Table of Contents

Introduction 1

SECTION I: Making the Case 4

SECTION II: The Evidence 12

SECTION III: Housing and Health in the Atlanta Region 25

SECTION IV: Recommendations 36

SECTION IV: The Atlanta Region 38
  County Projection Methodology 85
  City and Town Forecast Methodology 88
  Projection Calibration Techniques 89

Appendix 41
  Glossary 41
  Health Statistics by County 44

Acknowledgements 49

References 50
Introduction

Researchers, government agencies, and others have begun to focus on the relationship between human health and the communities in which we live, work, learn, and recreate. Many studies have shown links between public health and the built environment, but there is a great deal more to explore.

The link between housing and health was a much studied relationship in the 19th and early 20th centuries, when the United States faced infectious disease epidemics caused by poor sanitation. Today, our health issues are different and their causes more varied. Chronic disease has replaced infectious disease as the leading cause of death, precipitating the need to reconsider the link between health and the built environment. Infectious disease results from contact with viruses and bacteria, but chronic disease is largely an issue of lifestyle (diet, activity level, tobacco use) and long-term exposure (contact with toxic substances and unhealthful environments). However, this does not mean that infectious disease has disappeared as a focus of study in health and housing, rather chronic disease has moved to the forefront. Consequently, future research must examine the multifaceted manifestations of health issues such as cardiovascular disease, diabetes, and asthma, which are caused by a complex array of determinants of health including social, economic, and environmental factors.

Environmental causes of chronic disease are not limited to the dwelling unit, but extend to the neighborhood and beyond. At this time, agreement on direct causal links between health and housing only exists for specific exposures, such as lead or mold. The mechanisms that connect other physical, mental, and social illnesses to housing or to other facets of the built environment are not as well understood. There are many obstacles to the development of a full understanding. Researchers have been conducting studies to link health and the built environment with some success, but their findings tend to be limited to a particular health issue, population, or study area, making it difficult to establish a universal relationship between health and place. The theoretical underpinning necessary to consistently measure and evaluate the built environment is currently being developed through trial and error in the aforementioned empirical studies. Lastly, data are not yet systematically gathered at the appropriate scale for answers to the most crucial housing and health questions. Unlike transportation research, for example, where decades of federal funding has supported a multitude of studies and the assembly of data establishing a strong theoretical basis for analysis of specific impacts, the health and built environment field is in its infancy and still defining both the theoretical and analytical imperatives.

Even with these obstacles, it is important for communities to be proactive and deliberate in their response to the relationship between housing and health, especially since housing has long been identified as one of the main settings of human health.

About Healthy Housing: Forging the Economic and Empirical Foundation
This report was commissioned by the Atlanta Neighborhood Development Partnership (ANDP), which received funding from the Joint Center for Political and Economic Studies, and was written by Georgia Tech’s Center for Quality Growth and Regional Development. It is intended to build on the existing findings from Making the Case for Mixed-Income and Mixed-Use
Communities by incorporating health as part of the dialogue on quality housing. This effort, and other work on health and place, can put Atlanta at the forefront of this movement. *

The purpose of this report is to lay a solid foundation for the development of an evidence-based business case that supports housing interventions to improve public health in the Atlanta region. This is the first step in a long-term strategy to gather and analyze data that builds the health and housing link. The five main goals of this report highlight the complexity of the relationship between housing and health. The goals are:

1. To identify the economic and empirical links between housing and health
2. To identify the direct and indirect links between housing and health
3. To develop a new conceptual model on the complex effects of housing on health
4. To benchmark the current housing and health link for the 13-county Atlanta region
5. To present recommendations and future research needs to strengthen the link between housing and health

Healthy Housing: Forging the Economic and Empirical Foundation presents a multi-scaled approach to healthy housing that reflects the particular conditions of the Atlanta metropolitan area. This approach recognizes that the buildings in which we live, the neighborhoods in which they are situated, and the regions to which they are linked determine the quality of our indoor air, the access we have to healthy foods and recreation facilities, the costs of gainful employment, and much more. Much of our everyday lives, and hence our health, are associated with the condition, design, and location of the place where we reside.

This report is divided into five sections:

**Section I: Making the Case**
This section begins by describing the link between housing and health. It then defines healthy housing, establishes preliminary links between housing and health outcomes, and provides statistics on the economic and social impacts of health.

**Section II: The Evidence**
This section describes the scientific research that has illustrated various health outcomes as a result of the condition, design, and location of the dwelling unit, the neighborhood, and the region.

**Section III: Housing and Health in the Atlanta Region**
This section is an examination of data that begins to explain housing and health in the Atlanta region. Drawing from previous work on regional housing issues and considering raw data, it links housing to health in order to benchmark existing conditions.

---

* Many entities should be recognized for their work on health and place in the Atlanta area, including the Atlanta Regional Health Forum, the Atlanta Regional Commission, the DeKalb County Public Health Department, the Woodruff Foundation, the Annie E. Casey Foundation, the Centers for Disease Control and Prevention, Emory University, Morehouse College, and others.

** The primary study area for this report is the 13-county Atlanta metropolitan area — Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Paulding, and Rockdale counties — henceforth identified as the "Atlanta region." Another frequently used study area in this report is the 10-county Atlanta metropolitan area — Cherokee, Clayton, Cobb, DeKalb, Douglas, Fayette, Fulton, Gwinnett, Henry, and Rockdale counties — henceforth referred to as the "Atlanta area." In the majority of instances, the data and analysis in the report refers to either the 13-county region or 10-county area. If a geographic area other than these is utilized, the report clearly identifies it.
Section IV: Recommendations
The recommendations are aimed at involving stakeholders in a concerted effort to capture the social and economic impacts of housing on health. Through consensus building, policy review, data gathering, and continued research, the Atlanta region can be at the forefront of a new wave of healthy housing development.

Section V: The Atlanta Region Responds
Many public, nonprofit, and academic organizations and agencies are responding to the challenge to understand how housing and all components of the built environment affect human health. This section highlights some of the activities of these actors to illustrate how the region is leveraging this relationship to maintain and enhance quality of life for its residents.

Healthy Housing: Forging the Economic and Empirical Foundation presents a conceptual framework for studying the multi-faceted nature of housing and health to promote a continued and productive effort to achieve better public health by improving the condition and design of the places where we live.
Section I: Making the Case

In this section:
- A Common Understanding of Health and Housing
- A Conceptual Framework: Healthy Housing Defined
- A Business Case for Healthy Housing

For years, public health experts have identified housing as one of the main settings that affect human health. Housing not only serves as the place where we spend a large portion of our day, but shapes the context in which we pursue our lives. It can determine where we shop, go to school, play, and work. It provides basic shelter. It can influence who our friends are and the opportunities we have to be an active part of a community. Our housing can influence the access we have to healthy foods, health care, and other important services. Clearly, the role of our dwelling unit goes well beyond the front door; instead, it situates us in society. Thus it follows that housing has a significant impact on public health.

Furthermore, healthy housing is not simply a moral imperative; it also makes business sense for the public, policy makers, employers, and developers. Although the United States is healthier than it has ever been, health care costs are escalating. In 2004, the U.S. spent $1.9 trillion on health care, or $6,280 per person; by 2015 that number is expected to reach over $4 trillion.\(^1\) In part, rising costs can be attributed to increasing chronic disease rates. For this reason, it is vital that the link between health, housing, neighborhood design, and the region is not only made clear, but also becomes the subject of more focused research, targeted and refined data collection, informed policy creation, and public and private investment.

Sweeping changes in development patterns, the composition of the U.S. population, and lifestyle choices are affecting public health. Communities have become more automobile dependent despite the recent resurgence of interest in urban living. The population continues to grow and is becoming increasingly diverse both racially and ethnically. The population is also growing older. With the aging of the “baby boom” generation, 20 percent of the population will be over the age of 65 by the year 2030. This represents a doubling of the current size of that age group. Taken together, these factors call for an explicit consideration of the process of urbanization and its effects on the needs and lifestyles of the population in regard to health issues.

Approximately 60 percent of the U.S. adult population is at risk for diseases associated with physical inactivity because they do not achieve the recommended 30 minutes of daily physical activity,\(^2\) and 25 percent of all adults are completely inactive.\(^3\) An estimated 200,000 deaths per year are attributed to a lack of physical activity.\(^4\) Treatment of obesity and various other health problems related to inactivity costs the U.S. economy $117 billion each year and costs are on
the rise. Finally, chronic diseases, such as cardiovascular disease, cancer, asthma, and diabetes, have replaced infectious disease as the leading cause of death.

Health care alone cannot respond to this growing challenge. Instead, attention must focus on the underlying causes of poor health, in which housing plays a significant role.

A Common Understanding of Health and Housing
What is health? What is housing? And what is the relationship between health and housing? Health, as defined by the World Health Organization (WHO), is “a state of complete physical, social and mental well-being, and not merely the absence of disease or infirmity.” It also represents the ability of an individual or group “to identify and to realize aspirations, to satisfy needs, and to change or cope with the environment.” The WHO definition recognizes that many factors influence our ability to be healthy. Known as health determinants, these factors include biological, social and economic, environmental, lifestyle, services, and policy (see Table 1).

Table 1. Determinants of health

<table>
<thead>
<tr>
<th>Biological: genes, sex, age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social and Economic: poverty, employment, social exclusion, crime, social networks</td>
</tr>
<tr>
<td>Environment: air quality, water quality, housing, noise, urban design, land use, social environment</td>
</tr>
<tr>
<td>Lifestyle: diet, activity level, smoking, alcohol, drugs, sexual behavior</td>
</tr>
<tr>
<td>Services: education, health care, child care, social services, transportation, technology, recreation</td>
</tr>
<tr>
<td>Public Policy: priorities, policies, programs, projects, public involvement</td>
</tr>
</tbody>
</table>

Such a broad understanding of health calls for an equally broad understanding of housing. For the purpose of this report, housing is defined as “the conjunction of the dwelling, the home, the immediate environment and the community.” This definition means that housing is not simply the residential unit or even the piece of real estate where it is located, but is instead the collective housing units, associated land uses, and social environment that compose a neighborhood. This environment, in turn, will have impacts on many of the determinants of health. In places like the Atlanta region, where largely suburban development patterns and a relatively affluent population have created an environment dominated by automobile travel, it is unlikely that the immediate neighborhood can meet all the needs of an individual. Therefore, housing must be approached as a regional issue, including the location of housing in relation to jobs, health care, goods and services, and transportation.

With this understanding of health and housing, the next question arises: What is healthy housing?
A Conceptual Framework: Healthy Housing Defined

Healthy housing is the convergence of three elements of the physical environment: a healthy housing unit, a healthy neighborhood, and a healthy region. A healthy housing unit is characterized as being in good condition, free from pollutants and excesses in noise, temperature, and humidity. It is safe and not overcrowded.

A healthy neighborhood promotes active living through good design — appropriate density, land use mix, street connectivity, awareness of the human scale, attention paid to aesthetics — and by being safe and being perceived as safe. Healthy neighborhoods promote accessibility both within and between neighborhoods. Healthy neighborhoods provide opportunities to be actively engaged with family and community. Healthy neighborhoods buffer inhabitants from unhealthful things, whether social, economic, or environmental. Finally, a healthy neighborhood provides affordable and appropriate housing choices for residents in all stages of life.

A healthy region, from a housing perspective, is one that matches housing and transportation needs to jobs, both spatially and economically. This means that appropriate housing, in type and price, is located in proximity to jobs, and that transportation systems efficiently get people where they need to go. A healthy region is laid out in such a way as to reduce time spent traveling and to restrict the combined cost of housing and transportation to less than half of a household’s income. The availability of affordable or workforce housing is critically important in regard to reducing travel times and distances, thus minimizing negative impacts on air quality, stress, the economy, and the overall health of residents.

This concept of healthy housing—one that includes the housing unit, neighborhood, and region—presents a much broader and more appropriate lens from which to assess health. Unlike the typical housing unit focus of public health research, this concept takes a more holistic approach that recognizes that the condition, design, and location of housing are instrumental in determining human health. Furthermore, this enlarged conceptual framework is critical to our understanding of housing and health in largely suburbanized environments where decades of low-density development have put in place a pattern of living that is inherently dispersed. The Atlanta region is a perfect example, one where people often cross neighborhood, and even city and county boundaries for work, shopping, school, and entertainment on a daily basis. In this setting, the stage of our everyday lives is large, thus the impacts of housing must be considered beyond the housing unit and even the neighborhood, to look to the region.
A Business Case for Healthy Housing

Healthy housing makes good business sense. Policy makers, developers, employers, and the public all benefit from healthy housing in a variety of ways, including greater productivity, lower health care costs,* higher marketability, improved air quality, improved safety, and reduced transportation costs (see Figure 1).

Figure 1. Who benefits from healthy housing?

Following are statistics that illustrate the costs of health to various stakeholders. The statistics are compelling, but it is important to remember that the numbers deal with all issues related to health, not just health and housing. However, the statistics correspond to diseases and health impacts that have been shown, through research, to be associated with housing. Because of data limitations and the nature of diseases, the statistics do not capture the direct economic impact of housing on health. We know that poor health has economic ramifications and we know that housing has an effect on health, so we can make certain assumptions that the healthfulness of housing has economic impacts for different stakeholders.

