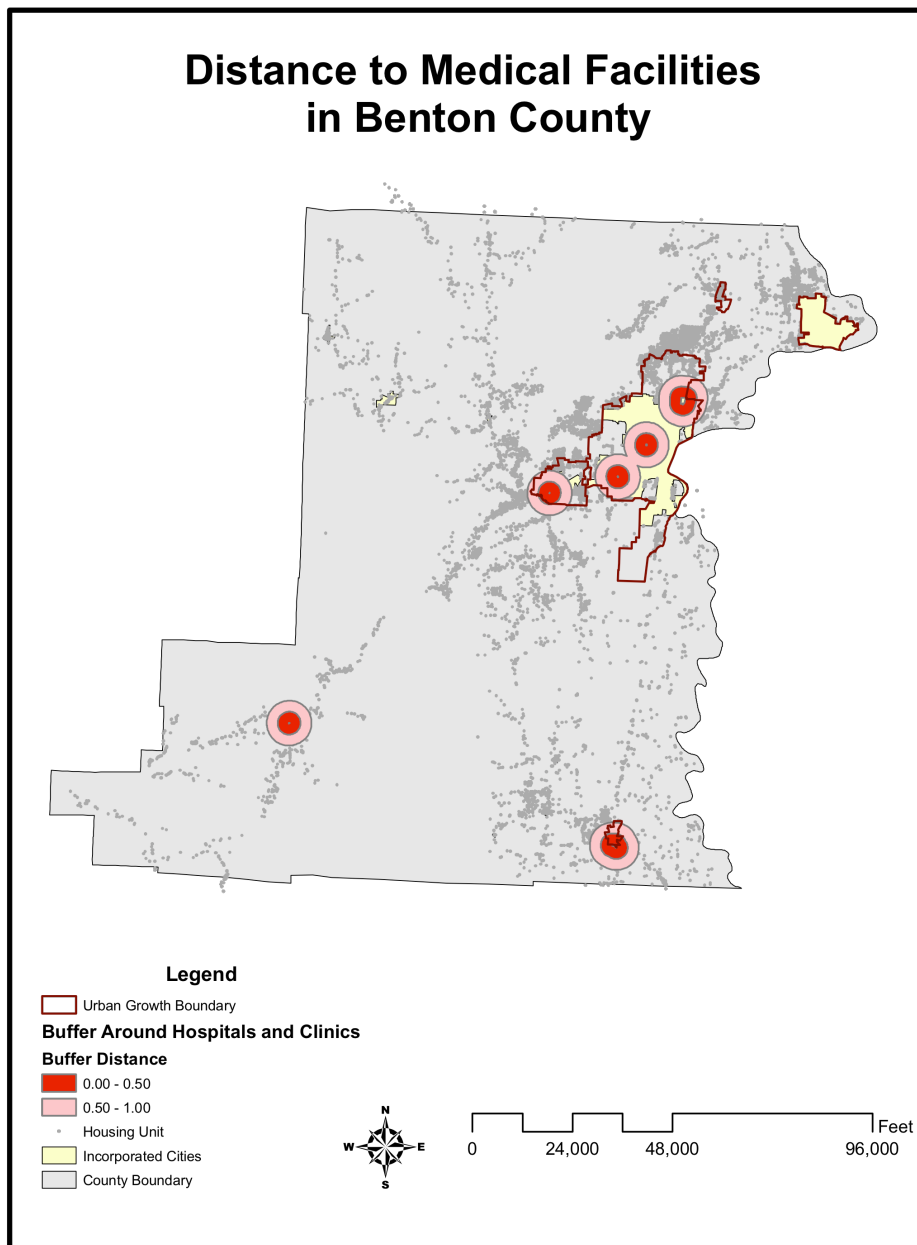


Figure 10: Distance of rural residential units from medical facilities
(Benton County GIS Data, 2010)

Social and Family Cohesion Findings

Allowing ADUs would have a high benefit to health in rural Benton County. The indicator measurements show a need for ADUs to provide health benefits related to social and family cohesion. The unincorporated County has the largest proportion of households with a person over the age of 65 at twenty-two percent when compared to the incorporated cities averaging approximately sixteen percent. However, according to Census data (2000), the unincorporated county had a smaller percentage of disabled persons (12%) compared to the incorporated cities ranging from 12 to 18 percent. This could be attributed to the lack of housing accommodation for disabled residents in rural areas. Elderly men in Oregon over the age of 75 have the highest suicide rates compared to any other age group or gender. Information specifically for Benton County is not available, but approximations are likely equivalent to the statewide rates. These indicators show a likely need for ADUs to increase and encourage social and family cohesion in rural areas. It is also noteworthy that there are currently 62 existing temporary medical hardship trailers in the unincorporated Benton County. These units represent households that might benefit from an ADU.

