

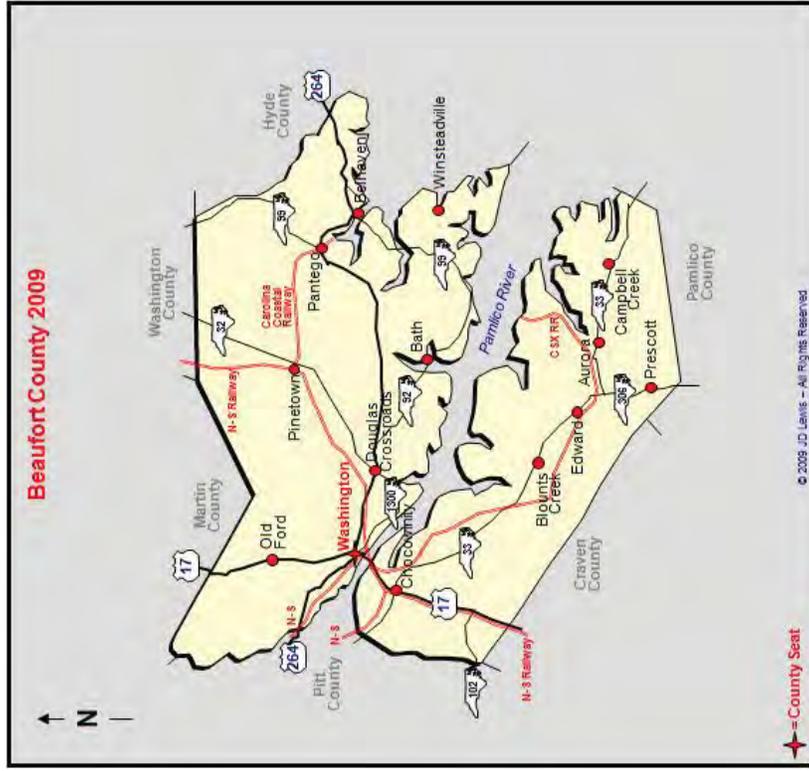
Appendix

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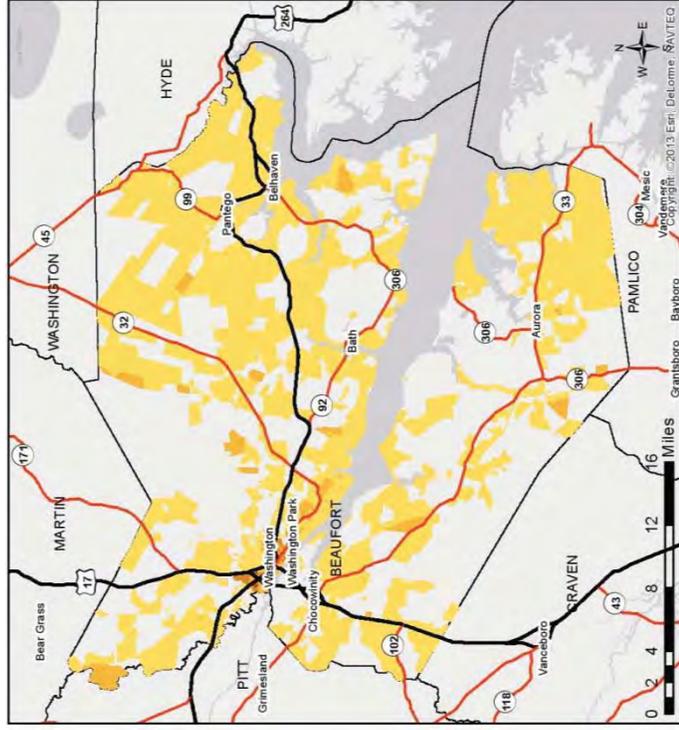
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Case Studies: Appendix

Beaufort County



Source: http://www.carolana.com/NC/Countries/beaufort_county_nc.html



Compilation of Disadvantaged Population Factors - Beaufort County

Number of Factors Exceeding Threshold (6 Total)



Threshold Values

- Low-income households: ≥ 28% of Population Below Poverty Level
- Households with mobility-impaired individuals: < 73% of Population 5 Years and Over Without Any Disability
- Households with youth of non-driving age: ≥ 23% of Population ≤ 14 years old
- Households with seniors: ≥ 29% of Population ≥ 62 years old
- Ethnic minority households: ≥ 64% Minority Population
- LEP households: ≥ 5% of Population or > 1000 persons per tract speaking English less than "Very Well"



Beaufort County Average: 0.54 factors

Data Source: 2011 Census Data Table S1701, S1801, P12, B02001, B16001, B08201

Beaufort County in brief

Beaufort County, located in the coastal plain and along the inland coast on Pamlico Sound, had a 2010 Census population of 47,759. The share of the population self-reporting as Black is 25%, with 7% Hispanic and 66% White. The historic town of Washington is located strategically at the confluence of the Tar and Pamlico rivers, with auto and train bridges providing key river crossings between the NE and SW halves of this river-bifurcated county. The county experienced modest growth of 6.2% from 2000 to 2010. The mean travel time to work (25.4 minutes) in this expansive but largely rural county is slightly longer than the state average of 23.4. Beaufort has very limited scheduled transit to five communities, and paratransit service across the county.

Beaufort County's population is relatively old (18% over 65, compared to 13% for the state) and poor (mean household income \$38,194 compared to \$43,417 for the state; 21% living below poverty line, compared to 17% for the state), although more households (71%) own their homes than the state average (67%). Unemployment is slightly above the state average.

Key informant interviews and resident focus groups

Key informant interviews involved eight interviews with 13 people, including representatives of

- Beaufort County Area Transit
- Beaufort County Social Services
- Beaufort County Manager's office
- Economic Development Division
- MidEast Council of Governments
- Pitt County Health Department, Community Transformation Project
- Aurora elected official
- Emergency Management Coordinator's office
- Washington Community and Cultural Resources Planning

Key informants from Beaufort County provided detailed comments and thoughtful suggestions about transportation needs and patterns in the County, and about the draft maps of transportation disadvantage the team generated and shared with them. A daylong visit to Washington and several of the smaller communities, and discussions with town and county informants, confirmed that the county seat of Washington has many cultural assets and committed professional and elected staff, as well as some challenges in transportation infrastructure and services and socio-demographic pressures. The county, likewise, has deep expertise among their staff, who are actively working on increasing infrastructure quality and transportation options.

The focus group held in Beaufort County did not align with the research protocol, which called for participation by non-practitioner non-expert (transportation) residents; indeed, each of the 12 people in the Beaufort focus group had some relevant knowledge of travel patterns and needs in

the county, whether from current or past professional work or through citizen involvement in local government. Nevertheless, the focus group was lively and productive, particularly with regard to ways the focus group mapping and discussion questions could be improved.

Main themes from interviews

Beaufort has distinctive traits, physical and social, that shape its transportation landscape. An inland coastal county bordering Pamlico Sound, with extensive flatlands and wetlands, the County hosts seven municipalities, numerous unincorporated settlements and a large rural area.

- Beaufort in some ways is a county divided, geographically, culturally, and politically. The County is divided nearly down the middle (on a NW to SE diagonal) by the mighty Pamlico River after it picks up the Tar River above Washington; this has implications for travel patterns, particularly for commuters working on the south side of the river. Politically, the seven current County Commissioners *all* are from the City of Washington, leaving Belhaven and Aurora without a direct voice, although in the past they had representatives on the Board.
- To some extent, Belhaven (in NE) identifies with and feels closer culturally to Hyde County.

Vulnerable populations in Beaufort County

- Elderly and others with health conditions have high demand for transportation services. Mental health patients and cognitively impaired residents are another vulnerable group.
- Community college students are an underserved, and potentially profitable, transit target.

Transportation infrastructure and supply

- BATS (Beaufort Area Transit Service) runs limited scheduled service to five towns; otherwise, public transport in Beaufort is demand-responsive. The dial-in service is RGP: Rural General Public. Much of the demand is for transport to Greenville in Pitt County, to East Carolina University's medical school and nearby clinics. The BATS director is experienced, committed and entrepreneurial; he has a growing paratransit operation he would like to expand and market. Students from Beaufort Technical Community College can get BATS service for a monthly charge.
- Medical trips usually are covered by Medicaid. Medical trips occur daily. Dialysis trips are scheduled in advance, and paid by Medicaid, an insurance provider, or the Dialysis Center. Vocational Rehab funds cover some trips. Funds generally are not moveable, so trips cannot be linked or mixed, which is a barrier for people using BATS for medical, work, and other trips.
- Taxi service is available in Washington and to some extent in Aurora, which is fairly densely populated; Pantego/Belhaven have no cab service; other areas have only limited cab service

Transportation challenges specific to Beaufort County

- The county has distinctly different types of settlement, with a rural/small-urban divide. Washington is the center of gravity; a few other towns get some traffic and attention; there are vast expanses of rural areas with limited transportation services and options.
- The Pamlico River divides the county nearly in two. A ferry (currently free, but likely to be tolled soon) provides critical access for employment on the south side.
- The county's size and diffuse employment and settlement patterns make it auto-dependent.

Solutions—formal and informal

- For communities off the beaten path, neighbors or friends may provide service, often for a fee.
- A ferry established for workers to the phosphate mine and to Cherry Point, which crosses the Pamlico River at Route 306, is seen by many residents as a critical part of highway system.

ITRE-generated county map of transportation disadvantage

Key informants in Beaufort County suggested revisions to the mapping protocol to improve relevance and usefulness.

- There is significant need for services right in Washington, so darker colors around the city are not surprising; the city would benefit from better walking and cycling conditions, and more travel options for residents. At the same time, Washington has better transportation capacity than the rural areas, so controlling for population and built environment could enhance maps.
- The lightest areas may not be meaningful: Weyerhaeuser stands, agricultural lands, woodlands.
- Some colored areas are easy to explain: A darker area NW of US-17/US-264 may be a trailer park; Aurora has limited grocery access; Pantego has a large minority population. Colors in the SE corner of county may relate to high industry with LEP (low English proficiency) employees, mostly Spanish-speaking, who are isolated by language and lack transportation except from their employer. More LEP workers are clustered E and SE of Belhaven, with limited grocery access. The crab house employer provides some transportation to shopping.
- Other observations on specific populations: Pamlico Beach (east-central coast) is a dying beach community. Mennonite population in north-central region is largely self-sufficient.
- Belhaven has a dentist and doctor [note: fall 2013 announcement that Belhaven's clinic will close soon]; Aurora has a doctor.
- Emergency Management professionals point out that weather events have a big impact.
- Overall conclusion on mapping: the map generated by the research team's protocol partially supports what social services know, but needs refinement to better reflect local conditions.

Focus group themes

The focus group in Beaufort County was arranged with the generous help of our professional contacts there. Although we did not recruit non-(transportation)-expert non-practitioners, the dozen participants were, in fact, all Beaufort County residents with personal travel experience, enriched with expert knowledge of transportation patterns or services in the county. As such, they provided valuable insights and useful comments.

Of the eight participants who provided (anonymous) socio-demographic information, household size ranged from single-person households to people from households with two adults and two resident children. All households had at least one automobile, and several held three cars. Three reside outside the county; several live in the rural part of the county; and all drive for all or nearly all travel needs. Several commented on the substantial distances they need to drive for all destinations: groceries, children's school, work. Several also commented on areas of high congestion, poor road condition, and safety hazards. Reported shared travel included formally arranged carpools and informal carpooling with family, friends, neighbors and co-workers. Focus group participants who reported using public transportation found information on the BATS website or from the Rural Planning Organization.