* When discussing the medical costs associated with disease there are typically direct and indirect costs involved. The Center for Disease Control and Prevention defines direct medical costs as those associated with preventive, diagnostic, and treatment services; whereas, indirect costs are related to morbidity and mortality costs. Morbidity costs are defined as the value of income lost from decreased productivity, restricted activity, absenteeism, and bed days. Mortality costs are the value of future income lost by premature death.
For Employers

Employer costs associated with health stem primarily from productivity losses, restricted activity, and absenteeism. Initiatives that address the housing issue can have positive results for employers. Following are some of the key economic impacts of health issues on employers:

- In 1998, estimated U.S. indirect costs for asthma totaled $3.8 billion. Absentee rates for adults with asthma accounted for an estimated $846 million, while absentee rates of parents with asthmatic children cost $900 million.\textsuperscript{12}

- Absenteeism costs U.S. employers an estimated 17 percent of payroll costs. A survey of U.S. employers indicated that 25 to 33 percent of their workforce is absent on a daily basis for a variety of reasons including illness and injury.\textsuperscript{13}

- The total annual cost of obesity to U.S. companies is estimated to be more than $13 billion. Of that total cost, $8 billion goes toward health insurance, $2.4 billion for paid sick leave, $1.8 billion for life insurance, and $1 billion for disability insurance.\textsuperscript{14} Medical costs tend to be 77 percent higher for obese workers than normal weight workers.\textsuperscript{15}

- Absenteeism rates are more than double for obese workers. Every dollar spent on intervention can save around $5 in lost productivity and health care costs.\textsuperscript{16} On an annual basis, obesity causes 39 million lost work days, 239 million days of restricted work activity, 90 million sick days, and 63 million visits to doctors.\textsuperscript{17}

- A report found that diabetics averaged 11.3 hours of lost work time per week.\textsuperscript{18}

- The estimated cost of hypertension for 1995 was $6.67 billion in lost wages and lowered productivity.\textsuperscript{19}

For Policy Makers and Elected Officials

Public officials are concerned with the increasing burden of treating chronic disease. Following are statistics that support policy maker efforts to address health issues:

- According to the Institute for Health and Productivity Management, the treatment of chronic conditions accounts for $425 billion in direct medical claim costs, and an estimated $234 billion in lost productivity.

- Total per-person costs for self-reported mild asthma was $2,646; moderate asthma was $4,530; and severe asthma was $12,813. These numbers are driven primarily by pharmaceuticals, hospital admissions, and non-emergency department visits.\textsuperscript{20}

- Obesity and overweight conditions account for $93 billion of the nation’s yearly medical bill.\textsuperscript{21} At the state level, between 1998 and 2000, Georgia spent over $2.1 billion to treat obesity. Approximately 6 percent of the state’s population is obese.\textsuperscript{22}

- At the national level, indirect costs associated with the treatment of diabetics was estimated at $54 billion.\textsuperscript{23}

- In 2003, Medicaid spending accounted for over 20 percent of total state spending and had become the second largest item in most state budgets after education.\textsuperscript{24}

- On a local level, Fulton and DeKalb Counties spent a combined $105.2 million in 2005 on the Grady Health Care System, which accounts for 17 percent of the total budget for Grady.\textsuperscript{25}
Encouraging higher-density, mixed-use infill development can have financial benefits by minimizing the cost of providing municipal services and infrastructure as compared to traditional sprawl-based development.\textsuperscript{26}

Public officials are also aware of the importance of an able-bodied and well-trained workforce that acts as an attractor for economic development. Cities across the country are trying to attract the “creative class,” or knowledge workers.\textsuperscript{27} These efforts often take the form of investments in cultural and recreational amenities, which can also create a positive health environment that attracts new residents. A 2001 survey of 50 senior executives of \textit{Fortune} 500 companies by Harris Interactive for the Kearney/EDS Corporation found that quality of life and cost of living tied for second place behind a pool of talented, skilled workers as the most important attributes considered when looking to relocate their company.\textsuperscript{28}

\section*{For Developers}

For the development community there is the prospect of creating more financially attractive projects that promote active and healthy living. The American Community Survey conducted for Smart Growth America and the National Association of Realtors drew three main conclusions about the places Americans want to live. First, Americans favor smart growth communities that offer shorter commute times, sidewalks, and places to walk and bike over sprawling communities. Second, length of commute times is of utmost importance for Americans, who were more in favor of policies that supported increasing public transportation alternatives and locating houses near jobs rather than increasing road capacities. Third, those surveyed felt strongly that governments and businesses should invest in existing communities before new communities. They also indicated that they were in favor of developers constructing more housing for people of low to moderate incomes.\textsuperscript{29}

- A report by the National Multi Housing Council indicated that 78 million baby boomers may look to downsize their homes by the year 2015.\textsuperscript{30}

- A 2001 study projected that demand for denser housing, in mixed-use, walkable communities will exceed availability if current development trends continue. The reason for the increased interest lies in the growing number of baby boomer households that are returning to more urban living environments.\textsuperscript{31}

- Similar trends of demand exceeding availability were also reported for transit-oriented development (TOD). At least 14.6 million new households are expected to want to live within a half-mile of rail transit systems by 2025 — more than twice the number who live in TODs today.\textsuperscript{32}

- There is an increasing amount of evidence to show that new urbanist communities are selling faster and for more money (around 25 percent more) than their suburban counterparts.\textsuperscript{33}

\section*{For the Public}

Finally, the public stands to personally gain from the rewards of healthier living by experiencing an improved quality of life. This can mean lower health care costs and better socio-economic success.

- Out-of-pocket expenses amount to 19.6 percent of all health care costs. That amounts to $427 per person annually.\textsuperscript{34}
In Atlanta, students living in revitalized, mixed-income communities missed six days of school during the academic year, while students living in public housing missed eight days.35

Nationally in 2003, children 5-17 years of age missed 12.8 million school days due to asthma.36

Approximately 88 percent of people over 65 have at least one chronic health condition and 21 percent of people 65 and older have chronic disabilities.38

In 2005, 35 million Americans lived in food-insecure households, including 12.4 million children. Of these individuals, 7.6 million adults and 3.2 million children lived in households with very low food security. Food insecurity is defined as occurring when the normal eating patterns of one or more household members is disrupted and food intake is reduced at times during the year because there was insufficient money or other resources for food.39

Companies in the Business of Housing
With the increasingly tight labor market and escalating housing costs, many employers (in particular universities and health care providers) and city governments have turned to employer-assisted housing (EAH) to combat growing recruitment and retention problems.40 Many employers see the economic benefit of providing affordable housing options to their employees and have gotten into the development business building or subsidizing affordable housing for their employees located near the job site. Economic benefits of employer-assisted housing are not limited to the employer but also include benefits to employees and the surrounding community. Benefits for employers include a more stable and happier workforce, better job retention, and reduced recruitment costs. Employees experience reduced commute times leaving more time to spend with family and friends or to pursue personal interests. Employees also benefit from lower housing and transportation costs, increasing the amount of money available for other household expenditures. The surrounding community benefits from reduced congestion, investment interest, and greater community involvement.41

Organizations, such as the Home Depot Foundation, recognize the importance of building healthy and affordable houses and communities. In 2005, the Home Depot Foundation funded a number of projects resulting in the construction of 8,000 affordable and healthy homes.42 While the Foundation has linked healthy homes with better quality of life, it has not entered the employee-assisted housing arena to provide healthy and affordable homes to their own employees. In other words, the Home Depot Foundation has not explicitly acknowledged the economic benefits of healthy homes on their own bottom line.

Although employers providing EAH recognize the economic benefits of affordable housing and organizations like the Home Depot Foundation recognize the importance of healthy homes, both are missing pieces of the housing and health puzzle. None have acknowledged the economic benefits associated with a healthy workforce, such as increased productivity, lowered absenteeism, and less expensive insurance premiums. Part of the solution is acknowledging that healthy housing has benefits both to the employee and the employer. Secondly, when developing housing it is important to be cognizant of neighborhood design that encourages physical activity and ensures access to parks, recreational facilities, grocery stores, and multiple
modes of transportation. The third piece of the puzzle is to recognize that EAH is not the only opportunity to achieve healthy housing. Public officials, the business community, developers, and the public can all reap the rewards of healthy housing. It is about creating healthy housing through healthy dwelling units, healthy neighborhoods, and a healthy region.
Section II: The Evidence

In this section:
- Health and the Housing Unit
- Health and the Neighborhood
- Health and the Region

Much of the research that exists on the intersection of health and housing has been conducted by public health researchers. While they have been able to make a link between the health of an individual and his/her housing situation, less has been done to broaden the lens and take a spatial view of the determinants of health related to housing particularly as it is defined according to the World Health Organization. This gap speaks to the need for public health professionals, city planners, and the business community to work more closely together to find solutions to the growing health crisis caused by unhealthy living environments. It is already known that good housing and neighborhood design alone will not solve the problem. However, providing people with healthy living options greatly increases the likelihood that their overall health will improve.

It should be recognized that in some cases, the built environment has a direct impact on health (e.g. a person living near a high-traffic roadways has a greater probability of developing respiratory disease). In other instances, the built environment plays an indirect role by influencing individual behavior (e.g. neighborhoods that are unsafe or perceived to be unsafe reduce the occurrence of outdoor activities associated with transportation, exercise, or recreation, thereby reducing routine physical activity which places people at greater risk of heart disease, obesity, and other chronic diseases).

Healthy housing has been defined as the intersection of quality housing units, neighborhoods, and regions. As Figure 2 illustrates, each of these three components is shaped by specific conditions. The housing unit is influenced by the condition and design of the specific building, be it a single-family dwelling, town home, condominium, or apartment. The neighborhood can be measured by its land use mix, density, transportation connectivity, and its access to parks, schools, and the like. The neighborhood is also affected by environmental factors, like contaminated sites, high-volume roadways, or noisy and noxious land uses. The region is largely shaped by the land use and transportation policies that govern it. Such policies can determine the availability of transportation options, the proximity of housing and jobs, and the exclusion of lower-income housing, among other things.

Together, the influences depicted in Figure 2, while not the only things that shape the built environment, are some of the most significant elements related to healthy housing. In this section of the report, each of the components of healthy housing is discussed, along with the empirical studies that have identified direct and indirect links between housing and health.
Health and the Housing Unit

Historically, efforts at improving the health of individuals have centered on improving the living conditions of the individual dwelling unit, and as a result the public health field has focused their research on the health impacts associated with the conditions of the housing unit. Accordingly, much of the policy designed to provide solutions to mitigate these unhealthy situations also has focused on improving the housing of the individual or family. As this section will show, the condition and design of the housing unit is only one part of the larger healthy housing equation.

Two important factors determine a healthy housing unit, as shown in Figure 3. The first is condition, which is reflected in the operation of heating and cooling systems, the presence of rodents or insects, the absence or presence of leaks, the availability of lighting, the presence of safety features like stair rails, the amount of space per person, and the reliability of plumbing systems. The second factor is design. Design determines how well people of varying abilities can function within the housing unit. Design also addresses safety issues. For example, a well designed housing unit will be constructed in such a way as to prevent children from falling from windows, or to ensure proper fire exits.

Researchers have directly linked housing condition and design with illnesses ranging from chronic and infectious diseases to physical injuries, poor nutrition, and mental disorders (see Figure 3). Lead poisoning is perhaps the highest-profile health issue that still affects a large number of children. Because the topic has been covered extensively in public health research, this report presents a brief examination of the aspects of the household environment that can have detrimental impacts on physical and mental health:
Housing Conditions’ Effects on Physical Health

Air Quality: Poor ventilation, cheap or old building materials, and inadequately functioning appliances can cause the release of toxic substances, such as carbon monoxide, nitrogen dioxide, asbestos, radon, polyvinyl chloride, pesticide residues, and volatile organic compounds that can contribute to a host of symptoms such as asthma, headaches, acute intoxication, lung cancer, mesothelioma, hypertension, and bronchial obstruction. Allergens produced by pests such as rats, dust mites, and roaches are associated with increased asthma attacks, particularly in children and the elderly.

Temperature: A constant and narrowly acceptable range of indoor temperature is important for the health of the household. The potentially fatal consequences of heat exposure are perhaps better known than the increased risk of cardiovascular disease and arthritic problems associated with excessively cold indoor temperatures.

Humidity: Dampness, which breeds mold and is exacerbated by poor ventilation or the inability to dry out a space using adequate heating and cooling systems, is a contributing factor to a variety of chronic conditions such as asthma, sore throat, skin problems, and headaches. Dampness also attracts rats and mice, mites, roaches, and other pests which produce allergens that are a major contributing cause of asthma attacks. In preliminary research, mold growth has also been linked with fatigue, depression, cerebral strokes, heart attacks, and hypertension.