ADUs would provide positive benefit to public health issues relating to social and family cohesion especially when they are prohibited from use as rentals. ADUs provide living spaces for disabled, ill, or aging family members near relatives or caregivers. They provide a more comfortable alternative to care than elderly nursing facilities. Aging homeowners can remain in their home toward the final stages of life with the assistance of a caregiver on site. ADUs also promote multigenerational housing arrangements and a stronger family unit. The unit's permanence is also financially beneficial to homeowners and preferred by the public for aesthetic reasons. Unlike temporary medical hardship trailers that require an initial cost and then must be removed after use, ADUs would remain after use and would contribute to the value of the home. The unit could also be used for more than one person's medical need, as some families experience medical hardships more than once and would benefit from not having to remove a temporary trailer. For these reasons, accessory dwelling units provide significant positive benefit to health. Mitigations can be implemented to ensure ADUs benefits to health.

Policy Option Three would have the greatest positive benefit to health. This ADU type will likely house ill, aging, or disabled persons in need of family support and socialization. Policy Option Two would have the most negative impact on health if adopted because it would restrict existing arrangements that provide some family care for persons with medical hardships.

Transportation and Mobility Findings

The transportation and mobility indicators show that ADUs would have a negative impact on health because of a greater dependence on the automobile. The indicator measurements show that only .01% of households in the unincorporated County do not have access to a private automobile (Census, 2000). A review of available transit services in rural areas also shows that rural dwellers are heavily dependent on automobiles with longer commutes to work and higher vehicle miles travelled annually. These indicators would suggest that ADUs would have a high negative impact on health related to the issues of transportation and mobility. However, there are several assumptions made about the characteristics of ADU residents in Benton County that make the impact low to moderate.

Rural ADUs would be farther away from amenities in urban areas (as assessed in Access to Goods and Services Indicators). However, the predicted and preferred residents of ADUs will not significantly contribute to County driving levels. ADU residents are likely aging persons or persons with disabilities, both populations that are not considered daily commuters and would not require high auto dependence. A possible scenario is that ADUs would increase health if family members who make frequent trips to visit loved ones in care facilities would no longer have to make those trips. However, despite these benefits, ADUs in rural areas would have a negative impact on total auto dependence in the County. A lack of pedestrian and bicycle infrastructure in the unincorporated county also discourage residents from walking that may live within walking or biking distance to certain amenities.

Policy Option Two would have the greatest positive benefit to health. Like the other impact groups, restricting current regulations would limit the number of new units allowed in rural areas. Persons would be discouraged from living in rural areas with high auto dependence and a lack of public transit services. Policy Option Five would

have the most negative impact on health, as larger ADUs would allow more individuals living in areas dependent on automobiles without investments in transit services.

Summary of Overall Impacts

Table 2 below summarizes the impacts of each policy option on the indicators of health for rural Benton County residents. A “+” symbol indicates that the policy has a positive effect on the indicator and would positively affect health. A “-” symbol denotes a negative effect on the indicator and a negative impact on health. A “*” symbol indicates that the policy has no impact on the indicator or that the effect is not significant enough to impact health.

The rankings for each policy are summed under the four categories. These numbers should not be compared category to category as some categories have more indicators than others. The accumulated scoring can be used to compare policies against each other in the last row of Table 2. The scoring totals are purely comparative, and do not represent a quantification of the policies impacts.