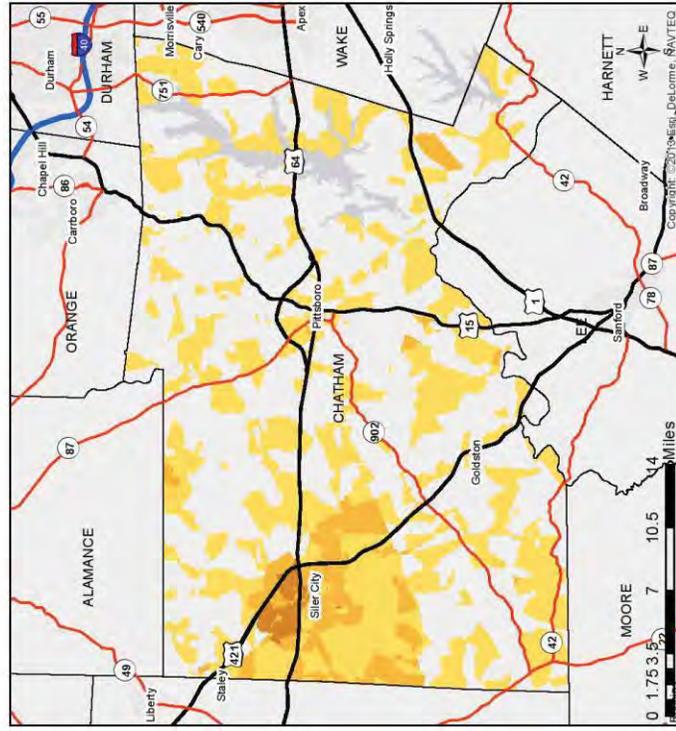
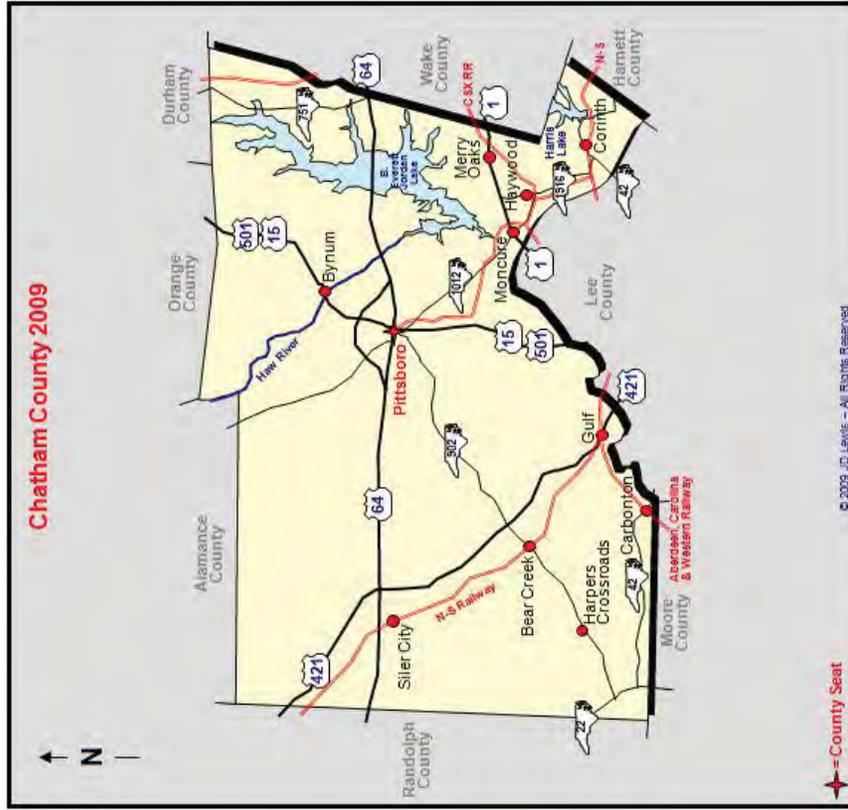
Travel options of interest to participants include shorter commutes, and a more walkable Washington. Dangerous narrow two-lane highways, lack of public transportation options, and limited access from the southern part of the county to Washington were cited as travel barriers.

Alignment of focus group responses with key informants

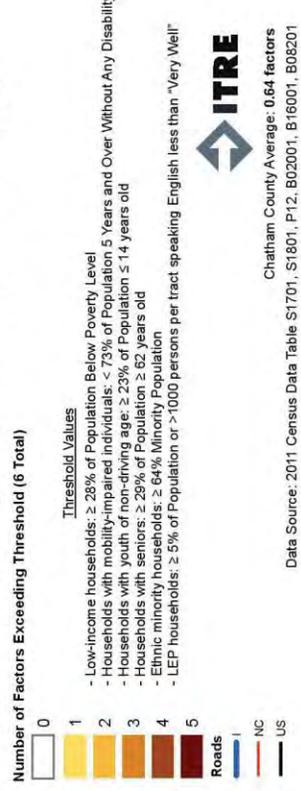
Several recurring themes in the focus group were consistent with information provided by expert key informants, particularly:

- The Pamlico River divides the county, posing not just a geographic, but also an economic and cultural barrier that makes travel and social interaction among residents challenging and expensive.
- There is an urban/rural gap, with the center of power and resources located in Washington.
- Smaller settlements and rural areas have transportation challenges, but also are self-sufficient.

Chatham County



Compilation of Disadvantaged Population Factors - Chatham County



Chatham County in brief

Chatham is a largely rural county in the Piedmont region, with a total 2010 population of 64,505, of which 71% self-identify as White, and 13% each as Black and Hispanic. The northeast corner borders on Durham and Orange counties; the county seat of Pittsboro is a 30-min drive or bus ride to the campus of the University of North Carolina at Chapel Hill, a major employer for Chatham County as well as a major destination for medical services for some Chatham residents. (Residents of other areas may travel south to Lee or west to Guilford or Randolph counties for services.) The county has been experiencing rapid population growth, adding nearly 29% in the previous decade; this growth is concentrated in the northeast corner, while much of the rest of the county has experienced heavy loss of industry and other employment opportunities. Mean travel time to work in Chatham (26.4 minutes) is slightly higher than for the state (23.4 minutes).

Median household income (\$53,958) is substantially above the state average of \$43,417, with a smaller share of the population (14%) living below the poverty line (17% for the state). Mean age (43.6 years) is higher than the state (37.4), with an aging population where 18% are older than 65 years, compared to 13% for North Carolina. Home ownership is high at 77% (compared to 67% statewide) and unemployment relatively low.

Key informant interviews and resident focus groups

Key informant interviews involved nine interviews with 10 people, including representatives of

- Economic Development
- Triangle Area Rural Planning Organization (TARPO)
- Pittsboro planning
- Chatham County planning
- Transportation Advisory Committee
- Council on Aging
- Adult Education
- Chatham Transit
- Chatham County Public Health

Key informants from Chatham County provided detailed information about the local population and their travel needs and habits. Cooperation and knowledge-sharing between county and town (Pittsboro) planners were apparent. Health, education and other social service providers were knowledgeable about the service population, and their needs and wants, including travel demand.

The research team held two focus groups with Chatham County residents:

- Southern Orange County Human Services (taking advantage of a planned TARPO outreach event, by linking up the focus group to draw in some attendees from the TARPO event), with Chatham residents with knowledge or experience relating to transportation services

- UNC campus, with Chatham County residents who commute to UNC on transit

Main themes from the interviews

Chatham has an active planning culture, with a distinctive socio-demographic challenge, given its location near Chapel Hill to the northeast and the associated growth pressure, and its more rural character and less affluent population in most of the rest of the country.

- The county has a corridor study underway for 15-501 between Pittsboro and Chapel Hill, where it anticipates more traffic and congestion, given planned and future development. Possible solutions to current and anticipated congestion include signal timing, intersection improvements and new lights. A study of route 751 is looking at the cost of 4-laning. Route 64 currently is well-controlled, with travel from Pittsboro to Apex taking only 20 minutes.
- Prospects for CMAQ (congestion mitigation and air quality) funds are more likely to flow to Chapel Hill/Carrboro/Durham MPO (Metropolitan Planning Organization) than to TARPO. TARPO has a technical committee linking all planners working in land use in their counties.

Vulnerable populations in Chatham County

Chatham County has significant populations of some traditionally vulnerable populations, with some specific features.

- The elderly in Chatham include relatively affluent retirees in the northeast and around Lake Jordan, and less affluent (often Chatham natives) elsewhere.
- Although Siler City is the largest municipality, Pittsboro is home to most county social and medical services, including the only DSS office; Sanford hosts a Social Security office.
- Siler City has a large Hispanic population, many of whom stayed on after even after several major employers left the county (such as a chicken processor that took down 2000 jobs), so Siler's population remains steady. Siler has a community college, satellite health clinics, and several non-profits: Hispanic Liaison, Chatham Together, Chatham Trades. Some residents reside in Siler but travel west to Randolph County for work, or east to Moncure.

Transportation infrastructure and supply

Chatham County's transportation network reflects its proximity to bustling Chapel Hill as well as its more rural and undeveloped reaches to the south and west.

- Chapel Hill Transit runs fee-based services to Pittsboro, serving commuting employees of UNC-Chapel Hill and UNC Hospitals (who get free passes), as well as patients.
- Paratransit serves the county with small vans, but demand exceeds supply. There is no transit from Siler to Asheboro, and perceived poor connections from Siler City's Wal-Mart (east side) to the rest of the city (many are unaware of Chatham Transit feeder service to downtown Siler). Feeder service to Chapel Hill Transit is under-developed. Transit would benefit from more routes, shorter headways, and possible service to Sanford and airports.

- Non-motorized travel frequency is low,,possibly lower than transit use. Walking incidence also is very low; there is little sidewalk mileage outside of the towns. Planners want improved bicycle and pedestrian capacity, but dollars and political support are still lacking.
- Bicycling activity is largely recreational, including Jordan Lake bicycle traffic, although there are some commuters in the northeast toward Orange and Durham counties. Infrastructure currently is limited. Pittsboro has a bike plan and Siler City is working on one.

Transportation challenges specific to Chatham County

Chatham is a Piedmont county with two main small-urban centers: Pittsboro (the county seat, with 3,743 people in the 2010 Census) and Siler City (the largest municipality, with 7,887).

- Most of the growth is in Pittsboro and the northeast corner, with heavy demand putting great pressure on the transportation system. The residential and commuting corridor between Pittsboro and Chapel Hill is growing steadily and is home to relatively affluent residents, including several retirement communities. There is also a steady flow of Chatham residents traveling to Chapel Hill's medical campus for employment and care.
- The approved development pipeline includes a million square feet between Pittsboro and Orange County, and over 7000 acres in Chatham Park. Large-scale future development is being promoted NW of Siler City along Route 421, where residents commute out to work.
- The SE corner, near Moncure, is an employment hub; most drive to work in Moncure, which is rural but thriving. Some commute from Sanford; others *from* Moncure *to* Sanford.
- Very rural settlements (Goldston, Bennett and Bear Creek) have limited goods, services.

Solutions—formal and informal

Chatham ranges from small-urban to very rural, with the latter home to residents who are largely self-sufficient. The county is largely auto-dependent, but some cannot drive.

- With limited transit available, or people unaware or reluctant to use it, carpooling and other shared travel is sometimes the mode employed.
- There is evidence of interest in independent transportation service providers,, an opportunity for fostering small independent businesses that would create jobs and fill a service gap.
- The County doesn't provide transportation as part of the Health Department's mothers-and-infants program, so providers go to them. Two-thirds of the clients are located in Siler City.