Noise: Noise is an issue related to the housing unit and the neighborhood. It can be caused by many factors, from the location of a house near a freeway, airport, or busy industrial complex to crowded living conditions. The health impacts of noise are difficult to quantify, particularly when noise is an annoyance rather than excessive to the point of hearing damage. Research has found that the effects of noise manifest themselves differently among age groups. Symptoms for adults typically include depression and impacts on the respiratory, cardiovascular, and muscular-skeletal systems. Children experience respiratory symptoms, while the elderly have an increased risk of stroke. Exposure to excessive or prolonged noise, such as in multi-family units with poor insulation, can lead to psychological stress and activation of the hypothalamic-pituitary-adrenal axis and sympathetic nervous system.
Light: Lack of light, particularly exposure to daylight, has a negative effect on psychological well-being and can have a detrimental effect on learning and motivation. Lack of light or poor lighting is also a contributing factor for physical injuries caused by falls and can increase feelings of isolation, apprehension, and fear.50

Safety and Injury: The 1999 U.S. Census Housing Survey documented 2 million houses that had severe physical problems and an additional 4.8 million homes with moderate problems. This places nearly 7 million households at increased risk of physical injury from burns, falls, and fires.51 A 2002 study noted that 13.5 million non-fatal injuries occurred in or around U.S. homes in one year.52 Falls are the leading cause of injury-related visits to emergency rooms in the U.S.,53 and children under the age of 5 and adults over the age of 65 account for the largest number of emergency department patients.54 In 2003 more than 1.8 million seniors over the age of 65 were treated in emergency rooms for fall-related injuries, resulting in an annual cost of approximately $19.2 billion. By 2020, the annual costs of injuries are expected to be $43.8 billion.55 There is also evidence that people living in dwellings occupied by more than one household are at an increased risk of injury and even death from fire, burns, and scalding.56 Finally, older homes and housing may not follow the Americans with Disabilities Act (ADA) guidelines for corridor and door width, and may lack accommodations that allow for safe and increased mobility for the elderly and disabled residents. Injury, decreased physical activity, and psychological consequences are of concern.57

Crowding and Space: Crowded living conditions have been associated with the transmission of respiratory infections, such as tuberculosis, and ear infections in children and have even been linked to mold growth in homes due to increased humidity.58 Crowding also contributes to an increase in noise and can have detrimental effects on the development of children, who cannot study undisturbed. Lack of space for playing contributes to a decrease in physical activity in children and increases the risk of obesity, this may have behavioral manifestations.59

Food and Water: Lack of affordable housing has been shown to contribute to poor nutrition as families put more money toward housing and less money toward food. Under- and malnutrition, particularly of children, can result in stunted growth and other developmental delays. Inadequate food storage and disposal facilities and leaking water feed pest infestations and contribute to respiratory ailments and other pest-borne diseases. Lack of safe drinking water, lack of hot water for washing, and poor sewer facilities contribute to the spread of infectious diseases.60

Housing Condition’s Effects on Mental Impacts
The evidence on the ways in which substandard housing impacts mental health is less well developed. A link has been made between excessive indoor heat and irritability and social intolerance.61 Anxiety and depression can be caused by excessively cold, damp, or moldy housing. Crowding appears to be particularly distressing for women. Children suffer from housing instability, such as homelessness or temporary housing, often manifesting in behavioral problems.62 Substandard housing conditions can also lead to social isolation and feelings of shame and low self-worth.

Lack of availability and affordability of housing, and the associated lack of autonomy and control over one’s housing situation, often cause higher stress levels contributing to related health concerns such as hypertension, headaches, increased occurrence of colds, and depression.
Chronic stress in pregnant women has also been associated with an increased chance for preterm delivery and low birth weight affecting the developmental trajectory of the child. Stress has also been shown to have a deleterious effect on the quality of the parent-child relationship, often resulting in harsh or abusive parenting styles.

Individuals living in substandard housing conditions are at an increased risk of exposure to physical, biological, mental, and chemical hazards that have a wide range of adverse health consequences for a population already considered at-risk by virtue of their socioeconomic status. The obvious solution seems to be to remove the family from the substandard house, but removing a family from a “bad” house and putting it next door in a “good” house may do little to improve the overall health of the family, because the surrounding neighborhood also has an impact on health.

**Housing Design’s Effects on Health**

Housing design has an effect on the health of the inhabitants as it impacts the functionality of the housing unit for people of all ages and ability levels. The impacts can be physical, in terms of injuries sustained, or can be psychological, when the ability to function efficiently and effectively within the house and the neighborhood is reduced. Some issues with design have been addressed above. In addition, two groups for whom housing design is of utmost importance are older adults and those with disabilities. As people live longer, the number of individuals living with functional limitations and disabilities is also on the rise. Researchers and designers have developed a practice known as Universal Design, which is defined as the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. The implementation of Universal Design in the construction of houses and the design of neighborhoods can promote livable communities that enable individuals of all ages and ability levels to function over time without segregation, loss of choice, lack of safety, increase in cost burden, or loss of mobility. These in turn have implications for the overall health and well-being of the inhabitants.

**Health and the Neighborhood**

Much of the research that links neighborhood environments with health focuses on four issues: physical activity, access and affordability, environmental exposure, and social networks. Physical activity studies explore how issues of land use—mix of land uses, density, and proximity—along with crime and safety, street design, and architecture—can encourage or discourage physical activity. Access and affordability looks at the health consequences associated with the lack of or limited access to schools, transit, food, goods and services, recreational facilities, and public spaces. Environmental exposure deals with the health consequences of poor quality air, water, and soil, as well as noise. Finally, social capital explores the ways in which healthy neighborhoods facilitate the communication of information, provide social support, and transmit accepted behaviors.

The context of the neighborhood plays a role in shaping these issues. Some of the most relevant neighborhood conditions related to the healthy housing discussion include:
• **Land use mix** - the mix of different uses (e.g. residential, office, shopping, industrial, and institutional uses), both horizontally (side-by-side land parcels with different land uses) and vertically (one building containing multiple uses).

• **Density** - generally expressed as the number of people per acre.

• **Connectivity** - the level of connection within the transportation system, to include roadways, transit, multi-uses paths, and sidewalks.

• **Access** - the resident’s ability to access education and recreation facilities, healthy foods, and green space.

• **Environmental Factors** - the proximity of noxious and/or noisy land uses, contaminated properties, dangerous transportation corridors, and other

As Figure 4 illustrates, the characteristics of the neighborhood can influence an individual’s level of physical activity, lifestyle choices, social capital, and exposure to unhealthy environments. Ultimately, these intervening factors have numerous potential health impacts, such as compromised overall well being, heart disease, obesity, diabetes, some cancers, injury, and cardiovascular disease. This section provides an overview of findings from numerous studies that relate neighborhood characteristics to health.

**Figure 4. The neighborhood has potential health impacts**

**Physical Activity**
The built environment can have an effect on the levels and frequency of physical activity. Regular physical activity, defined as 30 minutes of physical activity per day, is beneficial to people of all ages, having positive effects on health, longevity, and quality of life. It has been found to improve self-image, self-esteem, physical and mental wellness, and overall health. Negative health effects associated with low physical activity include heart disease, certain types of cancers, high blood pressure, stroke, osteoporosis, obesity, diabetes, and higher mortality rates.

Physical activity occurs not only through traditional means of exercise, such as walking, running, biking, and swimming, but also through daily activities such as taking the stairs instead of the elevator or walking and biking to run errands or to get to work or school. The design of the
physical environment can either facilitate or reduce the opportunities for physical activity. Greater land use mixes, population and employment density, street connectivity and continuity of the bike and pedestrian network, are all believed to contribute to positive health outcomes, as are the presence of recreational facilities and parks. Changes in street scale, design, and safety can also have impacts on the health of users.69

Some studies have found that higher density neighborhoods generally have higher rates of physical activity.70 However, density alone does not determine rates of physical activity; demographic characteristics of households must also be taken into account.71 The evidence suggests that density leads to greater physical activity except in low-income neighborhoods, where other factors such as time, access, and fear of personal safety can result in decreased physical activity. This area of research is still evolving because of the complexity of the built environment and of behavior and lifestyle choices. In fact, some studies have placed socioeconomic factors over the built environment in the determination of physical activity levels.72

In addition, land use design—mix of land uses, density, and proximity—can significantly impact physical activity. Street design, architecture, the overall attractiveness of a community, and perceptions of crime and public safety, affect the willingness of people to physically interact with their surroundings. Street design can facilitate or hinder walking and bicycling. Streets laid out in a traditional grid system have proven to be more conducive to walking than streets designed with long blocks and less connectivity.73 Greater street connectivity and continuity encourage travel by foot.74 The presence of sidewalks, crosswalks, and bicycle lanes has a positive impact on increased physical activity.75 Building scale and the relation of architecture to the street can either encourage or discourage physical activity. Vacant or blank walls and architecture that fails to interact with the street can prove uninviting to pedestrians.

Crime or the perception of crime and personal safety are significant obstacles to physical activity. Safety is often cited as a reason for not walking, visiting parks and recreational centers, or allowing children to play outside or walk to school, all of which reduce opportunities for physical activity and increase the risk of health problems.76 Neighborhoods with declining or substandard housing stock, boarded-up houses, broken windows, vacant lots, litter, graffiti, and vandalism can affect health if people are afraid to engage in physical activity outdoors.77

**Access and Affordability**
The ability to access schools, transit, nutritious food, goods and services, recreational facilities, parks, and other public spaces has physical and economic impacts. Lack of access typically implies that one is physically unable to access any or all of the above items because of disability or infirmity, lack of transportation options, distance, or time. Lack of access also implies an economic inability: for example, quality health care may be beyond the financial capabilities of a household. Crime and perceptions of personal safety can also limit access by making people fearful of leaving their homes and neighborhoods and by discouraging businesses from locating in an area.

Lack of access is a problem that plagues low-income communities and dramatically affects quality of life, financial prospects, and health. However, difficulties with access affect anyone at any income level who lives in a sprawling area lacking alternative transportation options. Those
affected include children of pre-driving age, the elderly of post-driving age, those with health issues that prohibit driving (e.g. blindness and epilepsy), and those without access to a vehicle.

Access to good schools contributes to a child’s well-being over the course of a lifetime. A quality education can improve the ability to make choices in life which typically has positive health consequences. Quality schools also contribute to a child’s health and well-being in the short-term. Neighborhood schools and recreational facilities that are within easy and safe walking distance encourage physical activity. Parental involvement, necessary for the success of a child, increases the closer the school is to the house. In addition to decreased physical activity, another downside of increased distance is the need for busing, which exposes children to air pollution and particulate matter that can exacerbate respiratory ailments; the longer the child is on the bus, the greater his or her exposure.

The inability to access nutritious food has direct health implications. Obesity, due to a combination of poor nutrition, high caloric intake, and lack of physical activity, plagues low-income communities in particular. Grocery stores, drug stores, and other retail establishments often are hesitant to locate in low-income communities, and as a result residents must travel greater distances, which takes time and money, to secure nutritious food or rely on resources at hand which are usually less healthy. The lack of access to food and goods and services is exacerbated by the lack of access to transit, which further limits options.

Low-income neighborhoods are often underserved by parks, recreational facilities, and other public spaces. This lack of access, worsened by fewer transportation options, a lack of time, fear of crime, and poor maintenance, has direct health consequences on the physical, mental, and social well-being of residents. Parks and public spaces provide opportunities for community interaction, places to exercise, relax, and commune with nature. Ease of access to parks, recreational facilities, and other public spaces greatly increases the chance that the spaces will be used. Access to these spaces is particularly important to children who experience behavioral and physical challenges when unable to play freely.

Good neighborhood design attempts to resolve the lack of access via street connectivity, and continuity of the bike and pedestrian network. Multiple modes of transportation enable the greatest amount of mobility, thereby removing physical barriers to access. Good design can also help ease financial barriers by eliminating or reducing the reliance on the automobile thereby freeing up a sizeable portion of a household’s income for more healthful pursuits.

**Environmental Threats**

Low income persons, minorities, children, the elderly, and those with disabilities suffer disproportionately from environmental exposure. There are many types of environmental exposures which affect the air, soil, and water near neighborhoods. Noise pollution is also a concern. Each of these exposures has directly attributable health consequences.

Communities located near heavy industry, freeways, rail yards, trucking routes, power substations, airports, landfills, hazardous waste sites, and former industrial sites or brownfields are disproportionately affected by pollutants. Poor air quality, from auto emissions or industrial sites, worsens and may even cause asthma and other respiratory ailments along with cardiovascular problems, stroke, low birth weights, and cancer. Long term exposure to air pollutants can result in premature death. Runoff of pollutants from industrial sites can
contaminate the soil, causing gastrointestinal and other diseases through consumption of vegetables grown in a household garden for example.\textsuperscript{84} Exposure to loud noises overtime can cause both psychological and physical disorders.