Table 2: Summary of Policy Impacts on Health Indicators					
	Policy Options				
Indicator	One	Two	Three	Four	Five
Health Housing	0	-4	5	8	4
HH.1: proportion of households paying more than 30% or 50% of their total household income on gross rent or mortgage	*	-	+	++	+
HH.2: proportion of housing unit types to housing need by household size and income	*	-	+	++	+
HH.3: Proportion of households living below the poverty line	*	-	+	++	+
HH.4: Proportion of households living in overcrowded and substandard conditions.	*	-	++	++	+
Access to Goods and Services	0	5	-10	-14	-9
AGS.1: Proportion of households within ½ mile of a public school	*	+	--	---	--
AGS.2: Proportion of population within ½ mile of a public park or recreational facility	*	+	--	---	--
AGS.3: Accessibility of full-service grocery store/supermarket	*	+	--	---	--
AGS.4: Average distance to the nearest hospital, urgent care clinic, or other medical facility	*	+	--	---	--
AGS.5: Accessibility to Senior Centers	*	+	--	--	-
Family and Social Cohesion	0	-4	12	8	4
SC.1: Proportion of households with a resident over the age of 65	*	-	+++	++	+
SC.2: Proportion of households with a disabled resident	*	-	+++	++	+
SC.3: Proportion of households with grandparents as caregivers of children	*	-	+++	++	+
SC.4: Mortality rates by age and gender	*	-	+++	++	+
Transportation and Mobility	0	5	-5	-9	-6
TM.1: Household access to a private automobile	*	+	--	---	--
TM.2: Average vehicle miles travelled by rural Benton County residents per day	*	+	*	-	-
TM.3: Average minutes travelled to work per day by rural Benton County residents	*	+	*	-	-
TM.4: Access to public transportation services	*	+	--	---	-
TM.5: Proportion of commute trips made by driving alone	*	+	-	-	-
Total cumulative Impact	0	2	2	-7	-7

DISCUSSION

Policy Implications

The findings show that allowing smaller, more restrictive ADUs (option three) will have positive benefits to health. These benefits derive from the family-friendly living arrangements that ADUs encourage. However, the findings also show that a restriction of currently permitted uses (option two), such as medical hardship trailers and satellite bedrooms, will have a similar positive benefit to health. These benefits come from restricting the number of dwelling units in rural parts of the County with poor accessibility to goods, services, and public transit options. Despite the two policies' equal impacts, option three allowing dependent ADUs is the more socially and politically preferred policy option.

The policy makers and public stakeholders that originally supported the HIA sought the implementation of a policy that would allow families to construct ADUs for family care. Although the HIA identified other positive benefits and negative impacts, their primary concern was confirming that ADUs benefit health through social and family cohesion. Even the positive benefits associated with providing affordable housing are disregarded because ADUs are not supported as an affordable housing alternative. The negative impacts related to access to goods and services and transportation and mobility are also excused because the social and family cohesion benefits are valued much more than those other health concerns. It is also more socially accepted to adopt policies that benefit disadvantaged populations. Option three has clear benefits to the disadvantages populations of physically and mentally disabled persons, and the elderly. Conversely, policy option two would be seen as removing rights from this group and creating additional hardships on providing them care. These social and political preferences make option three a more viable and accepted policy recommendation.

It is recommended that the Benton County Community Development Department consider the adoption of an ADU policy represented by Option Three and an update of current development code to permit such uses. However, as the assessment shows, ADUs are considered to have the most positive benefit to health when they are used as family accommodations. In order to ensure this type of use, certain mitigations should be included with the policy adoption. The mitigations are also intended to minimize the

negative health impacts identified in the assessment and nuisance concerns voiced by rural residents opposing ADUs.

The first mitigation recommendation is to include a clause in the permitting processing requiring that the resident of the ADU be either a family member or caregiver of the primary dwelling residents. The resident does not need to prove a temporary medical hardship as required by the current medical hardship trailer policy. Instead, the policy should allow relatives regardless of health levels to reside in the units. This will permit persons who may need some levels of long term care but cannot receive a doctor verified temporary or terminal medical hardship. As an example, the current policy does not allow healthy, able-bodied elderly individuals to live in manufactured trailers on their adult children's property because they do not have a medical hardship. However, their age and limited mobility might require some assisted care. The recommended policy would accommodate this family arrangement.

The second recommended mitigation is to establish a "cap" on the number of ADUs permitted per year for a certain number of years following the policy's adoption. This mitigation is intended to prevent more than expected permits from being requested. An excessive number of permits may result in negative impacts that were unforeseen during the policy analysis. A large volume of request can also consume staff time and resources that the department is not willing or able to commit because of existing obligations. The "cap" can be raised or lowered after the initial implementation period once the number of annual requests can be accurately predicted. The cap can also be removed if staff feels the permits are within the ability of staff to administer and enforce.