ITRE-generated county map of transportation disadvantage

Key informants in Chatham County found the first-round maps of transportation disadvantage to be generally reasonable and in line with their view of where transportation-poor residents may be clustered. They also provided insightful comments on where,, and why,,the maps diverged

from their professional knowledge, and made useful suggestions on revisions to the mapping protocol to bring the maps closer into alignment with conditions on the ground in the county.

- SE Siler City could be expected to be darker than it is, because of job loss and the large Hispanic population; dark colors in N and NW Siler match up with populations located there
- Some rural areas in the southwest county show up lighter than might be expected.
- A colored area SW of Pittsboro is not surprising, given the elderly there; but Pittsboro proper isn't as dark as might be expected given the many elderly, including retirement communities.
- Colored areas near Moncure may be industrial or utility, rather than transportation deserts.
- The colored areas between Pittsboro and Chapel Hill likely reflect the large share of older residents; but some are affluent residents of Governors Club, Carolina Meadows, and others.
- Transportation deserts in Goldston, Bear Creek, Silk Hope, Bonlee, and Bennett (not entirely clear on maps) may be a result of the gap in service connections for rural residents.
- Mapping could be improved with some filters, such as high-income retirees, presence of numerous services/destinations, or property values. Clipping out irrelevant parcels (federal property like Corps of Engineers or game lands) would make colored areas more informative.

Focus group themes

Participants in the first focus group included one person who works with substance abusers who need a variety of services, one private transport provider, and one accountant who is currently providing a lot of transportation services for parents and extended family and is considering starting a private transport service. Travel provided includes trips to Chatham, Lee, Orange or Randolph counties, for recreation, school, training programs, and shopping.

- The informal transport provider travels far and wide, using two handicapped-accessible vans: Chapel Hill for arthritis care for her mother; Moore for orthopedics and Sanford for dental for her father. She transports others as favors but may turn it into a private transport business. Some users of her informal service contribute money, but many cannot; coordination helps.
- Transit difficult for those with health conditions: long waits/distances, inconvenient schedule
- For non-routine travel, transportation can be arranged, but it's expensive, e.g., \$75 to airport.
- Scheduling demand-responsive seems complicated to users: signs may be inaccurate; reports of bad experiences get shared, so people make other arrangements. Transit is getting better!
- How do people with no car survive? •The best you can.Ž Call a friend, use informal networks
- Substance abusers often need help with transport; even if they have family or friends around, they may have burned bridges, and have limited options, so they are stuck.
- Residents find it hard to get to doctors• appointments, grocery store, pharmacy. Locations closer together with multiple services would be good for elderly citizens and Medicaid users.
- To understand the problem of transportation poverty, you need to be physically present in the environment and experience it.

A second focus group was held on the UNC-Chapel Hill campus and targeted Chatham County residents who use Chapel Hill Transit to commute to Chapel Hill, at least some of the time.

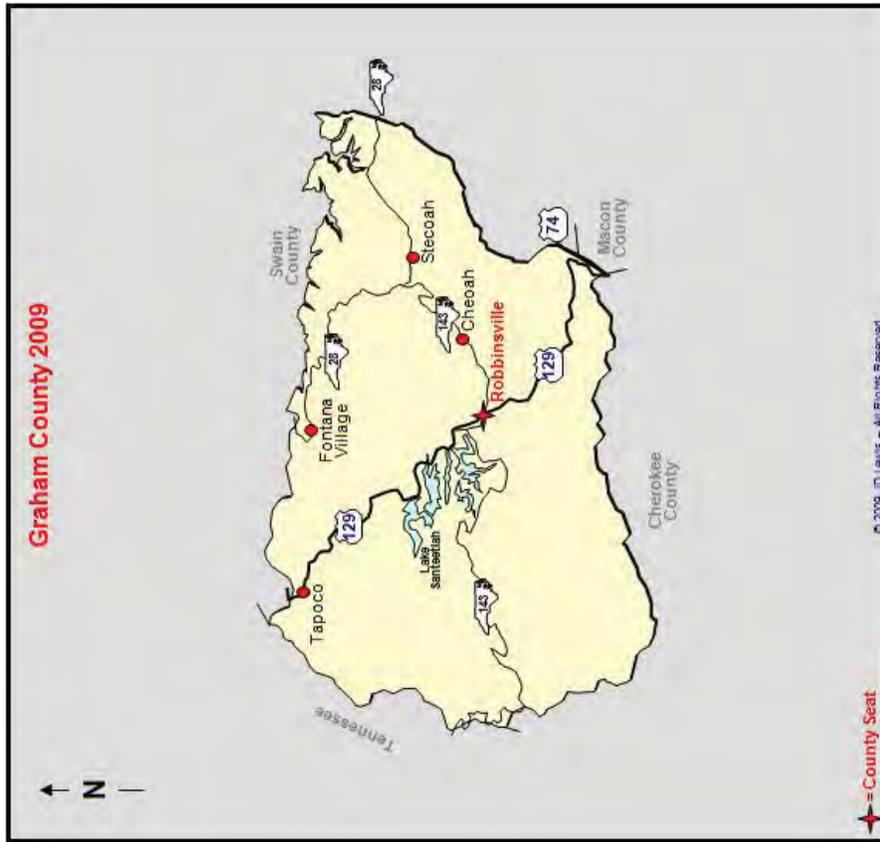
- People with no car often simply stay home: •If car-less in Pittsboro, you're stuck
- The PX bus is very convenient and saves money, once you figure it out; but it has a service gap in the schedule midday so that people may get stuck if they can't meet that schedule
- PX great for regular commute; other trips (weekend shopping) mean a drive to Siler or Apex.
- U route helps Chatham riders get around Chapel Hill during day, but the U stops in summer.
- Some convoluted routes complicate travel schedules, e.g., Ambulatory Care Center patient pickup. Some buses fill early; wheelchair users on some routes heavily; others mostly empty.
- Connectivity between 15-501 at Lowe's and rest of Pittsboro and Chatham is problematic; the big bus no longer comes to the courthouse circle, which is a disappointment to some.
- UNC doesn't promote or alert employees to the free CCX, so people have to find it. Ridership might go up if people knew about options. UNC parking information is hard to find and user-hostile; the once/month passes are hard to figure out.
- NextBus/ •all routes & services' webpage easy to use; weather, schedule changes hard to see
- Emergencies affect transit choice: the need to get to dentist or other key appointments or fetch kids or relatives is a factor; fear of getting stuck prevents people from relying on transit.
- Increase transit ridership? Provide more options, more destinations (e.g., airport), reduce fare for non-UNC riders, coordinate more with Chatham Transit (some ride 20 min from Siler to PX). Don't charge Park & Ride,, it will defeat purpose; some already plan to resume driving.
- Sidewalks in/around downtown Pittsboro are in good condition, and feel safe; but biking or walking from Lowe's to courthouse is not easy or safe: potholes, no bike space or sidewalk.

Alignment of focus group responses with key informants

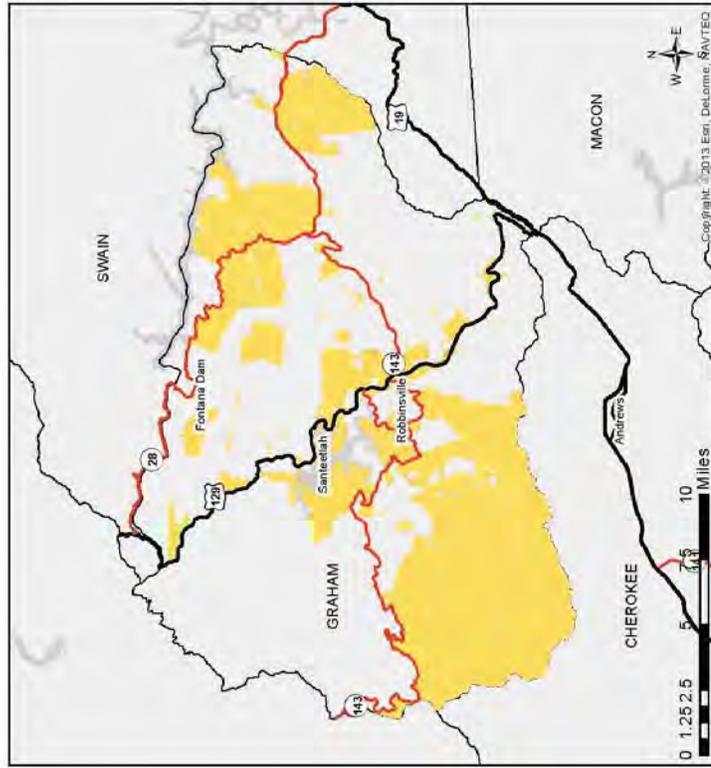
Some themes and comments from key informants were clearly echoed by focus groups

- Most disadvantaged are in Siler City (Hispanic residents), plus isolated Bonlee and Bennett.
- Bicycling and walking are not much used for utilitarian travel; it's not easy to do, and people have to travel long distances, with many leaving the county to work after loss of employers.
- Chatham County has two faces: north and east (affluent, denser) and south and west (poorer, more rural), with an enormous economic disparity.
- Irregular or weekend services would be useful: airport, campus, malls.
- To be used more, transit must be affordable, understandable, convenient.

Graham County



Source: http://www.carolana.com/NC/C/counties/Images/Graham_County_NC_2009.jpg



Compilation of Disadvantaged Population Factors - Graham County

- Number of Factors Exceeding Threshold (5 Total)**
- 0
 - 1
 - 2
 - 3
- Threshold Values**
- Low-income households: $\geq 28\%$ of Population Below Poverty Level
 - Households with youth of non-driving age: $\geq 23\%$ of Population ≤ 14 years old
 - Households with seniors: $\geq 29\%$ of Population ≥ 62 years old
 - Ethnic minority households: $\geq 64\%$ Minority Population
 - LEP households: $\geq 8\%$ of Population speaking English less than "Very Well"
- Roads**
- I
 - NC
 - US



Graham County Average: 0.28 factors
Data Source: 2011 Census Data Table S1701, S1801, P12, B02001, B16001, B08201

Graham County in brief

Graham County is a small, isolated and rural county located in the rugged hills of western North Carolina. It is bordered by Swain, Macon and Cherokee counties as well as the state of Tennessee. Roughly two-thirds of the county lies within the Nantahala National Forest. In 2010, the county had a total population of 8,861. Other than Robbinsville, which has a population of 620 people, there are only two incorporated towns within the county: Lake Santeetlah (population 45), and Fontana Dam, which became a town in 2012 with a population of fewer than 40 residents. Graham County also includes portions of the Qualla Boundary and is home to Snowbird, a Cherokee community with a few hundred residents.

In 2010, Graham County was 90.3% White, 6.4% American Indian (due to the Snowbird community) and less than 1% Asian, Black or African American and Other Race.

Like most other counties in Western North Carolina, Graham County faces many difficult challenges: isolation, poverty, unemployment, and economic uncertainty, due in large part to a decline in traditional industries such as furniture mills. According to the 2010 Census, 36.6% of families in Robbinsville were living below poverty level, compared to 16% for the county as a whole. Compared to the other counties in this study, Graham County has the highest unemployment rate (17%), lowest median household income (\$31,863), lowest population density (30 people per square mile), the second highest poverty rate (23%), behind Warren County, and the highest homeownership rate (80%). Twenty percent of workers travel outside the county for employment. The mean travel time to work is 20 minutes. The county lacks a hospital, and there are only three physicians in the entire county, which means that people have to travel a long way for medical care.