Exposure to traffic-related pollutants has been linked to an increasing array of health problems, including asthma, cough, reduced lung function, certain types of cancers, cardiopulmonary and stroke mortality, and premature births and lower birth rates.\textsuperscript{85} A recent study by the Center for Neighborhood Technology suggested that these adverse health outcomes appear most frequently in people living within 300 meters of roadways with traffic volumes of at least 10,000 vehicles per day\textsuperscript{86} although other reports have tracked health consequences at these distances from roadways with higher traffic volume.\textsuperscript{87}

Environmental justice—defined by the Environmental Protection Agency as the “fair treatment for people of all races, cultures, and incomes, regarding the development of environmental laws, regulation, and policies”—applies specifically to the protection of those who most often bear a disproportionate burden of environmental threats. Populations not considered at risk may also live near environmental threats, but they are more likely to have options to relocate or to mitigate the unhealthful consequences of living near those threats. Poor and minority citizens are at greater risk from environmental exposure as compared to people in middle and upper income brackets.\textsuperscript{88}

Good neighborhood design will mitigate some of the unhealthful effects of living near environmental threats. Buffer zones achieved through vegetation or land use mix can be effective. Parks and greenspace act as air filters improving air quality and reducing the heat island effect in urban settings. Parks and greenspace can also mitigate environmental noise, acting as a sound buffer for freeways and other high decibel land uses.\textsuperscript{89}

**Social Capital**

Social capital can be defined as the collective value of a network—social, political, and economic—whose purpose is to inspire trust in and provide support for other members of that community.\textsuperscript{90} Social capital is built both formally, through participation in group activities, and informally, through casual association and encounters. It is the degree to which people feel that they live in and belong to a socially cohesive local environment, and the range of activities and resources that emerge as consequence of those ties. A decline of participation in various civic associations and of socialization with neighbors has been recorded in the United States.\textsuperscript{91} Individuals who are not well integrated into the social, political and economic networks, those with low social capital, are reportedly at increased risk for poor physical and mental health.\textsuperscript{92} On the contrary, people socially engaged in their communities live longer and are healthier both physically and psychologically.\textsuperscript{93} In addition, recent studies have explored the relationship between the built environment and its effect on the building of social capital.\textsuperscript{94}

The health benefits that have been linked to high levels of social capital are extensive. Various studies have shown that isolation is a major cause of illness, and that once ill, socially isolated individuals are two to five times more likely to die than those with strong social networks. Thus social capital has been linked to prolonged life expectancy. Social capital has also been linked to better overall health, better cardiovascular health, and improved mental health (self-esteem, better self-image, greater self-worth). Social capital has even been shown to reduce incidents of violent crime and increase physical activity.\textsuperscript{95}
However, the link between social capital and the built environment is more tenuous, although a number of recent studies are providing systematic data to support what thus far has been anecdotal evidence. A strong connection has been made between lowered social capital and automobile dependence. Walkability, on the other hand, is positively correlated to social capital. The following design components can make neighborhoods more walkable and may increase social capital: grid-street pattern, narrow streets, small lot size, mix of uses, density, traffic calming, sidewalks and crosswalks, and the presence of parks, trails, and other public spaces. These last elements are particularly important, as they provide realms that encourage both interaction and physical activity.

The design of the built environment can have an effect not only on physical activity but also on the sense of community. The placement of entrances to residential units that are adjacent to or facing one another or that are directly connected to pedestrian paths or active common spaces, increases the likelihood of social interaction. The inclusion of certain architectural features such as stoops, porches, and communal gathering spaces also increases social interaction improving one’s sense of emotional well-being. Views of and access to nature have also been shown to have positive health impacts resulting in increased recovery times for hospital patients, decreased mortality in seniors, lower blood pressure and decreased anxiety, and higher levels of attention in school age children.

Low-income neighborhoods are often disproportionately affected by environmental exposures, lack of access, and a spatial mismatch between jobs and affordable housing among other ills, each of which has negative health consequences. One study indicates that residents of high-poverty neighborhoods live on average eight years less than non-poverty neighborhoods. Involuntary displacement and gentrification also destroy social capital by removing people from their established social networks, which has physical and mental health implications. Social networks have bearing on healthful behavior by communicating information about available health care services, providing social support, and transmitting norms of acceptable behavior particularly related to lifestyle choices such as smoking, drinking, and poor diet.

**Health and the Region**

Regional development patterns and policies determine the location of housing and hence play a significant role in public health. Because the Atlanta region came of age during the era of the automobile, the supremacy of the automobile and the propensity to sprawl defined land use patterns. Land use policies favoring single-use zoning with separation of land uses, low-density development, large-lot zoning, and housing subdivisions along with transportation policies that placed greater importance on the car as the primary mode of transportation have perhaps unwittingly impacted health.

Two primary elements shape the region’s impact on healthy housing—land use policies and transportation policies (see Figure 5). Broadly, these policies determine where people live, work, learn, and play and how they move about in their everyday lives. As Figure 5 illustrates, land use and transportation policies impact air quality, access (to jobs, healthcare, transportation, etc.), and affordability (both in housing and transportation costs). This in turn has resulted in a jobs/housing imbalance, a significant increase in vehicle miles traveled (VMT), a concentration
of poverty and low-income housing, and reduced access to the needs of everyday life. As several studies have shown, these conditions are associated with several potential health impacts, including heart disease, respiratory disease, obesity, and more.

Figure 5. The region has many potential indirect health impacts

The Location of Housing

Although the 13-county Atlanta region continues to grow, adding both population and jobs at a similar pace, there is an increasing disconnect between the places where people live and the places people work. Known as a jobs/housing imbalance, this concept recognizes the region’s inability to match jobs (based on wages) with appropriate housing (in type and cost) in a geographic area. The associated costs of the jobs/housing imbalance both directly and negatively impact quality of life. People are paying the penalty in time (spent traveling to and from work), money (spent on transportation costs), and health (stress and less time for health-promoting activities). The penalties become increasingly and disproportionately severe for those families who earn less than $40,000 a year.102 103

According to federal guidelines, a financially healthy household should not spend more than 30 percent of its income on shelter.104 If affordable, quality housing is not available near one’s workplace, households may opt to spend more on housing, leaving less money for other needs, they may accept substandard or overcrowded housing nearby, or they may choose to reside a greater distance from their place of employment. The health consequences of substandard housing are enumerated earlier in this section. Locating a greater distance from employment results in increased transportation costs that also can burden the physical, mental, and economic health of households.

Time spent in cars contributes to a loss of social capital as commuters have less time to engage in activities with their family or their communities. In addition, time spent commuting often correlates to less time spent pursuing physical activities thereby increasing the risk of obesity and other chronic diseases caused by inactivity. Commuting also heightens stress levels in drivers which can lead to health issues such as hypertension, headaches, depression, and can weaken an immune system increasing the risk and occurrence of colds and other illnesses. Stress can also be induced by a heightened anxiety over the ability to find and keep affordable housing as well as the ability to pay bills. Furthermore, the high housing and transportation cost burden means there is less money to go toward health care, nutritious foods, education, and recreational opportunities among other things all of which have direct negative impacts on health, overall quality of life, and the long-term economic success of the household.105 106 107
Overall, sprawling development patterns have been linked to negative health impacts. The most well known is the resulting increase in VMT and thus vehicle emissions, which impact air quality. Poor air quality can cause or exacerbate respiratory problems, both regionally and locally for the occupants of the vehicles and others who live near or commute through areas with high traffic volume or congested major road ways. These sprawling conditions have been associated with increases in both traffic and pedestrian fatalities. Furthermore, exurban counties have been shown to have higher traffic fatality rates compared to core counties.

Regulatory practices can also result in exclusionary zoning, or the segregation of populations based on income. This may result from requiring the use of high-cost building materials, imposing zoning restrictions, mandating code requirements, and placing moratoria on the construction of certain types of buildings such as rental, multi-family, and affordable housing units. The reasons for exclusionary zoning can be based on prejudices and the desire to self-segregate, but may also be an attempt by local governments to boost their tax base. In both cases, the results are either the complete lack of affordable housing for a population in need or the concentration of poverty in particular locations.

Areas with concentrated poverty are usually subject to greater environmental threats and have higher rates of crime, lower land values, and reduced access to goods and services, transit, amenities, and good schools compared to better-off areas. These environments can affect health by decreasing physical activity due to real or perceived crime, limiting access to nutritious foods, and exposing populations to harmful environments. Concentrated poverty also places a disproportionate economic burden on certain jurisdictions and communities that may be receiving a larger share of vulnerable populations that are in need of greater services, which can drain scarce public resources. This can result in an inability to provide basic health care and education.

Impacts of Lack of Access
Problems with the location of housing extend beyond a jobs/housing imbalance to include the separation of housing from goods, services, and amenities. Regional patterns can create pockets where access to the goods, services, and amenities that contribute to quality of life is lacking or absent. Areas of concentrated poverty typically lack many of those amenities and facilities and can be stressful environments as people struggle to make ends meet. Issues of access as they pertain to health deal more directly with issues like access to quality health care facilities, areas of concentrated poverty typically lack facilities in number and in quality. These conditions make automobiles increasingly important, causing families on tight budgets to extend themselves to purchase a vehicle and isolating non-drivers—including children, older adults, and people who do not own a vehicle. The cost of owning and maintaining a car adds significantly to the cost burden of a household. Direct costs of owning a vehicle are approximately $0.29 per mile or approximately $3,700 per year per vehicle. Households in auto dependent communities such as the Atlanta Metro Area can spend as much as 20% of their annual expenditures on transportation costs. In addition to the direct costs to households, there are also external costs to automobile dependency that can approach an additional $0.40 per vehicle mile. Included in this calculation are environmental, congestion, equity impact, and land opportunity costs to name a few. These external costs are generally borne by the entire region.
Healthy housing includes the housing unit, the neighborhood, and the region. This triad creates a complex environment in which many determinants of health are at play. In their everyday lives, people seamlessly move from home, to neighborhood, to region, making it difficult to isolate the impacts of any one element on human health. This reality supports a holistic and regional approach to housing and health.
Section III: Housing and Health in the Atlanta Region

In this section:
- Housing Conditions
- Health Conditions
- Observations on Housing, Health, and People
- The Complicated Nature of Housing and Health

The previous sections of this report describe the economic costs of poor health and the evidence that links health status to housing. This section benchmarks the current state of housing and health in the 13-county Atlanta region. In doing so, this report looks at housing quality, housing and transportation costs, and morbidity and mortality rates as indicators of health status. This section concludes with a brief discussion on the current state of the health and housing data in the Atlanta region.

Housing Conditions
An examination of housing in Atlanta as it relates to health requires a return to the three components of housing—the housing unit, the neighborhood, and the region. This section examines existing reports and available raw data to benchmark existing conditions at the county and census tract levels.

Housing Quality: To understand the condition of the housing unit it is useful to use data gathered in the American Housing Survey (AHS), the largest regularly administered national housing sample survey in the United States. AHS data were used to assess the condition of housing in the Atlanta region. Specifically, these data identify the number of housing units in each county that have moderate or severe physical problems.① Housing units that are identified as having moderate to severe physical problems have issues, to varying degrees of severity, with plumbing, heating, electricity, hallway safety, kitchen/cooking equipment, and interior and exterior upkeep and maintenance.② The conditions of housing units with either moderate or severe physical problems can cause a variety of health outcomes, including injuries, respiratory disease, infectious disease, and psychological problems, among others, as outlined in section II.

In the 12 counties with available data, almost 60,000 housing units have been characterized as having moderate to severe physical problems. This represents 4 percent of the occupied housing stock in those counties. Figures 6 and 7 show that DeKalb, Fulton, and Cobb counties

① This information is only available for 12 of the 13 counties in the study area. The data for Rockdale County are not available.
② For a complete description of the specific issues related to moderate and severe physical problems as related to housing, see the American Housing Survey definitions available at www.census.gov/hhes/www/housing/ahs/ahs01/appendixa.pdf.
have the largest number and percentage of poor housing stock, while Fayette and Douglas County have no registered problems with substandard housing.

Figure 6. Housing Units with Moderate to Severe Physical Problems by County

![Bar chart showing housing units with moderate to severe physical problems by county.](chart6)


Figure 7. Substandard Housing Units as a Percentage of All Occupied Units by County

![Bar chart showing substandard housing units as a percentage of all occupied units by county.](chart7)

Furthermore, as Figure 8 illustrates, poor housing conditions are not necessarily related to the age of construction. It is not, as previously thought, older houses that make up the majority of substandard units. In fact, the bulk of substandard housing has been constructed since 1980. Combined, these data show that the substandard housing issue in the Atlanta region is most prominent in the newer construction in Fulton, DeKalb, and Cobb counties, but is also an issue in the outer ring counties, where the majority of the newer housing stock exists (see Figure 9). This data calls into question current construction codes and standards, as well as household and landlord maintenance practices which have enabled relatively new housing stock to deteriorate quickly.

The data also indicate that the occupants of poor housing are disproportionately minorities and low income. Figure 10 shows that African Americans occupy almost 34,000 housing units with moderate to severe physical problems, the largest percentage of all races occupying substandard housing.
**Figure 10. Substandard Housing Units by Race, 12-county area**

<table>
<thead>
<tr>
<th>Race</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>33,900</td>
</tr>
<tr>
<td>White</td>
<td>25,400</td>
</tr>
<tr>
<td>Other</td>
<td>2,800</td>
</tr>
</tbody>
</table>


**Housing and Transportation Costs:** According to federal guidelines, a financially healthy household should not spend more than 30 percent of its income on shelter. By this standard, among the one-third of Atlanta metro families earning less than $35,000 a year, over half are struggling to pay for housing. In addition to struggling to pay for housing, these households also are faced with a housing shortage. A recent report by the Center for Neighborhood Technology (CNT) examines the affordable housing shortage problem utilizing 2005 U.S. Census Community Survey estimates. The numbers indicate a trend in population growth by income for the 10-county Atlanta area, whereby the lower and higher income households are growing at substantially faster rates than are the middle income households signaling an increasing divide between the highest and lowest income levels. According to the CNT report, the number of households earning less than $20,000 grew 16 percent from 2000 to 2005. Households earning more than $100,000 grew by 31 percent, while middle income households, $20,000 to $99,999, grew only 6 percent. The housing market continued to expand during this same time period resulting in a surplus of 164,000 units, but a housing shortage was reported at the lower and higher price points corresponding to those income brackets experiencing the greatest increase in households.