The third recommended mitigation is to review the policy and its impacts within a certain period of time after the policy's implementation. The review process is also an opportunity to address other impacts not related to public health such as environmental and economic impacts. A reassessment of community health indicators can be completed to determine if ADUs had any measurable impact on community health levels. Although staff would complete the review, the results would be used to inform decision makers if any alternations are necessary. Monitoring and adapting adopted policies is considered the final stage of the HIA approach and a period review would satisfy that stage.

Current Social Construction of ADUs

Accessory dwelling units became a policy issue because stakeholders and county staff started to reconstruct their social views of ADUs and ADU residents. Once ignored by the policy making process in Benton County, they have come to receive permitting of temporary medical hardship trailers and increased attention from the public and staff. The pursuit of this HIA indicates that the new view is positive enough to be considered adopting policies beneficial to the target population. Findings from the report may also continue to change the target population's social perception because they provide evidence that ADU residents are not social deviants, but are more accurately categorized as social dependents. Changing perceptions lead to more policy allocations and political representation.

The HIA shows that ADU residents are a disadvantaged population in need of political support. The assessment also shows that with certain mitigations, ADUs provide positive community health benefits with minimal negative impacts to rural communities. Adoption of the recommended ADU policy represents the final transition of ADU residents from being constructed as social deviants to being considered as dependents. If staff and the commission decide not to adopt or enforce an ADU policy, there is still some negative construction of the group because of perceived threats. The public might also still consider ADUs as having adverse impacts on their properties. There is also the possibility that Policy Option Two, which restricts current allocations to the target population, could be adopted. Assessment findings show that this option has an equivalent impact on health as the option permitting ADUs. This situation would indicate that the social construction of the group is shifting back towards the negative views of social deviants.

Shortcoming of the HIA Approach

The HIA approach is a commonly accepted methodology for assessing the health impacts of policy decisions. However, there are some shortcomings of the HIA approach that threaten its acceptance in academic settings and its application to some projects. Some impacts determined through HIA are so small that they are almost immeasurable. In this situation, allowing ADUs would create a small and almost immeasurable impact on community health and housing. If the projection of 8 units a year were correct, the

units would have less than a one-tenth of one percent impact on the unincorporated county's housing stock. It can be said that the policy will benefit health, but the benefit would be limited to a very small proportion of the population. Some HIA researchers consider that "When choosing outcomes to examine in an HIA it should be remembered that what is important may not be measurable, and that which is measured routinely or can be measured may be unimportant" (Mindell & Boltong, 2005). HIAs are more successful in determining health impacts when the issues affect a larger portion of the population with higher measures of detection.

Another shortcoming is that the HIA weighs individual impacts as being equal, regardless of the perceived benefit of those impacts from the public. In this HIA, the four indicator categories of healthy housing, access to goods and services, family and social cohesion, and transportation and mobility are considered to have the same weight of importance throughout the assessment. The results show that ADUs benefit social and family cohesion and healthy housing. However, in this case, healthy housing was not considered a significant benefit despite the study findings because the community was not seeking alleviation to housing issues. The rural community would not support constructing more housing regardless of its positive health benefits because they fear the environmental impacts it would have on their neighborhoods. Conversely, residents and decision makers were concerned with the social and family cohesion aspects of ADUs. They might consider one grandmother being able to live near their children to have a greater health value than several families receiving affordable housing from the units. The benefits of social and family cohesion are considered so significant that they "overshadow" the other study findings of negative impacts related to access to goods and services and transportation and mobility. This results in recommendations not representing the findings because those involved have preconceived preferences of what impacts are more valuable than others.

The HIA approach attempts to quantify impacts where possible to increase the credibility and acceptance of its findings. However, the approach also relies heavily on qualitative judgments as a substitute for unavailable quantitative data. These judgments are almost always subjective and biased by the HIA writers who generally represent a single interest. In this case, the HIA was funded and supported by the County Health Department. The Department had strong interests in permitting ADUs because of the

unit's social health benefits. Untested qualitative data may not necessarily be agreed upon amongst the entire study area population and usually come from key stakeholders and decision makers. This creates bias and jeopardizes the credibility of the study. The manner in which qualitative data is collected is also subject to criticism from methodological standards. HIA allows project writers to summarize and present the data as "assumptions and considerations". No record of the data collection is required, and direct quotation, opinion tallies, or transcripts are expected to be included in the analysis. The approach relies on the writers to appropriately summarize and present this information. Using assumptions and considerations from qualitative data sources is a commonly accepted practice in the HIA framework but may not withstand the methodological requirements of more academic and literary settings.