With only eight vans in its paratransit system, the county struggles to meet the needs of its residents, particularly those in need of medical services, such as dialysis treatment (there is no dialysis center within the county). The county transports people to a dialysis center six days a week. Five days a week, it takes seniors to the senior center, where they receive a free meal. It does not charge a fee for its services, although it does accept donations. The limited schedule along with a demand for rides to destinations outside the county pose challenges to the county's paratransit system.

Key informant interviews and resident focus groups

Key informant interviews involved five interviews, including representatives of

- Graham County Transit
- Graham County Board of Commissioners
- Town Council of Robbinsville
- Graham County Manager
- Graham County Department of Social Services

Key informants from Graham County were eager to discuss the transportation needs and challenges in the county. They provided insightful feedback on the GIS maps we presented. All of the interviewees were longtime members of the community, most spent their entire lives in the county and thus were very knowledgeable of the kinds of transportation challenges that exist in the county.

We convened two focus groups in the county. The first focus group was held at the Community Center in Snowbird, where about 30 members of the Eastern Band of the Cherokees attended. The second focus group was held at the County Senior Center, where 12 senior citizens attended.

Main themes from interviews

The key informants identified several key themes, including access to work, services (e.g., shopping) and health care. The isolation of the county and lack of services was a concern, particularly for those with limited transportation options. Most services and medical facilities are located outside the county, necessitating long trips for even the most basic items or services. For example, there is no Wal Mart or major retailer in the county. There is only one grocery store. Many people cannot afford the gas for long trips, so they go without, rely on friends to pick up things for them, or they spend a long time waiting, as illustrated by the excerpt below from an interview with a key informant from the County paratransit system:

If you call me today and say hey I live over here in Snowbird and I want you to take me to the Wal-Mart in Murphy so I can go shopping, I'm probably not gonna do that. I'm gonna tell you 'hey, we've got a run going to dialysis in the morning and we can drop you off and then pick you back up after the dialysis patients are done four hours later. Do you want to do that?' That's how we're going to handle that. A lot of people say, 'you're just going to drop me off and leave me there?' Well you know, they [the drivers] can't wait there.

Vulnerable populations in Graham County

Vulnerable populations include the elderly, poor and those with health conditions. Each of these groups relies heavily on the county paratransit system. In addition, there's a relatively small, and largely invisible Hispanic population, many of whom do not speak English, and a sizeable Cherokee population.

Transportation infrastructure and supply

Graham County Transit currently operates with five mini vans, three high top handicap accessible vans and one 20-seat bus. Transportation requests are on a seat availability basis.

Services include transportation to non-emergency medical appointments, shopping, Senior Center, and employment.

Regular services begin at 5:30 a.m. and end at 5:00 p.m. Daily schedules include routes to Andrews, Marble, and Cherokee. Scheduled trips are available to Asheville, Bryson City, Sylva, Waynesville, Murphy and Hayesville.

Most of the trips are for medical appointments, particularly dialysis treatments, in neighboring counties. It also contracts with a nursing home to transport one of its patients to dialysis, and with the Division of Social Services for Medicaid transportation.

Transportation challenges specific to Graham County

The rugged mountain roads, long winters, and large distance to most destinations (e.g., out-of-county travel) takes its toll on vehicles and on people's wallets. It's also dangerous to drive at night and in the winter, when the winding roads are covered with ice.

One key informant stated that there are numerous elderly widows in the county who either never learned how to drive or do not own a car.

We have a lot of elderly. Most of them raised children and they stayed at home and farmed. They grew everything they ate. And most of the time the wives didn't work. Now you're looking at widows that are left with very little Social Security to live on, and no means--no vehicles--to get to medical appointments.

Solutions—formal and informal

People in Graham County, as in other rural places, are very self-reliant and resourceful. They also help each other out in times of need. This applies to transportation. We heard many instances of people sharing or offering rides to those without vehicles, or offering to pick up something (e.g., at the store) for someone who couldn't make the trip, as the following excerpts illustrate:

I would say that, within the community, if Ms. Johnson needs to go the eye center, then you'd have four or five individuals that would stand up and say, I'll take her.
Where I live, in the Sweetwater community, you kind of have community where we say, I'm going to such and such place, and someone says, well would you mind getting anything from printing paper or cartridges for their computer, or if they need this or that. That's just the way it is.

Key informants expressed strong sentiment that people in Graham County try to take care of each other. Still, some were concerned that some people in need aren't being helped.

It's just the way it is here, you take care of your own the best you can. But there are still those that you just wonder--how do they cope?

ITRE-generated county map of transportation disadvantage

Key informants commented that the GIS map did not reflect accurately the conditions in Graham County, which is not surprising given the low population densities. Many of the factors or conditions that were mapped were not spatially concentrated, so it was hard to identify hot spots in the scale within which the maps were drawn, e.g., census tracts or block groups. For example, there were pockets (e.g., a trailer park) or parts of neighborhoods where Hispanic households were concentrated. Also, there is a sizable minority of Cherokees in the Snowbird Community. These pockets where people share some of the characteristics of social vulnerability were difficult to capture in the GIS maps.

Focus group themes

The focus groups in Graham County were arranged with the generous help of our contacts there. Comments from the focus group with seniors centered around public transit. All participants stated that they were very reliant on public transit. Most relied on transit to get to the Senior Center that day. One participant in particular, who is legally blind, said that public transit provides her with an essential service. They said that many more seniors, not represented in the focus group, use public transit. Participants at the focus group in the Snowbird Community seemed very appreciative of the team's interest and that they brought food and gift cards.

- Participants rely on transit for out-of-town travel, often organized by the Senior Center, to destinations such as Sylva, Murphy, Andrews, Franklin, Asheville, and Cherokee.
- Focus group participants relayed that if there were no public transit, they would have to rely on neighbors, family, and friends for rides, but this would be too much of a burden, since it would require friends or family to take a day off of work.
- Participants said that they travel an average of 40 to 50 miles one way to get to work, usually by personal vehicle or ridesharing. One of the participants said that he walks everywhere ... the rest of the group agreed that it was not unusual to see people walking to get where they needed to go.
- The Snowbird participants relayed that they do use public transit, but that it is not very convenient, because the public transit vans often go a long way, out of the way, to pick up other riders. Thus, most trips take a lot of time because the vans stop at several destinations. As a result, using public transit often requires riders to take a day off of work, which is not always possible and/or affordable.
- As an alternative to public transit, they rely on friends for rides or walk. A few of the participants (three to four) said that they either do not have a personal vehicle or that their personal vehicle is insufficient for long distance travel (due to road conditions, or simply the

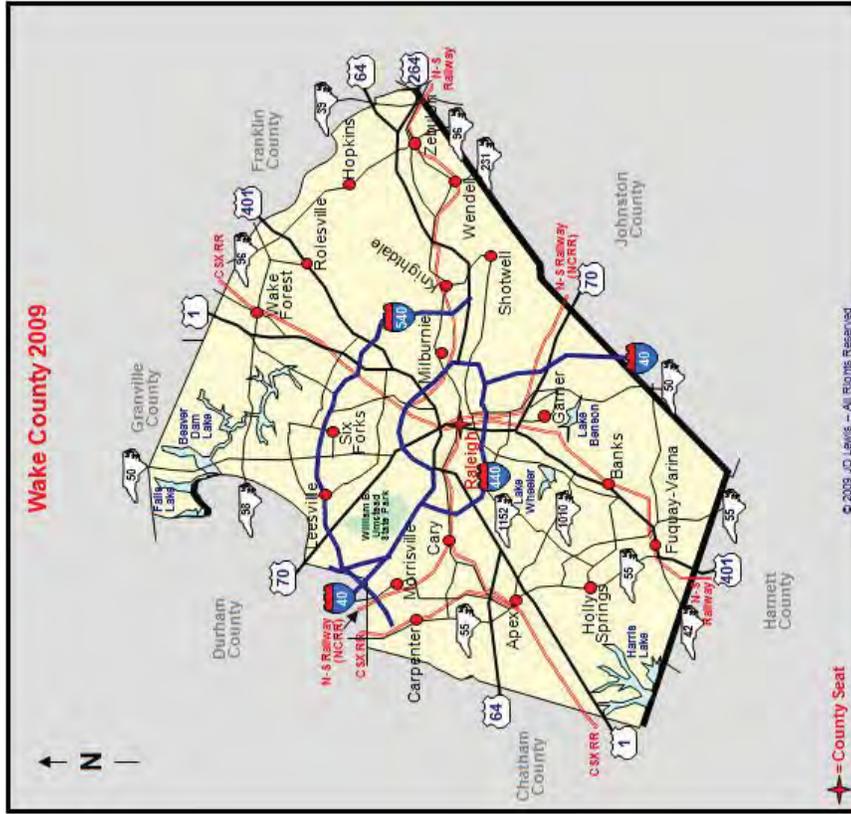
age/condition of the vehicle). A few participants said that vehicle maintenance is a significant issue. The secondary roads that Snowbird residents rely on are in poor condition and contribute to significant wear and tear on vehicles. These challenges are exacerbated during the winter months.

Alignment of focus group responses with key informants

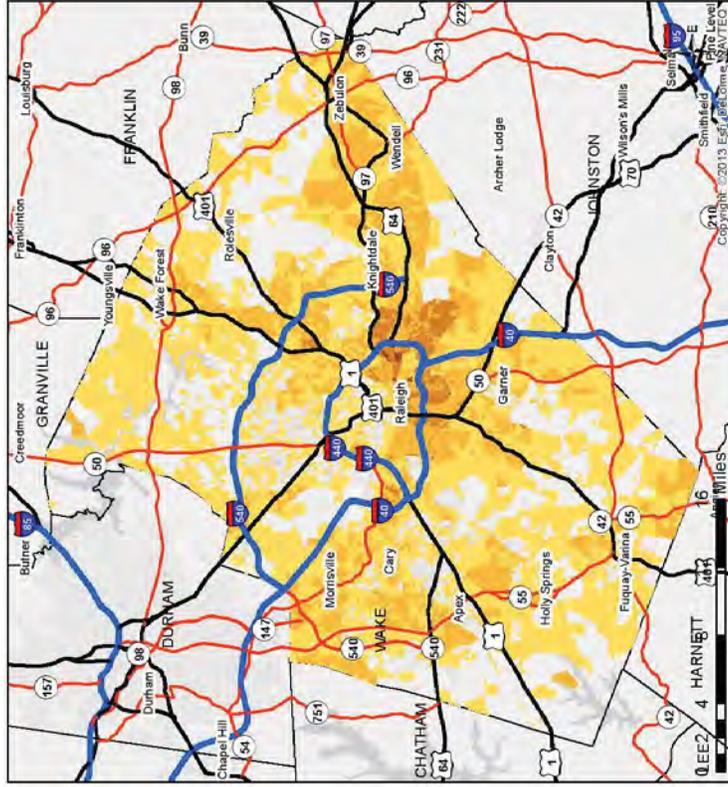
In general, the issues identified in the focus groups echoed those of the key informants, namely:

- The isolation and limited services offered in the county necessitate long trips for medical visits or shopping.
- Many disadvantaged groups, particularly the elderly and those with special medical needs, rely on public transit. This requires them to spend long hours on each trip.
- People in the county work to help each other out. Those who cannot drive, do not own a car, or simply cannot afford the cost of gas or vehicle maintenance rely on the kindness of family, friends or neighbors to help meet their travel needs.