The CNT report noted a shortage of 62,667 housing units, or 72 percent, at the 30 percent of Area Median Income (AMI) level. Although a surplus of housing was calculated for the middle income range, another housing “shortage” was indicated for households earning $60,000 and more. However, this is not considered a true shortage as these households have the option of purchasing less expensive housing. What this does suggest is that the shortage in housing units for the upper income brackets may impact housing for middle income households because the upper income brackets are “under consuming.” More important, this study has found that despite an increase in the number of housing units, there remains a shortage of housing for those making less than 30 percent of AMI.
The slow growth in the middle-income range in the Atlanta Area is corroborated by a recent report by the Brookings Institution which tracked the decline of middle-income neighborhoods in 12 selected metropolitan areas (including Atlanta), noting not only that middle income neighborhoods are declining in number but are becoming increasingly homogeneous and segregated—lower-income families are living in lower-income neighborhoods, while higher-income families are moving to higher-income neighborhoods.122

A report by Sawicki et al. determined that the availability of housing does not match up with salaries and locations of jobs within the metro Atlanta area.123 Areas of concentrated job clusters typically do not contain enough affordable housing units to meet the needs of workers in that job cluster, causing an ever increasing need to commute longer distances and for greater lengths of time.124 Atlanta recently was identified as the most expensive city in America for commuters. Between 1990 and 2000, the commute time for residents rose by 20 percent, the largest jump in the nation. Almost 12 percent of Atlanta workers have a commute time greater than 60 minutes.125

According to a recent study by the Center for Neighborhood Technology on the cost trade-offs and burdens of housing and transportation on working families in 28 metro cities, the Atlanta Metropolitan Statistical Area (MSA) ranks among the worst.126 On average in the metro Atlanta area, working families earning less than $40,000 a year spend over two-thirds of their income on housing and transportation combined. This is well above the national average of 50 percent.127 This disparity speaks to the degree of the Atlanta region’s spatial mismatch between jobs, salaries, and housing.128

Figures 11 and 12 show and compare the results of Atlanta’s MSA with the average of all 28 metro areas which include cities such as Boston, Chicago, Dallas, Los Angeles, Miami, New York, Philadelphia, and Seattle.129 Figure 11 shows that as income increases, the percentage of income spent on housing decreases. Once again, those making less than $20,000 or 30 percent of AMI are hit the hardest; 59 percent of income earned by households in this bracket goes toward housing costs.130 Figure 11 indicates a similar trend for the percent of income spent on transportation. Note that metro Atlantans making less than $20,000 are spending 63 percent of their income on transportation; the highest of all 28 metro areas studies.131 When the two costs were combined, the Atlanta MSA once again rated worst for those making less than $20,000. As Figure 11 illustrates, households in the lowest income bracket are spending more than 120 percent of their income on housing and transportation combined. This challenge is faced not only by very low income families, but also by families making under $50,000, who spend more than the national average of 50 percent on combined housing and transportation costs.132 In summation, those households that fall below 30 percent of AMI are bearing the highest cost burden for both housing and transportation. However, it should be noted that at almost all income levels, including upper income brackets, households in the Atlanta MSA are spending more for housing and transportation than the other 28 MSAs, as illustrated in Figure 12.
In the Atlanta MSA, affordable housing has been pushed to the outer suburbs where transit service does not exist or is extremely limited. In addition, 90 percent of low-to-moderate income workers in the Atlanta MSA drive a private vehicle to work with only 5 percent commuting by public transit. Thus the average total cost for transportation in the Atlanta MSA is $10,890,
Health Conditions
A national survey\textsuperscript{135} found that approximately 86 percent of the Atlanta MSA population believes they are in good to excellent health. This response ranks Atlanta 57\textsuperscript{th} out of over 150 MSAs. Only 43.6 percent of the adult population gets at least 30 minutes of moderate physical activity five or more days per week, or vigorous physical activity for 20+ minutes three or more days per week. Over 7 percent of adults had asthma at the time of the survey, and 7.5 percent of adults had diabetes.

While health status is an important indicator of a region’s overall health, access to health care is equally important. Between the years 2002 and 2004, 16.6 percent of Georgia’s population was uninsured, as compared to 15.5 percent of the U.S. population. Among Southeastern states, Alabama, Kentucky, South Carolina, Tennessee, Virginia, and West Virginia all had lower percentages of uninsured people than did Georgia.\textsuperscript{136}

Illness and Death Rates: The Georgia Department of Human Resources (DHR) tracks illness (morbidity) and death (mortality) rates throughout the state. For the purpose of this report, DHR information was gathered for the 13-county Atlanta region; it was disaggregated by race and ethnicity (when available); and the causes of death and illness (also known as morbidity) that have been indirectly linked to housing condition, neighborhood quality, and regional development patterns in the scientific literature were identified. These include infectious disease, chronic disease (including cancers, nutrition, cardiovascular, and respiratory), and external factors. In three instances—diabetes (chronic), asthma (chronic), and motor vehicle crashes (external)—more detailed information was gathered.\textsuperscript{*}

Trends in mortality and morbidity across causes, races, and counties were, for the most part, imperceptible. In terms of comparing the mortality rates of the 13-county Atlanta region against those of Georgia, there were several instances in which the mortality rates for the state exceeded those of the region. Morbidity rates, however, revealed a different trend. Across all categories at least one, if not multiple counties, exceeded the morbidity rates of the state.

Some trends can be loosely deciphered across counties, races, and causes. Cherokee, Coweta, Forsyth, and Fulton counties skewed towards more African Americans suffering from various health issues. Clayton, Douglas, and Henry counties were predominately white, while Cobb, DeKalb, Fayette, Gwinnett, Paulding, and Rockdale showed a mix of races suffering from various health problems. Infectious disease, diabetes, and asthma affected African Americans more often across all counties. Cardiovascular disease and cancer appear to affect whites across most counties, although cancer rates in African Americans in Fayette and Forsyth

\textsuperscript{*} The 13-county results of this analysis are found in the Appendix of this report.
counties were the highest of all counties. While external causes of morbidity—falls, homicide, fire, suicide, drowning, and other causes—had the highest rates and occurred most often in whites, morbidity rates caused by motor vehicle accidents rated highest and occurred most often in the “other” population category (primarily Hispanic and Latino).

One clear trend is the severity at which African Americans are affected by illness in Fulton County. In every disease category, except motor vehicle accidents, African Americans had higher morbidity rates than other races. In addition, for infectious disease, nutrition, diabetes, cardiovascular disease, respiratory illness, and asthma African Americans were disproportionately affected, sometimes as much as four times greater than other races. For example, the morbidity rate for diabetes in African Americans was 250.5 cases per 100,000 population, versus 54.9 cases for whites and 62.4 for others. Similar results for asthma were also evident; 210.5 for African Americans versus 47.8 for whites and 39.7 for others. The numbers show that African Americans living in Fulton County are at greater risk of suffering and potentially dying from infectious and chronic diseases. More research is needed to ascertain why this trend is occurring.

**Observations on Housing, Health, and People**

The culmination of a variety of data gathering makes it possible to observe certain conditions, and even small trends, in regards to housing, health, and people in the Atlanta region. While it is beyond the scope of this report to gather and analyze new data, the available data, although imperfect, do suggest that there is in fact a relationship between housing and health. New data are needed to ascertain exactly what kind of relationship there is and to what extent it exists.

**Figure 13. Morbidity Number (all causes) by Census Tract, 1999-2001**

**Figure 14. Total Population by Census Tract, 2000**

MAP SOURCE: Georgia Department of Human Resources, Division of Public Health, Office of Health Information & Policy, prepared from OASIS

Figure 13, showing morbidity numbers for all causes of ill health by census tract for the 13-county Atlanta region, appears to tell a dramatic story. However, this map only tracks morbidity numbers not rates. Thus, the census tracts with the largest numbers of people have the highest morbidity numbers. This inaccurate representation is evident by comparing Figures 13 and 14, where it is clear that the tracts with the largest population also have the greatest number of morbidities. In contrast, Figure 15 shows morbidity rates for all causes of morbidities by county (morbidity rates are calculated per 100,000 people, which normalizes the population numbers). According to Figure 13, the population in Forsyth, Paulding, and Gwinnett Counties are suffering from illness, relative to the rest of the region. But this assessment is inaccurate, as Figure 15 shows that morbidity rates for these counties are some of the lowest in the region. This is just one example of the challenges in interpreting the health data that is currently available.

Throughout this report the literature has supported the perspective that healthy housing is not simply a problem for low-income and minority households. To illustrate this fact in the Atlanta region, Figure 16 shows years of potential life lost (YPLL) for all causes of death during the 1999 to 2001 period. Public health professionals and economists use years of potential life lost (YPLL) to represent the number of years of life lost due to premature death. In Figure 16, years of potential life lost before age 75 that occur per 100,000 population are shown by census tract. The darker census tracts indicate areas with higher rates of YPLL, meaning more lives lost prematurely, adjusted for total population. Next, Figures 17, 18, and 19 show socioeconomic and housing conditions that have been attributed to poor health in previous studies. More specifically, Figure 17 shows percentage of people living in poverty by census tracts. Figure 18 shows the percentage of African American population by census tract. The African American population is singled out because, as mentioned earlier, research has shown that blacks are at higher risk of morbidities. Finally, Figure 19, indicates, on a county level, the percentage of that county’s housing stock that has moderate to severe physical problems, which could indicate a greater risk of associated negative health outcomes; the darker the color the larger the number of substandard housing units. When comparing the data in these three maps with the YPLL map, it is evident that while poverty, race, and housing condition do have impacts on health, it is not possible to identify the sole determining factors of an individual’s health status and one’s risk of dying prematurely. This further underscores the complexity of the housing and health link. Furthermore, these maps emphasize that poor health status is not only an inner city problem, but instead extends into the surrounding suburbs, making housing and health a region-wide issue.

* Morbidity rates are not readily available by census tract.
Figure 16. YPLL, 1999-2001

MAP SOURCE: Georgia Department of Human Resources, Division of Public Health, Office of Health Information & Policy, prepared from OASIS

Figure 17. Percentage of People Living in Poverty, using 1999 income, by Census Tract


Figure 18. Percentage African American Population by Census Tract, 2000


Figure 19. Housing with Moderate to Severe Physical Problems by County

The Complicated Nature of Housing and Health

In examining the health and housing link a large number of additional analysis was conducted on the demographic, socioeconomic, and health status of the 13 counties. Many findings were important but did not reveal definitive trends, direct, or causal links. This is not to say that those linkages do not exist, rather it suggests that there are issues with the data in terms of how it is collected and at what scale. Health data have been collected primarily by public health officials and have for the most part not been focused on the built environment. On the other hand, data collected on the built environment have not focused on issues related to health and thus there is imperfect data that suggest links between housing and health but do not corroborate causal or correlative relationships. In addition, the data as currently available are not collected at the appropriate scale to tell the story of housing and health. As was evident in the earlier maps, some of the data is collected on the county level, others on the census tract level. Census tract or smaller is the necessary scale to really begin making those links. The maps also indicate that the normal indicators of health, such as race and income, do not fully explain the housing and health link. It is difficult to ascertain what the determining factor for ill health is. The difficulty of determining where one health determinant ends and another begins and what conditions relative to the housing unit, neighborhood, or region are at play in the health of an individual underscores the need for more targeted research and data collection.
Section IV: Recommendations

The impact of housing on health is both direct and indirect in its nature. This report recognizes this duality with all sections structured to reflect this complex relationship. We recommend that future research address the dual nature of healthy housing. This research, along with future public policy attempts should focus on making indirect linkages between health and housing more concrete in addition to strengthening our understanding of more direct determinants of health.

Following are several recommendations for further research, data gathering, stakeholder involvement, and policy analysis.

**Build consensus on housing and health in the Atlanta region**
Undertake an initiative to build consensus on the vision of healthy housing among the various stakeholders, practitioners, and researchers. Ensure that this is a multidisciplinary effort that involves housing experts, public health experts, city planners, financiers, engineers, architects, transportations planners, community members, and elected officials among appropriate others. Build a partnership amongst these entities to ensure that useful data are collected and shared, that policies and projects are influenced by health considerations, and that interventions are evaluated.

**Conduct policy audits to achieve healthy housing**
Develop auditing procedures to review transportation, land use, and affordable housing policies and regulations based on research linking health and housing. For example, the data studied in this report point to a lack of housing longevity. It appears that much of the region’s substandard housing can be found in units constructed since 1980. An evaluation of building codes, regulations, and practices through a health lens could prove beneficial to the future of housing construction, especially considering that the region is projected to experience considerable population growth and hence new housing construction.

**Conduct case studies to examine the housing and health link in the Atlanta region**
Data on health as it relates to housing are often collected on a smaller scale in order to make the larger housing and health links. The Atlanta region has the opportunity to be at the forefront of data collection while simultaneously furthering the housing and health research because of the Atlanta Neighborhood Development Partnership and the Atlanta Housing Authority’s efforts to move people out of public housing and into mixed-income communities. So much information is already collected by the Housing Authority, here is an opportunity to conduct longitudinal case studies of residents moving into mixed-income communities to measure the effects of mixed-income communities (and design elements within them) on residents’ quality of life over time. Studies should also examine the nature of association (i.e. correlative vs. causal) between health and the built...
environment and develop indicators of these associations. This should be a multi-
faceted/multi-part study focusing on various neighborhood characteristics (design, 
connectivity, homogeneity (racial and income), mix of land uses, mix of housing types, 
etc.) and their effects on physical activity and health. Such studies should also explore 
the ramifications of the health effects of the built environment on different demographic 
groups, especially at risk groups like children, older adults, and low-income households. 
Research in this arena could also study the association between various factors—like 
commute time, jobs/housing imbalance, neighborhood type, and access to healthy 
foods—on health, in particular obesity and physical activity levels.