A Health Impact Assessment would be more appropriate in a temporal study, measuring indicators before and after policy implementation. This study assumes that rural areas have indicators that might be affected by allowing ADUs. For example, ADUs are thought to have a negative impact on the indicator measuring levels of community poverty rates. Bringing in more residents would increase the number of persons below the poverty line, or allowing new residents would encourage residing in communities with lower incomes. These assumptions are likely false. There are no firm conclusions that ADU residents are lower income and would actually impact this indicator or community health measurement. It would be more appropriate to make these assumptions than test the indicator levels over time to determine if this policy actually had any measurable impact on poverty levels. The approach taken in this study looks at the characteristics at one point in time and cannot truly capture any changes or effects.

CONCLUSIONS

Accessory dwelling units have the potential to positively benefit health in rural Benton County, Oregon. They are most beneficial to ill, aging, and disabled residents because they provide an alternative housing option, living accommodations for caregivers, and promote a stronger social network with relatives living in the primary unit. They are also beneficial to able-bodied adults and children, as they provide an affordable housing option in communities that often suffer from higher rates of poverty than urban areas.

However, the political objectives and public sentiment towards allowing ADUs as rentals is unlikely in upcoming policy making cycles.

There are barriers for individuals with medical hardships who live in rural areas as identified in the literature review and throughout the assessment. Rural residents have poorer access to goods and services, are more reliant on automobiles, and have limited access to public transportation. Implementing a policy allowing ADUs in the unincorporated County would promote residing in these low services areas where health is threatened. However, it can be concluded that because ADU permits are requested by homeowners with dependent relatives, there is a strong enough social network that provides assistance and care to the individual in need. These individuals may actually receive less care in an urban area because their support system is located in a rural setting.

This assessment concludes that a policy permitting ADUs, such as policy option three, should be adopted in Benton County to improve or maintain levels of public health. However, certain mitigations as explained in the policy recommendations section should also be included to minimize the negative health impacts associated with ADUs in rural areas. It is recommended that monitoring be conducted once a policy is adopted to determine any unforeseen impacts, health benefits, and changes in community health. This type of adaptive management ensures the policy will have the greatest positive benefit to its target group.

Further Research

This paper has identified gaps in academic and public health knowledge that warrants future research. Foremost is the need to direct more focus on rural health and housing issues. Significant literature is available on the application of ADUs in urban areas. The health and environmental impacts are well identified and understood amongst city planners and public health specialists. The lack of knowledge of the issue in a rural setting shows that attention and research has been focused in urban areas where ADUs are more commonly applied. Rural scholars, planners, and health officials can apply the existing knowledge of urban ADUs to understand the issue in a rural setting. This paper attempts to contribute to this process by identifying issues and assessing policy options in a rural county case study based on findings from urban studies.

Further research can explain the uses of ADUs in rural areas and the characteristics of rural ADU residents. Urban findings on uses and resident composition are useful for applications like this assessment, but may be an inaccurate comparison because of the differences between rural and urban environments and cultures. The scope and extent of this assessment limited data collection to a “community-based” unit of analysis because of time and data restrictions. However, future studies that use an individual unit of analysis by surveying individual homeowners and residents would provide valuable data and insight into the true characteristics in these environments. This research can determine if rural ADU dwellers are elderly, ill, or disabled as predicted or able-bodied working adults with young children. Feelings of isolation, barriers to goods and services, and dependence on automobiles can also be better understood through individual surveys.

Additional research focusing on the environmental impacts of rural ADUs would benefit the policy making process. Surveying residents would identify the approximate trips per day generated by ADUs, unit demand for services such as water and sewer, and impacts on public services such as police, fire, and school systems. By better understanding these impacts, rural communities can implement ADU policies knowing their full impacts on community services. The unknown fears associated with ADU impacts would be reduced and more jurisdictions may adopt policies benefitting rural health associated with accessory dwelling units.

Contributions to rural studies and more research on ADUs will assist policy makers and community planners to create policies and development codes that are more beneficial to community members. As presented in previous sections of this paper, proponents of accessory dwelling units have been historically viewed as deviants with little policy allocations. With these advancements and continued research, the policy process will provide greater benefits to these groups as they are identified as disadvantaged and in need of support for government systems.

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