Wake County



Source: http://www.carolana.com/NC/Countries/wake_county_nc.html



Compilation of Disadvantaged Population Factors - Wake County

Number of Factors Exceeding Threshold (6 Total)



Threshold Values

- Low-income households: $\geq 28\%$ of Population Below Poverty Level
- Households with mobility-impaired individuals: $< 73\%$ of Population 5 Years and Over Without Any Disability
- Households with youth of non-driving age: $\geq 23\%$ of Population ≤ 14 years old
- Households with seniors: $\geq 29\%$ of Population ≥ 62 years old
- Ethnic minority households: $\geq 64\%$ Minority Population
- LEP households: $\geq 5\%$ of Population or >1000 persons per tract speaking English less than "Very Well"



Wake County Average: 0.96 factors
Data Source: 2011 Census Data Table S1701, S1801, P12, B02001, B16001, B08201

Raleigh/Wake County in brief

Wake County, a central Piedmont county of 900,993 people (2010 Census), is home to the state capital of Raleigh. The self-reported ethnic composition in the County is 62% White, 20% black, and 10% Hispanic. Wake is among the most developed and wealthiest counties in the state (median household income \$61,594, compared to \$43,417 for the state), with relatively high levels of education (47% of residents hold a bachelor's degree, compared to 26% for the state). Home ownership of 65% is slightly lower than the state 67%.

Key informant interviews and resident focus groups

Key informant interviews involved five interviews with six people, including representatives of:

- City of Raleigh Transportation Planning
- City of Raleigh Emergency Management
- City of Raleigh Planning Department
- Center for Volunteer Caregiving

We did not convene focus groups in Raleigh or in Wake County as part of the research plan; rather, Raleigh served as a one-off urban comparison for our key informant data set.

Main themes from the interviews

The City of Raleigh is the state capital and part of the rapidly growing Triangle metropolitan area. Raleigh is only one municipality in a large county that includes urban, suburban, and rural areas. The outreach in Raleigh was intended to add a large, urban center to the analysis.

As one key informant summarized, *It's tough to look at Wake County, one of the largest in North Carolina because it is so dynamic and diverse. The interviews revealed some unique characteristics, including the regional perspective that is necessary for planning transportation in Raleigh. With RTP, Durham and multiple other Wake County municipalities, Raleigh exists only as part of a larger network. The related theme of urban sprawl is also evident in our interviews.*

One of my volunteers sent me an email today saying, you know, it's interesting that the people who live in Cary have doctors in Raleigh, and the people who live in Raleigh have doctors in Cary, so. And I marvel over that.

Vulnerable populations in Wake County

The vulnerable populations discussed in interviews with Raleigh key informants included:

- Elderly residents in an aging population. Suburban and rural Wake County is especially disconnected. Within Raleigh, there are challenges like: How much time do you allow at pedestrian crossings, taking into consideration elderly people who may travel in the area?

- Disabled residents may need consideration in planning and special services
- Low-income residents, which in Raleigh took a different shape. Poorer and wealthier live much closer together in the city, compared to the rural counties. There are patterns of wealth and poverty; the divide may still be there but it geographically nuanced.
- Southeast Raleigh is home to relatively lower-income populations.

Transportation infrastructure and supply

There are many resources available through the City of Raleigh and Wake County. Key informant interviews touched on many, but may not capture all that the county and city offer.

Scheduled service

CAT (Capital Area Transit)

- Ridership around 6.4 million on CAT
- 20 fixed routes operate 7 days a week with 70 peak buses
- 15-minute service in some corridors

Wolf Line (NC State's free service)

- Ridership around 3 million
- Seasonal,,does not run when classes are not in session

Triangle Transit (TTA)

- Ridership around 1.5 million
- Regional transportation for Triangle: Apex, Cary, Chapel Hill, Durham, Garner, Hillsborough, Knightdale, RDU Airport, Raleigh, RTP, Wendell, Wake Forest, Zebulon
- Go Pass program
- TTA batches rideshare for the region: parking discounts serve as incentives for participation

C-Tran

- Town of Cary's fixed-route and door-to-door transit service
- Every day except Sunday

Paratransit

ART (Accessible Raleigh Transit)

- Provides 1,500 trips per day
- Raleigh's paratransit system for people with disabilities that preclude use of fixed-route
 - Eligibility requirements are customized
 - Application process involves doctor / health assessment, additional 3rd-party assessment
- ADA requirements limit charge to double the fixed-route fare, so it costs \$2/ride
- Call center receives requests 24 hours in advance or up to 30 days in advance
 - Automated, database generated to batch trips
 - Multiple requests usually are for work trips

- If ART cannot provide service, they contract out to about 40 taxi companies with established record, so individuals typically have the same driver and build relationships,, good and bad.
- Growing bicycle/pedestrian infrastructure in Raleigh, primarily in the downtown area, also connects with Cary's greenways. Culture of bike community increasingly evident in the city.

Transportation challenges specific to Wake County

Wake and Raleigh transportation capacity is auto-centric, but offers many transit options

- Reliance on autos for most commuting means congestion and long commutes, including RTP
- Unsafe biking and walking conditions limit non-motorized travel
- Difficulties with public transit,,reliability and frequency
 - Weighted towards commuters
 - Sunday service is available but much more limited (only three or four routes running)
 - Good geographic coverage but frequency is somewhat limited
 - Transit: per-ride fares add up (people forget gas taxes and roads tolls as part of auto cost)
 - Poorer people may need transit for medical appointments or non-traditional shifts for service jobs, but the transit does not always support them
 - Crossing busy thoroughfares to get to bus stops going the in right direction is tricky.
- Grocery trips can be difficult, especially for those in southeast Raleigh (Kroger just closed).
- Getting to medical appointments might be less difficult in Raleigh because Wake Med (largest provider in the region) is bus-accessible. Center for Volunteer Caregiving disagrees.
- Gap between long-time residents and transient populations, who work for a couple of years and move on, may lead to community disengagement.
- Cost of living in Raleigh feeds into urban sprawl and suburban/exurban developments,,•just cheaper to live outside of Wake County,Ž but gas costs are starting to make up that difference.
- Planning professionals are starting to think about transit-disadvantaged populations more broadly beyond the traditional focus on low-income and carless households. In the last few years, as the cost of fuel has increased and labor has increased because of medical and other costs, you find out that people just figure out a way to make it work.
- Bicycle and pedestrian themes
 - Safety
 - Feasibility in a sprawling city
 - Aging in place: new operational considerations
- Paratransit challenges: logistics, •making a lot of calls,Ž 24-hour window can strand riders.
- RDU is an international airport but has no access for non-drivers.

Solutions—formal and informal

While Raleigh has more infrastructure and services than the other counties in our study, there are also more people, and thus more demand and pressure on the systems in place.

- Public transit and paratransit: Raleigh prides itself on its paratransit services (ART), which one official called a •Cadillac type of service.Ž He elaborated, •We•ve actually had people tell us they moved to Raleigh because of the type of service we have.Ž ART reaches 1,500 people daily, and uses technology to sort and streamline the requests. Eligible individuals can access work, health care, and amenities for \$2/trip, even though it costs the county much more to provide that service. Reliability and regularity are great benefits, but such optimal service may have unintended consequences. One official described the process and outcome:
It can be a bad thing in that we have found that Mr. Smith not only picks them up at the curb but Mr. Smith takes them into the house, puts the groceries away, does all kinds of things that could be liability issues for us. There could be side deals going on that we really can't administer. So we have to be careful. We want to provide a good service but as we have integrated a shared van service over the last 18 months the community has realized we're doing this to save costs, and we're doing this to try to offer a service that's more similar to what's offered nationwide. It's not the, I'm going to be guaranteed a taxi ride with my personal driver. That's been very difficult for some of our clients to get used to. "I don't wanna ride in the van with someone else. There's a delay; I don't know them." They've really, for lack of a better term, gotten spoiled of having—and that trip costs them \$2. ADA requirements say that we can only charge double the fixed route fare. And we have a dollar fare. So Ms. Smith can go to the beauty shop for 2 dollars. The average trip costs us about 20 dollars.

- Non-profit: Center for Volunteer Caregiving (CVC) averages 40-65 rides/month for people just above the Medicaid income eligibility threshold, but still poor. CVC:
 - offers non-medical rides for Medicare/Medicaid recipients.
 - also has funds for taxi services in areas with no volunteers.
 - matches volunteers with individuals.
 - encourages socialization, while the City and County programs may have to discourage relationship-building between drivers and recipients due to liability and insurance.
Often, when our volunteers take someone to a doctor's appointment, they'll tack on to that a trip to the pharmacy to get their prescriptions filled. And sometimes shopping, sometimes also just to go out and get some food. Because the people we are serving, along with being elderly and disabled, the result of that is that they are also socially isolated. And so our volunteers are providing transportation but also providing contact and companionship that people without access to transportation don't.

ITRE-generated county map of transportation disadvantage

Key informants generally supported the map framework, but City officials found the level of detail was weak. It would be great to have more detail than Census tracts, especially in Raleigh:

- •micro-levelŽ and •little pockets rather than broad areasŽ

- connecting sidewalks
- positives of the built environment and bus routes
- normalization for exposure, high pedestrian activity or transit

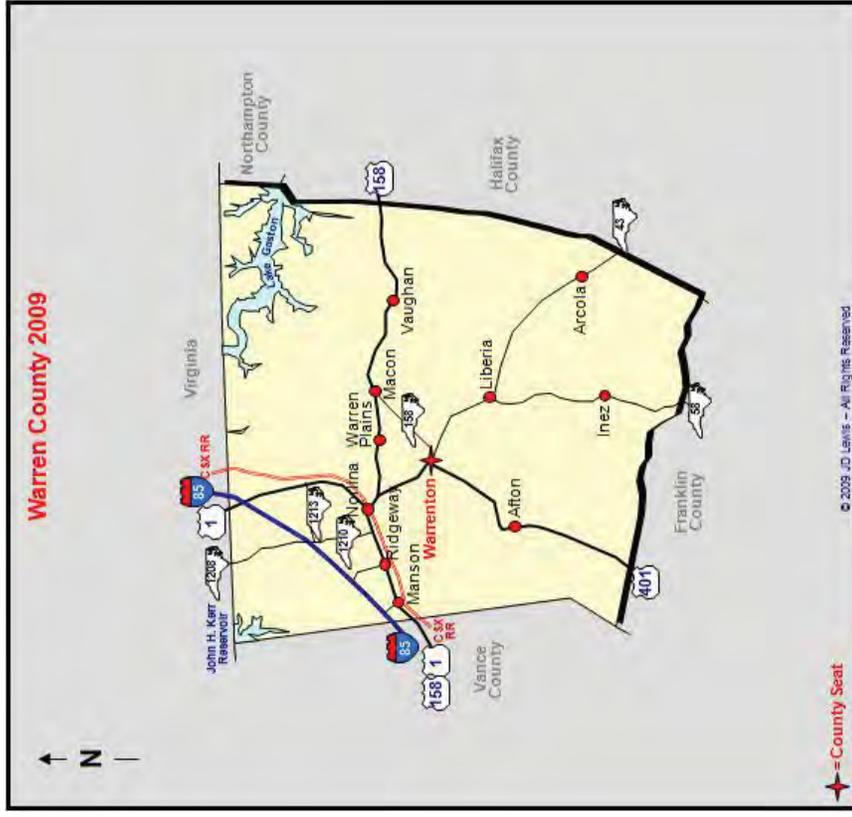
One official said the transportation desert map looks a lot like our bus route map. The heaviest bus service areas (number of routes and frequency) are also the most disadvantaged areas.

According to city officials, there is a strong alignment between need and provision of services.