Make more explicit the transportation-housing-health link in regional policy

The effect of traffic congestion on productivity is frequently at the center of public policy 
discussion. However, the availability, location, cost, and quality of a more diversified 
housing stock and the resulting opportunity to reduce the need to travel along with the 
potential associated positive health outcomes are often not part of the public debate. Yet, 
there are few commodities more critically important to a region than the health and well-
being of its citizens. In addition, health and quality of life are primary considerations in the 
region’s bid to remain an attractive destination for employers, employees, and visitors. 
Implicit within this recommendation is the expectation that analysis will be conducted to 
measure the benefits associated with greater housing diversity and price points and 
increases in the transit and pedestrian infrastructure. The objective of having the cost of 
transportation and housing be less than half of household income is one example of a 
regional policy that focuses greater attention on the transportation-housing-health link.

Coordinate data collection and develop a set of health and housing indicators

It is not an easy task to decide what data need to be collected and how to go about 
collecting it. This difficulty calls for bringing decision makers from a variety of disciplines 
together to jointly develop a data collection framework. Included at the table should be 
representatives of local jurisdictions along with housing experts, city planners, public 
health practitioners, and administrators responsible for housing projects in order to 
discuss methods and opportunities for gathering and sharing data. This is also an 
opportunity to look to others for best practices and lessons learned. For example, the 
Large Analysis and Review of European Housing and Health Status (LARES) project 
uses a survey aimed at a comprehensive understanding of housing and health.137 
Created by the World Health Organization, this project developed a methodological 
approach and survey tools to gather information about the health and housing 
relationship.

Create healthy housing

Housing is defined as "the conjunction of the dwelling, the home, the immediate 
environment and the community." This broad definition allows us to begin to address the 
health and housing connection recognizing the many indirect effects that ultimately shape 
health outcomes. The development community must be made a partner in creating more 
financially attractive housing that promotes active and healthy living. Increasingly there is 
demand for denser housing and mixed-use, walkable, affordable and pedestrian friendly 
communities. Municipalities and counties should create incentives for developers who 
construct housing meeting the broad definition outlined above.
Section V: The Atlanta Region Responds to Housing and Health

We know, based on decades of research, that housing impacts human health and through this report we have begun to link the Atlanta region’s housing conditions to the population’s health. Much work remains to be done to fully understand the benefits of healthy housing, but it is clear that many local stakeholders are investing resources to better understand the healthy housing relationship.

Following are several research and data gathering activities currently in progress. This is not an exhaustive list, but it does illustrate the breadth and multi-sectoral interest in this subject.

**Neighborhoods Count**

Neighborhoods Count was a project undertaken to establish a baseline of data to allow users to measure the overall progress and direction of change in the five neighborhoods of Atlanta that make up Neighborhood Planning Unit V. The Neighborhoods Count databook is the result of the work of a group of neighborhood residents and community-based organizations known as the Neighborhood Data Advisory Group (NDAG). Neighborhoods Count includes data from many different sources to provide a foundation for meaningful dialogue about the value of neighborhood residents and options and choices for the future. It also includes history and profiles of each neighborhood along with local success stories. Finally, the databook helps identify gaps between individual neighborhoods, the City of Atlanta, and Fulton County.

Support: Annie E. Casey Foundation
Status: completed
Contact: Annie E. Casey Foundation, T: 404.688-5525; OR LaShawn M. Hoffman, NPU V Chairman, T: 404-522-9331, E: lhoffman0706@yahoo.com

**Atlantic Station Health Study**

Can mixed use residential neighborhoods like Atlantic Station provide opportunities for residents to get out of their cars and be more physically active than in other residential settings? Can neighborhoods like Atlantic Station help reduce the health risks of sedentary lifestyles and improve the quality of life among residents? Researchers from Emory University’s Rollins School of Public Health want to answer these and other questions by studying residents who move into Atlantic Station. They will study whether and how travel and physical activity behaviors change when people move to Atlantic Station.

Support: Centers for Disease Control and Prevention
Status: Scheduled for completion September 2009
Contact: Karen Mumford, Ph.D., Emory University, E: kmumfor@sph.emory.edu

**BeltLine Health Impact Assessment**

The proposed BeltLine has generated excitement throughout the Atlanta community as a solution to Atlanta’s need for open space and transportation alternatives. How will this 22 mile multimodal path and park system affect the quality of life of the 225,000 residents living in communities...
around the Beltline? Georgia Tech’s Center for Quality Growth and Regional Development and the Center for Disease Control are teaming up to address this question and others relating to physical activity, social capital, safety, equity and fiscal impacts through a Health Impact Assessment (HIA). The purpose of the HIA is to make health outcomes a significant aspect of the project definition and approval. The BeltLine HIA is the first such study done in the United States to evaluate a major transportation/land use project that has the potential for long-term, widespread redevelopment impact.

Support: Robert Wood Johnson Foundation
Status: scheduled for completion December 2006
Contact: Karen Leone de Nie, Georgia Tech’s Center for Quality Growth and Regional Development, P: 404.385.5125, E: k.leonedenie@gatech.edu

Buford Highway Health Impact Assessment
Buford Highway, a seven lane arterial highway that connects downtown Atlanta to its northern suburbs, is one of the country’s most dangerous roadways. 12 percent of the residents who live on or near Buford Highway do not have a car, yet the highway is a hostile, and often times deadly, environment to pedestrians. The Center for Disease Control, in collaboration with Project MOVE, conducted a health impact assessment to examine the impacts of a proposed highway redevelopment project that included the addition of sidewalks, crosswalks, and bike-lanes and the reduction in the number of car lanes. This study looked at issues such as pedestrian safety, physical activity, and social capital.

Support: Robert Wood Johnson Foundation
Status: completed
Contact: Candace Rutt, Ph.D., Centers for Disease Control and Prevention, P: 770.488.6015, E: crutt@cdc.gov

Neighborhood Parks and Active Living
Do parks serve as venues for physical activity and if so, what factors are related to use of and physical activity in parks? A group of researchers from Emory University, the University of Georgia, Georgia Tech, and the CDC are studying urban neighborhood parks in DeKalb County, GA as settings for physical activity. Researchers are studying who uses parks and for what purposes (exercise, meditation, etc); how park users travel to parks (on foot; by car); and residential proximity to parks. Preliminary results suggest that those who live closer to parks use them more frequently and receive a greater percentage of their weekly exercise in parks.

Support: Robert Wood Johnson Foundation
Status: scheduled for completion June 2007
Contact: Karen Mumford, Ph.D., Emory University, E: kmumfor@sph.emory.edu

Physical Activity and Use of the PATH Trail at Arabia Mountain Preserve
Proximity of housing developments to recreational trails and paths may provide health benefits to nearby residents in the form of physical activity opportunities. Researchers from Emory University’s Rollins School of Public Health are collaborating with members from the PATH Foundation to study physical activity levels among users of the Arabia Mountain Trail, a newly constructed multi-use trail through a predominantly African American portion of DeKalb County, Georgia. According to 2000 Census data, approximately 80 percent of the population residing near or along this trail is African American. As a result, the Arabia Mountain Trail provides a unique opportunity to assess the health and physical activity impacts of trail use among African Americans.

Support: Healthcare Georgia Foundation
Status: scheduled for completion February 2007
Contact: Karen Mumford, Ph.D., Emory University, E: kmumfor@sph.emory.edu
Many other city, county, state, and federal agencies, as well as nonprofit and academic institutions are responding to need to address the impacts the built environment has on human health. For example, the DeKalb County Board of Health sponsors a “Built Environment” listserv where information about meetings and reports pertaining to transportation, land use, and health are disseminated throughout the region. The Atlanta Regional Health Forum, a nonpartisan, nonprofit coalition dedicated to creating healthy local communities, has developed a booklet on land use planning for public health practitioners to invite health experts into land development discussions. The Atlanta Regional Commission (ARC) hosts the Livable Centers Initiative, which encourages local jurisdictions to plan and implement strategies that link transportation improvements with land use development strategies to create sustainable, livable communities consistent with regional development policies. Emory University, the Centers for Disease Control and Prevention, and Georgia Tech work together to host a monthly forum known as the Healthy Places Research Group (HPRG). This Group brings together researchers and practitioners from many disciplines to explore the relationship between the built environment and the health of communities. Furthermore, the ARC’s Aging Resources division provides recommendations regarding community design for the region’s growing older adult population.

These are just a sampling of the activities happening in the Atlanta region to address policies, regulations, and research regarding health and the built environment. Collectively, these efforts have begun to place the Atlanta region at the forefront of a growing movement to preserve and enhance quality of life through the creation of healthy places, of which healthy housing is critically important.
Appendix 1: Glossary

Accessibility – Distance to or from destinations or facilities.

Affordable Housing - Housing that cost no more than 30% of annual household income.

Built Environment – Defined broadly as human-made buildings and structures, as opposed to natural features. Includes land use patterns, transportation systems, and design features that together provide opportunities for travel and physical activity.

Connectivity – The directness of travel to destinations.

Cost burden - Ratio between payments for housing (including utilities) and reported household income.

Density – Typically measured as employment or population per square mile.

Direct Medical Costs – Those costs associated with preventive, diagnostic, and treatment services.

Exclusionary Zoning - The abuse of zoning to impose large minimum lot size and square footage requirements in order to exclude housing for low income households.

Gentrification – An influx of one societal group, usually of a higher socio-economic class, into a community for the purpose of establishing itself as residents and homeowners, thereby displacing existing residents.

Health - A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

Health Determinants - Personal behaviors and lifestyles as well as influences within a community that can sustain or damage health. Examples include living and working conditions, access to health services, and general socio-economic, cultural and environmental conditions.

Health Disparities - Differences in the prevalence of morbidity, mortality and other adverse health conditions among specific population groups in the United States.

Health Impact Assessment – A set of methods and tools used to answer how policies, plans, programs, or projects affect health, health behaviors, and social resources necessary for health.

Household - All persons who occupy a housing unit.
**Housing** - The conjunction of the dwelling, the home, the immediate environment and the community.

**Inclusionary Zoning** - A strategy to encourage the development of affordable housing by offering developers incentives, (e.g. density bonuses, parking reductions and impact fee waivers) in exchange for a dedicated number of units targeted for income groups earning 80% of the area median income or lower.

**Indirect Medical Costs** – Costs related to morbidity and mortality costs. Morbidity costs are defined as the value of income lost from decreased productivity, restricted activity, absenteeism, and bed days. Mortality costs are the value of future income lost by premature death.

**Land Use Mix** – Diversity or variety of land uses (i.e. residential, commercial, industrial).

**Longitudinal Studies** – Data collected from the same population at regular intervals over time.

**Low income** - Families or individuals reporting income that does not exceed 80% of the HUD adjusted area median income.

**Moderate income** - Household income of 120 percent of area median by household size.

**Morbidity** - Illness or disability rate, usually expressed per 1000 population.

**Mortality** - Death rate, usually expressed per 1,000 people.

**Neighborhood/Community** - Localized communities with geographic, psychological and social meaning.

**New-Urbanist Developments** – Development whose design is characterized by land use and street patterns that encourage physical activity such as walking and cycling. They typically include such features as interconnected street networks, sidewalks, bicycle lanes, mixed uses, and higher densities as compared to other suburban developments.

**Social Capital** – Those features of social organization – such as the extent of interpersonal trust among citizens, norms of reciprocity, and density of civic organizations – that facilitate cooperation for mutual benefit.

**Social Equity** – The need for the fair distribution of the benefits and costs of conservation among different social groups and individuals.

**Social Exclusion** – A process whereby certain individuals are prevented from fully participating in society due to discrimination based on poverty, lack of basic competencies, or other traits.

**Transit-Oriented Development** – Projects that involve mixed-use development near public transit stations.
Universal Design- The design of products and environments that are usable by all people, especially those with disabilities. Universal Design is distinguished by six principles:

1. Equitable Use - The design is useful and marketable to people with diverse abilities.
2. Flexibility in Use - The design accommodates a wide range of individual preferences and abilities.
3. Simple and Intuitive Use - Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.
4. Perceptible Information - The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.
5. Tolerance for Error - The design minimizes hazards and the adverse consequences of accidental or unintended actions.
6. Physical Effort - The design can be used efficiently and comfortably with a minimum fatigue.
7. Size and Space for Approach and Use - Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

Workforce Household - Households with at least one full-time worker, whose members earn incomes too low to afford to pay market prices for homes or apartments in the communities where they work, but, by most definitions, too high to enable them to qualify for significant federal housing subsidies.
Appendix 2: Death and Morbidity Rates

The data is presented as a general reference of health status in the 13-county Atlanta region. The Georgia Department of Human Resources (DHR) tracks illness (morbidity) and death (mortality) rates throughout the state. For the purpose of this report, DHR information has been broken down in several ways. First, the data is provided for the 13-counties in the Atlanta region. Second, the data has been disaggregated by race and ethnicity (when available). And third, the causes of death and illness that have been linked to housing and neighborhood quality have been separated out. These include infectious disease, chronic disease (including cancers, nutrition, cardiovascular, and respiratory), and external factors. In three instances—diabetes, asthma, and motor vehicle crashes—more detailed information is presented.