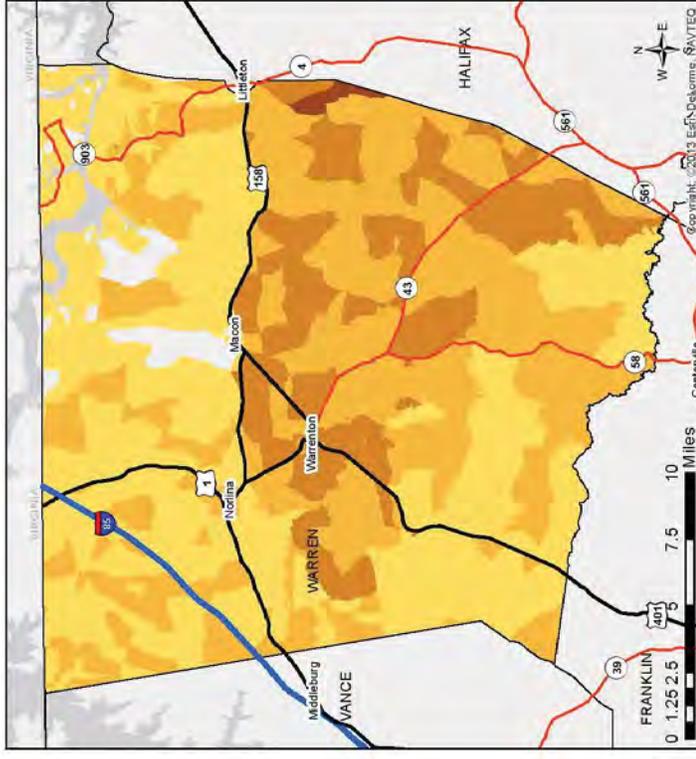
Another key informant echoed this sentiment,

Southeast Raleigh is probably considered to be disadvantaged, where the northern part of Raleigh is not economically disadvantaged. We provide less transit service here (north) and more transit service here (southeast). Is there a desert? No. We just allocate our resources where they're needed. That's where I get kind of tripped up because this desert concept, desert paints a picture of just nothing. And that's not the case in Raleigh. As you zoom out, in the rural areas, I'm sure there are areas that have difficulty. But as far as the city limits of Raleigh, I have a hard time saying there's a desert anywhere.

Warren County

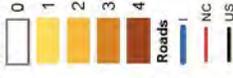


Source:
http://www.carolana.com/NC/Counties/Images/Warren_County_NC_2009.j
 pg



Compilation of Disadvantaged Population Factors - Warren County

Number of Factors Exceeding Threshold (5 Total)



Threshold Values

- Low-income households: $\geq 28\%$ of Population Below Poverty Level
- Households with youth of non-driving age: $\geq 23\%$ of Population ≤ 14 years old
- Households with seniors: $\geq 29\%$ of Population ≥ 62 years old
- Ethnic minority households: $\geq 64\%$ Minority Population
- LEP households: $\geq 5\%$ of Population or >1000 persons per tract speaking English less than "Very Well"



Warren County Average: 1.49 factors
 Data Source: 2011 Census Data Table S1701, S1801, P12, B02001, B16001, B08201

Warren County in brief

Warren County, a relatively sparsely populated Piedmont county in the north-central region of the state, had a 2010 Census count of 20,972 residents, a 5% increase over the 2000 Census. Warren is a majority-minority county, with 52% of the population self-identifying as Black, 5% as American Indian and 3% Hispanic; Whites account for 38% of the population. Although largely rural, with only three small incorporated municipalities, Warren County is close to Wake and Durham counties, and identifies itself as the northern reach of the Triangle, with good highway and rail connections. The county also boasts good access to multiple recreation areas and water bodies, and is developing its tourism and biotechnology sectors. Median household income in Warren, at \$32,574, is much lower than the state average (\$43,417); 27% of Warren residents are below the poverty line, compared to 17% statewide. The mean age is 44.9 (37.4 for the state), with 19% of residents older than 65 (13% for the state).

Key informant interviews and resident focus groups

Key informant interviews involved six interviews with six people, including representatives of:

- Warren County Senior Center
- Warren County Health Department
- Warren County Planning and Zoning
- Warren Family Institute
- Warren County Social Services
- Warren County Manager

The research team also held a focus group with Warren County residents at the Green Duke house, a job-link center, in Soul City, which yielded a lively and informative discussion.

Main themes from the interviews

Warren County is a poor rural county with no major cities. As such, Warren County residents are scattered throughout the rural areas of the county, which presents many transportation challenges, especially considering the presence of socially vulnerable populations. Warrenton, the county seat, and nearby Norlina constitute the major town centers of the county.

Route 158 serves as a dividing line between wealthier (north) and poorer, more disadvantaged (south) communities. One official said, "We have two counties. And in one county there are the haves and [in the other] the have-nots. It sounds very generic." Lake Gaston in the northeast is an affluent area that one official identified as the site of most of the development and source of most of the tax base. Well-off families and retirees live near the lake, where many of the structures are second or vacation homes. This is an important consideration, as elderly here may not be as disadvantaged as other aging populations. The county's wealth gap is manifest in the built

environment: Key informants identified three main supermarkets in the county: one in the lake area, which disproportionately serves the wealthier, and the other two in Warrenton and Norlina.

Other key amenities and services are also unevenly distributed in the county. There are several health providers in the county, including the Health Department, a free clinic, and a rural health group. However, there is no hospital, which means people with more serious conditions or with radiology or other needs must travel long distances, or use an ambulance, which is very costly.

More of the vulnerable populations are scattered south of Route 158 in the very rural areas. Thus, the sickest, poorest residents are farthest from grocery stores and services like the Health Department, which are located in Warrenton and Norlina. The most disadvantaged often must rely on others to get around, which can be frustrating and difficult. There is increasing demand for paratransit services, which still does not meet the needs of the most vulnerable. Reliance on paratransit by Medicare and Medicaid recipients means that frail, elderly or disabled individuals often end up taking day-long trips with no bathroom breaks. One key informant said:

You're dealing with a population that needs to use the bathroom more frequently than others! And unfortunately the current KARTS system does not allow bathroom breaks.

Walking and cycling are not currently feasible options for getting around Warren County. Even in towns like Warrenton, it typically takes 10-15 minutes driving to get to town for work or for recreation. Warrenton has recently built new sidewalks and improved the safety and accessibility within town, but in such a rural county, walking and cycling are not realistic primary modes.

Vulnerable populations in Warren County

Warren County has several different, and overlapping, socially vulnerable populations:

Minorities are the majority: 52% African-American, with a substantial Latino population.

The Haliwa-Saponi community of Hollister straddles Warren and Halifax counties.

Transient or short-term laborers often have low English proficiency and usually are carless.

Warren has many low-income residents; median income is \$32,574 and poverty is 27%, with unemployment at 14%, well above the level in the Triangle (to the south) and state.

Elderly and disabled, as well as other residents such as pregnant women, need services.

Transportation infrastructure and supply

Warren County does not have scheduled transit service. Warren County works with other counties in the region to offer paratransit. As a Tier-1 county with limited resources, Warren has a comprehensive plan for transportation (CTP), but lacks a bicycle-pedestrian plan (•a pipe dreamŽ); although some people are talking about it, •there•s no coordination or concerted effort, it•s all very piecemealŽ but •at least we•ve identified needs in our CTP.Ž

The Kerr-Tarr Council of Governments is very active and interested in improvements for the area. They are also part of an attempt by their Rural Planning Organization to create regional service with other rural counties and Wake County, an idea with strong support, but no funding.

- KARTS (Kerr Area Rural Transport Service)
 - Services are contracted out, to a private company based in Henderson, NC.
 - Lack of coordination between KARTS and planning/zoning division leaves service gaps.
 - Paratransit is geared toward medical transportation for elderly and disabled/.
 - Services are limited to weekdays.
- Warren County Social Services Agency has 2 vans and drivers
- CPTA (Choanoke Public Transportation Authority) serves Bertie, Halifax, Hertford, and Northampton Counties. This agency does not actually serve Warren County, but there is some coordination for out-of-county or cross-county trips

Transportation challenges specific to Warren County

Warren County's transportation challenges relate to its geography, low population density, and socio-demographic profile, with small towns and large rural expanses, and low-income residents.

- Lack of jobs in the county mean that many workers commute *out* of the county; lack of transportation also means some willing workers may not have the means to access jobs.
- Basic amenities are available in the county, but specialized aren't, e.g., no clothing outlets.
- Paratransit challenges include scheduling, logistics, less-than-full service, and affordability (for those who do not qualify for reimbursement through Medicaid or Medicare).
 - KARTS operates on a specific timetable, e.g. to Wake Med on Tuesday and Thursday, Duke Hospital on Wednesdays, etc. Vans usually leave around 10 am and return by 5:30.
 - Individuals need to know about KARTS options when scheduling appointments.

Solutions—formal and informal

The travel landscape in Warren County is a mix of public and private, formal and informal.

- Paratransit is critical, but currently doesn't meet the demand, and imposes limitations
- Family support networks cover many travel needs. Public Health official estimated that more people (50%) rely on family and friends than on KARTS (10-15%).
- Non-transportation oriented government services, like the Senior Center, provides rides to seniors. Similarly, social workers from the Social Services Agency will go out to fetch patients who don't have any of the other formal or informal solutions available to them.
- The Warren Family Institute has a van and provides some rides.
- At least two churches operate vans, and as one official described, "We crisscross each other on Sunday mornings."
- Migrant farmworkers are transported by employer-provided "refurbished school buses."

- A formerly thriving taxi service folded for economic reasons, illustrating the financial challenges of balancing transportation supply and demand in a poor, rural county.

ITRE-generated county map of transportation disadvantage

Key informants indicated that the research team's map of transportation disadvantage risk is fairly accurate: "dead on the money," according to one key informant. However, it doesn't capture all of the nuances, and the local experts had feedback and suggested enhancements.

- South and southeast of 158 are the most disadvantaged areas.
- A lot of farmland and natural forest where few, if any, people live. If possible, it would be helpful to exclude those sections from the mapping treatment. But in reality, there may be a small handful of households in each census tract, weighting the "color" of the tract heavily toward those individual households.
- Map could be divided into "quadrants"; one of those quadrants (southwestern) has the largest senior population and is the furthest from "anything."
- Warrenton was shaded darker than might be expected, because that is where the resources are. But in such a small population, the presence of low-income housing and nursing homes could push those Census tracts over the thresholds included for the maps. Consider a filter.
- Hollister, the area where the Haliwa-Saponi tribe lives, is actually divided between Warren and Halifax counties.

Focus group themes

A focus group in Soul City on June 12, 2013 drew 13 participants, including one white and 12 African-American adults, who shared challenges and experiences from their daily lives. All owned cars. However, the cost of car ownership was noted as potentially burdensome; one participant said, "The least little glitch and you're in trouble." For those who don't own cars, there is a "ripple effect" because a person can't get to interviews or appointments, and then may get demoralized and stop looking for work.

- Several participants had children, including one woman with eight children; one participant was a community college student.
- Many people seemed excited about the possibilities of public transportation and its effect in their lives, but also recognized that scheduled service would be infeasible in such a rural county. They mentioned MegaBus, park-and-ride hubs, and shuttles.
- While the general sentiment was that quality of life is high in rural Warren County (more than one participant had moved there from places like Detroit and New Jersey), feelings of isolation and missed cultural opportunities manifest when discussing mobility and accessibility. One participant even wrote, "Warren County is simply devoid of transportation options" on the mapping exercise.

- There was some nostalgia for a sense of community that would bring people together to support each other. A participant asked rhetorically, •One of the key questions is: How do we develop a sense of community again so that people will be more willing to help each other to take care of one another? This insight provides a perspective on institutionalizing some of the informal solutions that may already be present.

Alignment of focus group responses with key informants

The focus group echoed sentiments expressed in key informant interviews, including the difficulties of getting around in the rural community without a car. Even with a car, the cost of travel (gas, wear and tear) and the long distances are common barriers, and can determine what activities or trips Warren County residents take part in. While focus group participants were not the most disadvantaged members of the community, all had experiences and shared knowledge of the types of challenges enumerated by key informants. One take-away from a poor, rural county like Warren is that there co-exist, paradoxically, an atmosphere of isolation along with shared, supportive communities.

Wilson County in brief

Straddling the rough border between Piedmont and coastal Plain, Wilson County is located in the east-central region of North Carolina; rolling hills in the west give way to flatter plains toward the east. The county's Census-reported population in 2010 was 81,234; Wilson is a minority-majority county where 39% self-report as Black and 10% as Hispanic, with 49% identifying as White. The county seat is Wilson, a small city with a distinctive and appealing downtown and urban core that has worked hard to keep its economy humming, aided by a major bank headquarters (BB&T), small college (Barton), strong health care sector, and other industry. The county experienced moderate growth of 10.1% from 2000 to 2010. The 19.2-minute mean travel time to work is lower than the state average (23.4 minutes). Wilson has scheduled transit in the City of Wilson, with paratransit available for residents across the entire county who need special services. Wilson's age profile is very similar to the state average, with the mean age and percentage of residents older than 65 both just slightly above the statewide number. The median household income (\$36,645) is lower than the state (\$43,417), and home ownership (60% of households) is lower than the 67% of households statewide who own their homes.

Key informant interviews and resident focus groups

Wilson County key informant interviews involved six interviews with 12 people, representing:

- Public Relations Office
- Citizen Transportation Advisory Board
- Chamber of Commerce Transportation Committee
- Planning and Development Services
- Bike-Pedestrian citizen board representatives
- Wilson Police Department
- Wilson County Emergency Management

Key informants from Wilson County provided detailed comments and thoughtful analysis on how the infrastructure in the city and across the county meets the needs of various residents, and commented extensively on the color-coded maps of transportation-disadvantage risk areas.

The first focus group in Wilson County was very small, and did not align with the protocol, which calls for non-practitioner non-(transportation)-expert residents; each of the three people in the first focus group had direct knowledge of travel patterns and services in the county, primarily in their roles as emergency dispatchers or responders. Nevertheless, the group provided useful feedback and comments on the map activity and on Wilson County transportation patterns.

A second focus group specifically sought out farm workers on H-2A temporary agricultural worker visas who are based at a camp in Wilson County. These 30 farmworkers, whom large agricultural operations hire, mostly from Mexico for seasonal work, typically have low English

proficiency. Since they do not have cars, they rely on employer-sponsored transportation to get to work and to access goods and services.

Main themes from interviews

Wilson is a growing and relatively stable county, where economic development has been steady if not explosive, the city remains a strong center of social and cultural interaction, and rural livelihoods are fairly stable. The county has a strong professional planning corps, active in state and regional planning organizations, and interested in exchanging knowledge with academic partners.

- With a diverse economy and diverse population, Wilson is experiencing growth pressures
- Strong management and infrastructure offer chance for creative and affordable improvements

Vulnerable populations in Wilson County

- A large Hispanic population provides farm and other labor; many of these workers are carless.
- Low-income and older residents need assistance in accessing medical and other services.
- College students in the City of Wilson, while not necessarily vulnerable residents, add to the transportation puzzle, with about 1000 trips/day, many of them on foot.
- Wilson is home to a sizeable population of deaf and hard-of-hearing; the School for the Deaf and Hard of Hearing is located northeast of downtown Wilson along Route 301.

Transportation infrastructure and supply

The city sits at the general juncture of several routes: 117, 301, 264, plus smaller state roads; Interstate 95 runs just west of town. An active train line parallels Rt. 264 from the northwest into near-downtown; development along this rail line is anticipated to intensify in coming years.

- Wilson's urban bus system is good but under-utilized; the system would benefit from more marketing, as many residents are unaware of the extent and convenience of the transit system.
- The Public Relations office within the City of Wilson gets calls from within *and* outside the city (from Wilson and other counties), and attempts to find out callers' needs and refer them on to other places. Many callers are looking for transport to medical care in Wilson County, or need to go to Pitt County to access East Carolina University medical campus and nearby clinics.
- Regional auto access is good from anywhere in Wilson County, to Raleigh, Kinston, Goldsboro, and other destinations.

Transportation challenges specific to Wilson County

Heavy traffic and safety concerns are by-products of Wilson's generally positive current economic climate, with many areas around the city described as dangerous and congested. Major thoroughfares are in place for autos, but bicycles and pedestrians are not well-served, and connectivity is insufficient. Lack of money is holding back pedestrian and cycling-supportive projects that the city and county are eager to launch. Some places have sidewalks, but are still dangerous for walkers.

- Much of the employment is outside the city, e.g., factories, tobacco. Firestone/Bridgewater is just north of the city. Most who can drive to work do so; most utilitarian cycling that happens is by necessity, not choice. The latter group includes some non-driving seasonal laborers.
- Wilson is flat, so cycling and walking could flourish, in theory, and there is an active bicycling advocacy group that meets regularly; recreational cyclists are more common than utilitarian. But even if traffic were slowed, it is still too dangerous for biking without dedicated paths or lanes. North and east of downtown, near Ward Blvd, Corbett is to be repaved with bike lanes. Northwest of town beyond Ward Boulevard, Pack House Road has shoulders that bikes can use.
- Safe passage is hard to come by on busy wide roads; Ward Boulevard is marked 45mph, but people drive 60. Engineers do a good job moving traffic without so much speed. Airport Boulevard goes from two to five lanes. Route 301 heading northeast out of town sees very busy traffic and high speeds; they are working on sidewalks on old 95, with stoplights, where kids walk to school.
- Many schools do not have good bike/pedestrian access, including an elementary school in the congested district near the hospital. Children walk to Winstead School even with no sidewalks.
- Airport between US-264 and Rt. 58 hosts a senior village with few bus stops, Section 8 apartments at Joyne Lane off Airport, as well as Starship Lane off Nash St. NW (Rt. 58), where there are no sidewalks but lots of foot traffic on a five-lane road. Farther up Airport Boulevard is an upscale retirement community, across Lake Wilson Rd from the Food Lion.
- Other development patterns: suburban large-lot development west of town, between US-264 and route 42 and west of I-85: pharmaceutical plants, low-density development, and upscale residential housing northwest of town along Rt. 58. Southeast of downtown is settled by lower-income residents. In Hispanic neighborhoods, there are a lot of cyclists mixed in with traffic: high speed, narrow roads, and weak enforcement of speeding laws are a dangerous mix.

Solutions—formal and informal

Transportation challenges in the seasonal farm-worker camp take several forms:

- The employer provides bus service from camp to work sites, along with emergency transport.

- A routine Sunday bus run stops first at a flea market, second at a place where workers can cash checks and wire money, and third at Wal-Mart. They usually leave at 7am and return by 1 p.m.
- Food access is addressed at the camp, in part, by a woman who comes daily to sell traditional Mexican food. About half buy food from her; the others cook in the communal kitchen.

ITRE-generated county map of transportation disadvantage

The Wilson County key informants found the results of the mapping to be interesting and in many cases readily interpretable given their knowledge of Wilson residents, travel behavior and needs, and existing transportation infrastructure and services. Comments on color-coding and mapping:

- Downtown Wilson might reasonably be expected to be lighter, given its transit access. Directly south of the city is commercial development; west is mostly middle-class residential. A moderately dark area directly south of downtown is an isolated neighborhood in rural farmland.
- Areas in western near-downtown may be more disadvantaged than show up on the map. Southeast of downtown, which is a bit darker, perhaps shouldn't be, as it doesn't have much housing.
- East of downtown, with darker areas, are scattered neighborhoods and solid waste facilities. Northeast of Wilson, along Rt. 301 to Elm City, perhaps should be lighter, as it's mostly rural. Dark areas east and northeast (east of railroad tracks from Norfolk Southern) of downtown Wilson may be trailer parks; possibly also located there are some elderly but self-sufficient populations. Trailer parks just west of downtown (past Ward Boulevard) folded; FEMA bought them out and didn't rebuild. Dark areas around Elm City are in an area far from city services.
- Migrant camps and other Hispanic concentrations are located west of Wilson and I-95, between US-264 and Rt. 42, as well as in and around Elm City to the northeast.
- The rail corridor running to the Triangle is valuable, so it's worth preserving development along this route.
- North of downtown, along Rt. 58, is the country club. There is some county/city political tension, but appreciation for the "great city manager," thinks outside the box. The city has been becoming more progressive recently, while the county generally is going the other way.
- Planning for land use and transportation: Services are located mostly downtown and east of Wilson; handicapped and elderly need help getting to those locations. Much of the shopping and services are moving north and west. There is interest in revitalizing downtown, but that will need a push from citizens to support the planning process, and dollars to make it happen.

Focus group themes

Focus groups in Wilson County included a small group of people with transportation or public-service experience, and a large group of seasonal farm laborers hired from Mexico and provided with group housing and limited transportation (work sites, weekend transportation to shopping). The farm-workers shared personal experiences that illustrate transportation challenges that directly shape their daily lives. Focus group participants were very limited in their ability to independently access health care, retail, other services and social opportunities outside of the camp. Because of their geographic isolation and the lack of access to public transportation (which doesn't reach them) and private transportation (no one can afford a car), they were wholly dependent on their employer and a nearby clinic for transportation. They sometimes walk into town or to the lake to go fishing, but make limited other trips, usually to a tienda or dispensa (small stores). Their constrained travel reflects their options: There was a lot of expressed interest in going to nearby cities such as Raleigh and Durham to sight-see and access a greater variety of goods at lower prices. Having access to the beach and other public destinations would provide opportunities for affordable entertainment and recreation, but saving money to send home remains their paramount concern. The overall impression is one of forced dependency on the employer to provide a gateway to the world outside of the camp.

People come from all over Mexico to work at this camp, out of the 31 states in Mexico, there are 20 states represented among the workers at the camp. They are on 6-7 month contracts, after which they go back home; most of them return for the next harvesting period, so many know each other from previous years. Most of the seasonal workers are bussed between the camp and work site each day; the whole group travels together to each location. Work locations change day by day, but usually are within a half-hour of where they live.

To go anywhere else besides work and the weekly bus run to Wal-Mart is another story, and very difficult without someone offering transportation. There are some destinations outside the camp they can access on foot (within 2.5 miles), a few friends living nearby, as well as a lake where they can fish. There is no restriction on walking around the property or beyond, so they are free to go walking, and sometimes they can find a ride back to camp from their friends. But leaving camp is risky since there is no rail, lights, or other protection from traffic:

We have not been outside the camp today... We only go out on Sundays

During the week, they don't really leave the camp; limited disposable income and the need to send money home to their families constrains their travel and non-work activities. In addition, many want to be available for unexpected work opportunities.

Recreational activities are limited by transportation and liability. The farm-workers appear to take their limited mobility in stride, aware that the terms of their contracts make the employer responsible for everything that happens in the camp, but not outside. As soon as they step out of the camp for anything other than work, they assume the risk for any injury. Given their limited

contracts and the goal to earn and send money back to their families, they tend to stay at camp and forego recreational activities. If they decide to leave the camp outside of work, they need to either call a friend or pay someone to take them. During the rest of the week they work in the field and only leave the site if it is an emergency or completely necessary, for example: assigned work in another place, equipment pickup, errands for the employer, or if someone is sick or hurt.