The death rate is the number of deaths per 100,000 population. Morbidity is the number of persons discharged from non-federal acute-care in-patient facilities for illness, and the morbidity rate is the number of people discharged per 100,000 population. Therefore, higher rates illustrate greater numbers of deaths or illnesses. Within the table, the highest rates in each category are highlighted to reveal a pattern. It is important to note that these numbers only captured diagnosed illnesses. People without health care or with inadequate health care insurance may go undiagnosed.
## Mortality Rates by Race and Ethnicity by State and County, 2004

The number of deaths per 100,000

### All Causes

<table>
<thead>
<tr>
<th>Mortality Rate</th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>744.5</td>
<td>526.7</td>
<td>511</td>
<td>506.6</td>
<td>657.6</td>
<td>608.7</td>
<td>647.3</td>
<td>617.8</td>
<td>481.8</td>
<td>689.1</td>
<td>396.8</td>
<td>521</td>
<td>545.6</td>
<td>645.7</td>
</tr>
<tr>
<td>White</td>
<td>812.3</td>
<td>549.6</td>
<td>927.4</td>
<td>602.9</td>
<td>653.3</td>
<td>798.7</td>
<td>778.7</td>
<td>690.8</td>
<td>502.9</td>
<td>632.2</td>
<td>471.1</td>
<td>578.3</td>
<td>586.6</td>
<td>798.3</td>
</tr>
<tr>
<td>Black</td>
<td>675.3</td>
<td>356.2</td>
<td>336</td>
<td>289.3</td>
<td>751.5</td>
<td>522</td>
<td>387.7</td>
<td>368.5</td>
<td>196.3</td>
<td>829.9</td>
<td>242</td>
<td>415.1</td>
<td>322.2</td>
<td>388.6</td>
</tr>
<tr>
<td>Other</td>
<td>130.7</td>
<td>*</td>
<td>122.6</td>
<td>104.6</td>
<td>*</td>
<td>160.4</td>
<td>150.4</td>
<td>176.8</td>
<td>*</td>
<td>84</td>
<td>168</td>
<td>153.1</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>126</td>
<td>128</td>
<td>125.8</td>
<td>113.9</td>
<td>217.7</td>
<td>142.4</td>
<td>125.7</td>
<td>239.9</td>
<td>138</td>
<td>127.5</td>
<td>117.5</td>
<td>153.4</td>
<td>143.8</td>
<td>96</td>
</tr>
</tbody>
</table>

### Infectious Disease

<table>
<thead>
<tr>
<th>Mortality Rate</th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>27.6</td>
<td>13.7</td>
<td>21.1</td>
<td>16.5</td>
<td>26.6</td>
<td>30</td>
<td>11.2</td>
<td>15.8</td>
<td>11.4</td>
<td>46.4</td>
<td>11.1</td>
<td>16.3</td>
<td>15.1</td>
<td>18.2</td>
</tr>
<tr>
<td>White</td>
<td>22.2</td>
<td>14.2</td>
<td>23.5</td>
<td>15.2</td>
<td>18.8</td>
<td>24.6</td>
<td>12.3</td>
<td>18.5</td>
<td>12</td>
<td>23.9</td>
<td>12</td>
<td>14</td>
<td>15.4</td>
<td>17.8</td>
</tr>
<tr>
<td>Black</td>
<td>43.2</td>
<td>*</td>
<td>21.1</td>
<td>23.8</td>
<td>65.8</td>
<td>36.8</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td>78.5</td>
<td>11.9</td>
<td>25.6</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>0</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>*</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>5</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td>8.4</td>
<td>*</td>
<td>0</td>
<td>10.3</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Cancer

<table>
<thead>
<tr>
<th>Mortality Rate</th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>161.9</td>
<td>121.4</td>
<td>114.4</td>
<td>118.5</td>
<td>145.2</td>
<td>132.7</td>
<td>150.2</td>
<td>165.8</td>
<td>119.8</td>
<td>150</td>
<td>113.5</td>
<td>118.9</td>
<td>161.4</td>
<td>228.5</td>
</tr>
<tr>
<td>White</td>
<td>179.7</td>
<td>128.1</td>
<td>225.4</td>
<td>141.2</td>
<td>144.8</td>
<td>177.3</td>
<td>194</td>
<td>183.8</td>
<td>125.3</td>
<td>149</td>
<td>116.4</td>
<td>133.4</td>
<td>128.1</td>
<td>188.2</td>
</tr>
<tr>
<td>Black</td>
<td>139.5</td>
<td>63.6</td>
<td>65.2</td>
<td>65.7</td>
<td>164.6</td>
<td>111.2</td>
<td>58.6</td>
<td>114.4</td>
<td>*</td>
<td>167.2</td>
<td>50.6</td>
<td>66.6</td>
<td>80.6</td>
<td>122.5</td>
</tr>
<tr>
<td>Other</td>
<td>31.7</td>
<td>0</td>
<td>32</td>
<td>30.3</td>
<td>0</td>
<td>40.1</td>
<td>*</td>
<td>*</td>
<td>18.7</td>
<td>44.8</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>19.8</td>
<td>*</td>
<td>45.8</td>
<td>20</td>
<td>0</td>
<td>23.5</td>
<td>*</td>
<td>*</td>
<td>12.1</td>
<td>16</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Nutrition

<table>
<thead>
<tr>
<th>Mortality Rate</th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>26.9</td>
<td>16.6</td>
<td>23.8</td>
<td>12.1</td>
<td>19.9</td>
<td>21.9</td>
<td>22.4</td>
<td>15.8</td>
<td>11.4</td>
<td>19.6</td>
<td>12.3</td>
<td>17.6</td>
<td>18.9</td>
<td>18.2</td>
</tr>
<tr>
<td>White</td>
<td>20</td>
<td>17.3</td>
<td>41.1</td>
<td>12.6</td>
<td>16.5</td>
<td>21.5</td>
<td>26</td>
<td>16</td>
<td>12</td>
<td>14.1</td>
<td>13.2</td>
<td>14.9</td>
<td>18.6</td>
<td>21.8</td>
</tr>
<tr>
<td>Black</td>
<td>31.5</td>
<td>0</td>
<td>16.1</td>
<td>13.3</td>
<td>13.8</td>
<td>23.3</td>
<td>16.3</td>
<td>*</td>
<td>0</td>
<td>28.6</td>
<td>9.5</td>
<td>25.6</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Other</td>
<td>6.2</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>10.5</td>
<td>*</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>3.2</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Nutrition -Diabetes

<table>
<thead>
<tr>
<th>Mortality Rate</th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>18.4</td>
<td>9.7</td>
<td>15.9</td>
<td>7.8</td>
<td>15.2</td>
<td>15.7</td>
<td>16.8</td>
<td>12.8</td>
<td>6.6</td>
<td>13.3</td>
<td>9.4</td>
<td>11.3</td>
<td>10.4</td>
<td>14.3</td>
</tr>
<tr>
<td>White</td>
<td>17.3</td>
<td>10.5</td>
<td>26.1</td>
<td>8.2</td>
<td>11.8</td>
<td>14.2</td>
<td>17.8</td>
<td>12.3</td>
<td>7.2</td>
<td>6.9</td>
<td>9.5</td>
<td>7.8</td>
<td>11</td>
<td>17.8</td>
</tr>
<tr>
<td>Black</td>
<td>22.6</td>
<td>0</td>
<td>12.4</td>
<td>8.4</td>
<td>32.9</td>
<td>17.5</td>
<td>16.3</td>
<td>*</td>
<td>0</td>
<td>22.4</td>
<td>8.7</td>
<td>23.1</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Other</td>
<td>4.5</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>9.2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>2.3</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
### Cardiovascular Mortality Rate

<table>
<thead>
<tr>
<th></th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All</strong></td>
<td>253.4</td>
<td>165.4</td>
<td>187.2</td>
<td>169.4</td>
<td>224</td>
<td>183.4</td>
<td>222</td>
<td>186.5</td>
<td>157</td>
<td>213.9</td>
<td>114.6</td>
<td>183.1</td>
<td>169.9</td>
<td>199.2</td>
</tr>
<tr>
<td><strong>White</strong></td>
<td>275.3</td>
<td>171.4</td>
<td>301.7</td>
<td>206.1</td>
<td>222.5</td>
<td>245.6</td>
<td>267.8</td>
<td>203.5</td>
<td>162.3</td>
<td>184.4</td>
<td>140.9</td>
<td>201</td>
<td>188.6</td>
<td>249.6</td>
</tr>
<tr>
<td><strong>Black</strong></td>
<td>233.6</td>
<td>127.2</td>
<td>112.4</td>
<td>82.4</td>
<td>257.8</td>
<td>151.9</td>
<td>130.3</td>
<td>133.4</td>
<td>157</td>
<td>270.9</td>
<td>54.6</td>
<td>158.9</td>
<td>64.4</td>
<td>114.1</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>37.9</td>
<td>*</td>
<td>0</td>
<td>33</td>
<td>0</td>
<td>66.8</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>32.7</td>
<td>42</td>
<td>*</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Hispanic or Latino</strong></td>
<td>21.7</td>
<td>*</td>
<td>0</td>
<td>23.1</td>
<td>*</td>
<td>25.1</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>22.4</td>
<td>20.7</td>
<td>*</td>
<td>0</td>
<td>*</td>
</tr>
</tbody>
</table>

### Respiratory Mortality Rate

<table>
<thead>
<tr>
<th></th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All</strong></td>
<td>68.7</td>
<td>56.1</td>
<td>41.9</td>
<td>43.3</td>
<td>56</td>
<td>42.8</td>
<td>73.7</td>
<td>57.2</td>
<td>43.2</td>
<td>49.2</td>
<td>35.2</td>
<td>39.5</td>
<td>48.1</td>
<td>43</td>
</tr>
<tr>
<td><strong>White</strong></td>
<td>86.4</td>
<td>60.7</td>
<td>102.1</td>
<td>56.1</td>
<td>62.4</td>
<td>75.6</td>
<td>97</td>
<td>69.1</td>
<td>45.8</td>
<td>56.6</td>
<td>45.2</td>
<td>48.3</td>
<td>52.6</td>
<td>63.4</td>
</tr>
<tr>
<td><strong>Black</strong></td>
<td>37.5</td>
<td>0</td>
<td>14.3</td>
<td>10.5</td>
<td>32.9</td>
<td>24.1</td>
<td>26.1</td>
<td>*</td>
<td>0</td>
<td>45.9</td>
<td>14.2</td>
<td>20.5</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>6.5</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Hispanic or Latino</strong></td>
<td>5.3</td>
<td>0</td>
<td>*</td>
<td>7.7</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Respiratory- Asthma Mortality Rate

<table>
<thead>
<tr>
<th></th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All</strong></td>
<td>1.3</td>
<td>0</td>
<td>*</td>
<td>0.8</td>
<td>0.4</td>
<td>1.6</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>1.7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>White</strong></td>
<td>0.8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Black</strong></td>
<td>2.4</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>2.6</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>2.8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Hispanic or Latino</strong></td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### External Mortality Rate

<table>
<thead>
<tr>
<th></th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All</strong></td>
<td>61.7</td>
<td>52.1</td>
<td>49.1</td>
<td>45.6</td>
<td>60.7</td>
<td>56.2</td>
<td>59.7</td>
<td>50.3</td>
<td>35.6</td>
<td>63.5</td>
<td>42.8</td>
<td>52</td>
<td>57.6</td>
<td>53.4</td>
</tr>
<tr>
<td><strong>White</strong></td>
<td>68.7</td>
<td>52</td>
<td>86.9</td>
<td>52.7</td>
<td>62.4</td>
<td>64.1</td>
<td>68.3</td>
<td>55.5</td>
<td>37.8</td>
<td>57.8</td>
<td>45.4</td>
<td>57.9</td>
<td>63.6</td>
<td>65.4</td>
</tr>
<tr>
<td><strong>Black</strong></td>
<td>51.7</td>
<td>76.3</td>
<td>31.7</td>
<td>31.4</td>
<td>54.9</td>
<td>54</td>
<td>45.6</td>
<td>33.8</td>
<td>0</td>
<td>76.8</td>
<td>43.3</td>
<td>35.4</td>
<td>*</td>
<td>33.8</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>20.1</td>
<td>*</td>
<td>26.6</td>
<td>*</td>
<td>24.1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Hispanic or Latino</strong></td>
<td>42.6</td>
<td>45.2</td>
<td>38.1</td>
<td>32.3</td>
<td>*</td>
<td>53.6</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>46.5</td>
<td>43.2</td>
<td>*</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### External- Motor Vehicle Accident Mortality Rate

<table>
<thead>
<tr>
<th></th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All</strong></td>
<td>16.8</td>
<td>16</td>
<td>10.2</td>
<td>5.4</td>
<td>20.9</td>
<td>12.9</td>
<td>16.8</td>
<td>11.8</td>
<td>11.4</td>
<td>12</td>
<td>10.8</td>
<td>15.7</td>
<td>17</td>
<td>18.2</td>
</tr>
<tr>
<td><strong>White</strong></td>
<td>18.8</td>
<td>15.5</td>
<td>12.9</td>
<td>5.3</td>
<td>18.8</td>
<td>14.2</td>
<td>15</td>
<td>11.1</td>
<td>12</td>
<td>11.9</td>
<td>10.8</td>
<td>15.8</td>
<td>18.6</td>
<td>23.8</td>
</tr>
<tr>
<td><strong>Black</strong></td>
<td>13.5</td>
<td>*</td>
<td>8.7</td>
<td>6.3</td>
<td>27.4</td>
<td>12.4</td>
<td>22.8</td>
<td>*</td>
<td>0</td>
<td>*</td>
<td>13.1</td>
<td>14.2</td>
<td>*</td>
<td>12.8</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>6.8</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Hispanic or Latino</strong></td>
<td>16</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>21.8</td>
<td>*</td>
<td>0</td>
<td>*</td>
<td>15.5</td>
<td>16</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

**SOURCE:** Georgia Department of Human Resources, Division of Public Health, Office of Health Information and Policy. February 2006.

**Death rate is the number of deaths per 100,000 population.**

**Morbidity rate is the number of morbidity discharges per 100,000 population. Persons are counted only once if readmitted for the same chronic condition. Morbidity excludes people discharged dead, healthy newborn infants, and healthy mothers giving birth to newborn infants. Data on morbidity rates are not disaggregated to the Hispanic or Latino population.
## Morbidity Rates by Race and Ethnicity by State and County, 2004

The number of morbidity discharges per 100,000

### All Causes

<table>
<thead>
<tr>
<th>Morbidity Rate</th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>8,574.70</td>
<td>7,259.60</td>
<td>6,828.40</td>
<td>6,879.50</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>7,836.40</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>White</td>
<td>8,628.00</td>
<td>7,156.60</td>
<td>8,777.80</td>
<td>7,031.50</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>8,036.00</td>
<td>...</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>8,886.90</td>
<td>10,458.00</td>
<td>6,152.50</td>
<td>7,140.10</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>6,691.20</td>
<td>...</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>5,383.20</td>
<td>5,640.20</td>
<td>3,778.70</td>
<td>3,865.70</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>3,986.90</td>
<td>...</td>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>

### Infectious Disease

<table>
<thead>
<tr>
<th>Morbidity Rate</th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>263.20</td>
<td>182.60</td>
<td>184.20</td>
<td>169.30</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>229.60</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>White</td>
<td>232.40</td>
<td>182.60</td>
<td>228.90</td>
<td>163.70</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>180.30</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Black</td>
<td>346.70</td>
<td>254.50</td>
<td>173.90</td>
<td>206.10</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>215.40</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Other</td>
<td>155.60</td>
<td>*</td>
<td>69.30</td>
<td>96.40</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>*</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

### Cancer

<table>
<thead>
<tr>
<th>Morbidity Rate</th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>371.20</td>
<td>252.50</td>
<td>313.30</td>
<td>232.60</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>300.70</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>White</td>
<td>335.20</td>
<td>249.40</td>
<td>385.10</td>
<td>221.50</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>299.90</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Black</td>
<td>474.80</td>
<td>343.50</td>
<td>296.60</td>
<td>296.60</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>295.20</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Other</td>
<td>202.00</td>
<td>209.60</td>
<td>127.90</td>
<td>129.40</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>215.70</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

### Nutrition

<table>
<thead>
<tr>
<th>Morbidity Rate</th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>134.8</td>
<td>72.1</td>
<td>126.4</td>
<td>84.4</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>115.60</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>White</td>
<td>99.2</td>
<td>70.6</td>
<td>138.5</td>
<td>68.7</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>105.20</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Black</td>
<td>224.3</td>
<td>114.5</td>
<td>130.4</td>
<td>150.2</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>150.90</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Other</td>
<td>64.5</td>
<td>*</td>
<td>37.3</td>
<td>30.3</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>83.50</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

### Nutrition -Diabetes

<table>
<thead>
<tr>
<th>Morbidity Rate</th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>1,277.20</td>
<td>1,085.40</td>
<td>939.00</td>
<td>989.30</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>1,049.90</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>White</td>
<td>1,342.40</td>
<td>1,104.80</td>
<td>1,500.30</td>
<td>1,106.30</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>1,191.10</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Black</td>
<td>1,203.40</td>
<td>865.10</td>
<td>690.00</td>
<td>729.50</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>735.00</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Other</td>
<td>740.70</td>
<td>819.40</td>
<td>527.60</td>
<td>484.60</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>560.80</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
## Respiratory Morbidity Rate

<table>
<thead>
<tr>
<th>State</th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>835.60</td>
<td>613.70</td>
<td>540.90</td>
<td>563.50</td>
<td>571.30</td>
<td>556.90</td>
<td>901.00</td>
<td>457.90</td>
<td>643.60</td>
<td>619.70</td>
<td>454.60</td>
<td>656.40</td>
<td>755.20</td>
<td>684.70</td>
</tr>
<tr>
<td>White</td>
<td>876.80</td>
<td>602.20</td>
<td>850.00</td>
<td>606.60</td>
<td>607.40</td>
<td>548.80</td>
<td>1,094.20</td>
<td>478.60</td>
<td>643.50</td>
<td>440.00</td>
<td>489.80</td>
<td>705.60</td>
<td>783.90</td>
<td>796.30</td>
</tr>
<tr>
<td>Black</td>
<td>805.50</td>
<td>1,017.80</td>
<td>418.60</td>
<td>501.00</td>
<td>411.40</td>
<td>586.90</td>
<td>524.60</td>
<td>413.00</td>
<td>1,452.70</td>
<td>868.50</td>
<td>456.40</td>
<td>551.00</td>
<td>612.30</td>
<td>515.40</td>
</tr>
<tr>
<td>Other</td>
<td>378.80</td>
<td>362.00</td>
<td>186.50</td>
<td>220.30</td>
<td>503.00</td>
<td>310.10</td>
<td>*</td>
<td>243.10</td>
<td>227.60</td>
<td>326.80</td>
<td>221.80</td>
<td>428.60</td>
<td>386.30</td>
<td>*</td>
</tr>
</tbody>
</table>

## Respiratory- Asthma Morbidity Rate

<table>
<thead>
<tr>
<th>State</th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>109.8</td>
<td>69.3</td>
<td>81.5</td>
<td>73.2</td>
<td>67.4</td>
<td>115.9</td>
<td>127.8</td>
<td>42.4</td>
<td>75.1</td>
<td>117.9</td>
<td>82</td>
<td>76.5</td>
<td>79.3</td>
<td>69</td>
</tr>
<tr>
<td>White</td>
<td>86.1</td>
<td>64.4</td>
<td>78.7</td>
<td>56.1</td>
<td>69.4</td>
<td>66</td>
<td>131.1</td>
<td>30.8</td>
<td>74.7</td>
<td>47.8</td>
<td>76.7</td>
<td>86</td>
<td>75.7</td>
<td>55.5</td>
</tr>
<tr>
<td>Black</td>
<td>168.5</td>
<td>190.8</td>
<td>68.2</td>
<td>139.7</td>
<td>65.8</td>
<td>154.3</td>
<td>130.3</td>
<td>108</td>
<td>196.3</td>
<td>210.5</td>
<td>125.8</td>
<td>58.9</td>
<td>104.7</td>
<td>105.6</td>
</tr>
<tr>
<td>Other</td>
<td>61.1</td>
<td>*</td>
<td>37.3</td>
<td>35.8</td>
<td>0</td>
<td>74.8</td>
<td>*</td>
<td>*</td>
<td>38.7</td>
<td>44.6</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

## External Morbidity Rate

<table>
<thead>
<tr>
<th>State</th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>476.50</td>
<td>393.90</td>
<td>329.50</td>
<td>372.00</td>
<td>382.40</td>
<td>383.90</td>
<td>524.20</td>
<td>388.80</td>
<td>493.50</td>
<td>296.00</td>
<td>388.70</td>
<td>473.90</td>
<td>445.20</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>522.10</td>
<td>390.50</td>
<td>490.70</td>
<td>406.30</td>
<td>401.40</td>
<td>430.20</td>
<td>635.20</td>
<td>419.40</td>
<td>436.10</td>
<td>333.20</td>
<td>328.70</td>
<td>491.20</td>
<td>519.00</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>394.50</td>
<td>407.10</td>
<td>253.40</td>
<td>303.20</td>
<td>279.80</td>
<td>359.00</td>
<td>257.40</td>
<td>203.30</td>
<td>471.10</td>
<td>587.70</td>
<td>217.50</td>
<td>294.70</td>
<td>362.50</td>
<td>291.50</td>
</tr>
<tr>
<td>Other</td>
<td>325.90</td>
<td>476.40</td>
<td>250.50</td>
<td>195.50</td>
<td>503.00</td>
<td>312.80</td>
<td>541.50</td>
<td>486.30</td>
<td>351.70</td>
<td>350.20</td>
<td>182.40</td>
<td>489.80</td>
<td>386.30</td>
<td>412.40</td>
</tr>
</tbody>
</table>

## External- Motor Vehicle Accident Morbidity Rate

<table>
<thead>
<tr>
<th>State</th>
<th>Georgia</th>
<th>Cherokee</th>
<th>Clayton</th>
<th>Cobb</th>
<th>Coweta</th>
<th>DeKalb</th>
<th>Douglas</th>
<th>Fayette</th>
<th>Forsyth</th>
<th>Fulton</th>
<th>Gwinnett</th>
<th>Henry</th>
<th>Paulding</th>
<th>Rockdale</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>88.9</td>
<td>73.8</td>
<td>78.9</td>
<td>61.9</td>
<td>79.7</td>
<td>73.1</td>
<td>117.5</td>
<td>78</td>
<td>64.5</td>
<td>73.8</td>
<td>66.6</td>
<td>114.7</td>
<td>139.7</td>
<td>101.5</td>
</tr>
<tr>
<td>White</td>
<td>90.4</td>
<td>71.2</td>
<td>102.1</td>
<td>60.7</td>
<td>74.2</td>
<td>57.2</td>
<td>131.1</td>
<td>75.2</td>
<td>61.9</td>
<td>57.8</td>
<td>69.1</td>
<td>121.1</td>
<td>133.8</td>
<td>107</td>
</tr>
<tr>
<td>Black</td>
<td>83.5</td>
<td>*</td>
<td>67.7</td>
<td>65.7</td>
<td>76.8</td>
<td>81.3</td>
<td>61.9</td>
<td>63.5</td>
<td>*</td>
<td>90.1</td>
<td>62.5</td>
<td>79.4</td>
<td>153.1</td>
<td>80.3</td>
</tr>
<tr>
<td>Other</td>
<td>105</td>
<td>190.5</td>
<td>69.3</td>
<td>63.3</td>
<td>320.1</td>
<td>101.6</td>
<td>330.9</td>
<td>176.8</td>
<td>124.1</td>
<td>95.7</td>
<td>57.7</td>
<td>214.3</td>
<td>302</td>
<td>187.5</td>
</tr>
</tbody>
</table>

* Death rate is the number of deaths per 100,000 population.
** Morbidity rate is the number of morbidity discharges per 100,000 population. Persons are counted only once if readmitted for the same chronic condition. Morbidity excludes people discharged dead, healthy newborn infants, and healthy mothers giving birth to newborn infants. Data on morbidity rates are not disaggregated to the Hispanic or Latino population.

Acknowledgements

This report was commissioned by the Atlanta Neighborhood Development Partnership (ANDP). It was written under the direction of Catherine L. Ross, Ph.D., director of the Georgia Tech’s Center for Quality Growth and Regional Development (CQGRD); Karen Leone de Nie, research scientist at CQGRD; and Saskia Benjamin, research assistant at CQGRD. Contributors include Jason Barringer, Heather McCarey, Jessica Harbour Doyle, Mine Hashas, David Pierce, and Sundaram Vedala, all members of the CQGRD staff.

CQGRD wishes to express its appreciation to the ANDP Board and staff, as well as Larry Keating, Ph.D., Georgia Tech; Dan Immergluck, Ph.D., Georgia Tech; and Andrew Dannenberg, MD, MPH, Centers for Disease Control and Prevention, for their advice and recommendations during the development of this report.
References


7 WHO. 1986. Ottawa Charter for Health Promotion


9 Ibid.


11 When discussing the medical costs associated with disease there are direct and indirect costs. “Direct medical costs may include preventive, diagnostic, and treatment services... Indirect costs relate to morbidity and mortality costs. Morbidity costs are defined as the value of income lost from decreased productivity, restricted activity, absenteeism, and bed days. Mortality costs are the value of future income lost by premature death.” Centers for Disease Control and Prevention. [http://www.cdc.gov/nccdphp/dnpa/obesity/economic_consequences.htm]. Last accessed on 12/4/06.


14 Knowledge@Wharton. 2006. “Efforts are Growing to Trim the Fat from Employees and Employer’s Health Care Costs.” Research at Penn. [http://www.upenn.edu/researchatpenn/article.php?1130&bus]. Last accessed on 12/1/06.


16 Ibid.

17 Knowledge@Wharton. 2006. “Efforts are Growing to Trim the Fat from Employees and Employer’s Health Care Costs.” Research at Penn. [http://www.upenn.edu/researchatpenn/article.php?1130&bus]. Last accessed on 12/1/06.


19 Ibid.


21 Knowledge@Wharton. 2006. “Efforts are Growing to Trim the Fat from Employees and Employer’s Health Care Costs.” Research at Penn. [http://www.upenn.edu/researchatpenn/article.php?1130&bus]. Last accessed on 12/1/06.


32 Ibid.

Inequality in education, income, and occupation exacerbates the gap between the “haves” and the “have-nots.” 


[117] Center for Neighborhood Technology, Making the Case for Mixed Income Housing – Next Generation. As reviewed in draft form, 10/11/06.

[118] Ibid.

[119] Ibid.

[120] Center Ibid.

[121] Swaicki, D. et al. 2003. Fair Share Housing in the Atlanta Region. Georgia Institute of Technology, City and Regional Planning Program.


[124] Ibid.


[128] Ibid.


[130] Ibid.

[131] Ibid.

[132] Ibid.


[134] Ibid.