The workers reported that emergencies are well-covered: Harvest Clinic will arrange transport on certain days of the week, and the employer will lend a vehicle or provide a ride for urgent needs.

If we ask to go somewhere, they take us. That has never been a problem. [...] In case of an emergency the patron helps us get wherever we need fast, and without a problem

The focus group was unanimous on what would make it easier for them to get around: a bus that makes daily or other routine trips for workers. Destinations of interest include cities like Raleigh and Durham (beyond Wilson, which they already know), stores, and the beach. Other desirable destinations: church, bars, sports events, other retail outlets (beyond the routine Wal-Mart runs). Although several people in the camp (8-10) have licenses and can drive the trucks for work purposes or emergencies, no-one owns a car. Without a car or license, it is very difficult to get around. A bus that could be used for grocery store trips and other needs would make them feel less isolated and less dependent on their employer or service providers. Their transportation situation, with regular access to Wal-Mart and other services, is better than other camps they have worked at or heard of; they consider their situation atypical of migrant camps. The consensus: The primary reason for their residence in the camp is employment and family support; their desire for travel to destinations other than work and weekly shopping are modest and secondary to their motivation to maintain employment and earnings, but still factor into attitudes about the camp and their lives.

Some of the focus group participants seemed reluctant to speak up or skeptical of the value of this inquiry; they gave the impression they do not expect anything to change in the long run. But in the background, one of youngest workers was heard repeating *•Never say never* with a hopeful and grateful tone.

Annotated Bibliography: Appendix

Department of Transportation Updated Environmental Justice Order 5610.2(a)

Type: Document

Abstract

The Department of Transportation (the Department or DOT) is issuing an update to Departmental Order 5610.2(a) (Actions to Address Environmental Justice in Minority Populations and Low-Income Populations). This Order updates the Department's original Environmental Justice Order, which was published April 15, 1997. The Order continues to be a key component of the Department's strategy to promote the principles of environmental justice in all Departmental programs, policies, and activities. DOT Order 5610.2(a) sets forth the DOT policy to consider environmental justice principles in all (DOT) programs, policies, and activities. It describes how the objectives of environmental justice will be integrated into planning and programming, rulemaking, and policy formulation. The Order sets forth steps to prevent disproportionately high and adverse effects to minority or low-income populations through Title VI analyses and environmental justice analyses conducted as part of Federal transportation planning and NEPA provisions. It also describes the specific measures to be taken to address instances of disproportionately high and adverse effects and sets forth relevant definitions. This updated Order reaffirms DOT's commitment to environmental justice and clarifies certain aspects of the original Order, including the definitions of "minority" populations in compliance with the Office of Management and Budget's (OMB) Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity of October 30, 1997. The revisions clarify the distinction between a Title VI analysis and an environmental justice analysis conducted as part of a NEPA review, and affirm the importance of considering environmental justice principles as part of early planning activities in order to avoid disproportionately high and adverse effects. The updated Order maintains the original Orders general framework and procedures and DOT's commitment to promoting the principles of environmental justice in all DOT programs, policies, and activities.

URL:

http://www.fhwa.dot.gov/environment/environmental_justice/ej_at_dot/order_56102a/

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Date Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- DOT
- Environmental Justice

Notes:

- Policy of DOT to promote the principles of EJ through the incorporation of those principles in all DOT programs, policies, and activities.
- Assure that minority and low income populations are not disproportionately affected by adverse effects.

Definitions:

- Low income: a person whose household income is at or below the dept. of HHS poverty guidelines
- Minority: black, Asian American, Native American, Native Hawaiian
- Low income population: a readily identifiable group of low income persons who live in geographic proximity and if circumstances warrant, geographically dispersed/transient persons
- Minority populations: readily identifiable minority persons
- Adverse effects: totality of significant individual or cumulative health or environmental effects.
- IMO, fundamental flaw: reliance on "readily identifiable" as means to define populations implicitly precludes further search for disadvantaged populations. Entrenches disenfranchisement.

Perspectives and methods for evaluating the equity impacts of transportation decisions

Type: Webpage

Author: Todd Litman

Abstract

This chapter discusses general concepts of transportation equity, ways to evaluate it, and describes the specific criteria this Encyclopedia uses to rate the equity impacts of individual TDM strategies. For more detailed information on this issue see the report "Evaluating Transportation Equity" at www.vtppi.org/equity.pdf.

Website Title: Victoria Transport Policy Institute TDM Encyclopedia

URL: <http://www.vtpi.org/tdm/tdm13.htm>

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Date Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- auto-dependency
- DONE
- Equity
- Mobility
- Transportation affordability
- transportation equity

Notes:

- Identifies reasons for being disadvantage-prone and ways in which populations can be underserved.
- Auto dependency places a burden on lower income households
- Four types of equity related to transportation
 1. Egalitarianism- everybody should receive the same quality of services, pay the same price, and bear the same costs
 2. Horizontal equity-consumers should “get what they for and pay for what the get” unless a subsidy is specifically justified.
 3. Vertical equity with regard to income and social class- transport is most equitable if it provides the greatest benefit at the least cost to disadvantaged groups therefore compensating for overall social inequity.
 4. Vertical equity with regard to mobility need and ability- everyone should enjoy at least a basic level of access even if people with special needs require extra resources and subsidies

Important groups for equity analysis

- Income class
- Travel mode
- Gender and age
- Ability to drive
- Geographic location
- Physical ability
- Travel need
- Cost bearer

Social Exclusion is used to describe inadequate basic access-

- Spatially
- Temporally
- Financially
- Personally

Transportation adequacy evaluated in terms of

- Affordability
- Availability
- Accessibility
- Acceptability

Definitions:

- Equity: refers to the distribution of resources and opportunities.
- Basic access: means that people can obtain goods, services and activities that are considered valuable to society.
- Transportation disadvantaged: refers to people who have significant unmet transportation needs
 - Non-drivers
 - Low income
 - Disabled
 - Commuter
 - Care giving responsibilities
 - Automobile dependency

Understanding the Transit-Dependent Population

Type: Report

Author: Jennifer Dill

Abstract:

Public transit in metropolitan areas serves multiple and sometimes competing objectives. Increased attention on "choice" riders and transit as an economic development tool has shifted resources towards suburb-serving rail systems at the expense of inner-city bus service. This investment strategy may be at odds with the social service role that transit plays in providing mobility to those without other transportation options. However, there is a lack of

research on the "transit-dependent" population and how it is affected by transit policies. While transit agencies analyze the impacts of fare and route changes on racial minority and low-income populations for Title VI, these groups do not correspond exactly to transit dependent, leaving a gap in knowledge about what challenges may be faced by transit dependent persons in paying fares or accessing jobs and needed services. This proposal seeks to generate understanding of the transit dependent population in three metropolitan areas - Portland, Minneapolis-St. Paul, and Salt Lake City - using both surveys and focus groups to describe demographics, travel patterns, and transit policy impacts on access and mobility. These three metro areas include light rail as a cornerstone of their livability planning and have similar patterns of demographic change, with increasing numbers of racial minorities and suburbanization of poverty. Both Portland and Salt Lake City are considering fare structure changes. Comparable data are available from prior and current household travel surveys as well as on-board surveys of transit users. Partnering with transit agencies and community-based organizations for outreach, new data from focus groups will describe daily patterns and quality of life in depth. This research will result in analysis of how different fare structures might affect the transit dependent, providing information for transit agency decision-making that can complement existing Title VI equity analysis. Findings will also have implications for land use and housing policies that could provide access through the location of affordable housing and employment opportunities rather than via transit. The research will generate recommendations on how to improve access and reduce barriers to transit access and use, including insights into the public involvement process to proactively engage transit dependent populations.

URL: <http://otrec.us/project/551>

Location in Archive: 01376474

Extra: In progress. End date: 12/31/2013 TRB RiP: 32175

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Date Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Demographics

- Low income groups
- Mobility
- Mode choice
- Transit dependency
- Travel patterns

Mobility and Accessibility of Hispanics in Small Town and Rural Areas

Type: Report

Author: Matsuo Miwa

Abstract

The Hispanic population is rapidly increasing in the U.S., particularly in non-metropolitan counties in the Midwest and South, including Iowa. The status of non-metropolitan Hispanics raises concerns about their accessibility because of the low-density built environment and socioeconomic factors that may reduce their mobility. Hispanic people in rural areas generally have lower income than non-Hispanic whites, and they also face language barriers in receiving public assistance. This project examines mobility and accessibility difficulties that Hispanic population in small town and rural area are facing, using several manufacturing areas in Iowa as examples. Specifically, the researcher will conduct mail-in surveys and telephone follow-up interviews on Hispanic population around four towns in Iowa: Marshalltown, Columbus Junction, West Liberty, and Carroll. The survey will examine who in the Hispanic community suffers from mobility limitation and how much informal mobility support is provided within the community. The survey will also investigate barriers the Hispanic population faces in using public transit service or public fund for transportation. After the survey, the principal investigator will follow up with telephone interviews to identify more detailed travel diary data to specify the needs for transportation services. All of the processes will be planned and conducted with a Spanish-speaking research assistant hired using grant funds. From literature and preliminary interviews, it is expected that Hispanic families have difficulty in getting access to goods and services for their daily needs. Since the proportion of senior citizens is small in these Hispanic communities, the main source of troubles would likely be scheduling vehicle

usage between commuting and discretionary trips, particularly related to children. The final product of this project will be a quantitative analysis of the survey result to illustrate mobility and accessibility of rural Hispanics, and a qualitative analysis of their barriers in using public transportation services.

Location in archive: 01448468

Extra: Project underway. End date: 12/31/2013. Sponsor organization: Research and Innovative Technology Administration University Transportation Centers Program Department of Transportation 1200 New Jersey Avenue, SE Washington, DC 20590 USA Performing Organization: University of Iowa, Iowa City 102 Church Street Iowa City, IA 52242 USA

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Date Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Hispanics
- Iowa
- mobility
- Public transit
- Rural areas
- Socioeconomic factors
- Surveys

Surveying the Needs of Low-mobility Individuals in Cache County, Utah

Type: Report

Author: Anthony Chen

Abstract

Transportation plays a pivotal role in providing access to opportunities and serves as a key component in supporting independent living and full participation in society. Access to health care, education, work, shopping, etc. are essential to all individuals. Access to these necessities may be limited to those that are considered low mobility - low income groups, the

disabled and the elderly. This project will investigate the needs of these low mobility individuals, and how access to necessary activities, commodities and care may be best met.

Location in Archive: 01331457

Extra: In progress. End date: 6/30/2012 Sponsor Organization Utah State University Transportation Center <http://transportation.usu.edu/> Utah State University, Logan 4110 Old Main Hill Logan, UT 84322-4110 USA Performing Organization Utah State University Transportation Center <http://transportation.usu.edu/> Utah State University, Logan 4110 Old Main Hill Logan, UT 84322-4110 USA

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Date Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Cache County (Utah)
- Low income groups
- mobility
- Public transit
- Societies
- Socioeconomic factors
- Transit operating agencies

Can the built environment reduce health inequalities? A study of neighbourhood socioeconomic disadvantage and walking for transport

Type: Journal Article

Author: Gavin Turrell, Michele Haynes, Lee-Ann Wilson, Billie Giles-Corti

Abstract

Residents of socioeconomically disadvantaged neighbourhoods are more likely to walk for transport than their counterparts in advantaged neighbourhoods; however, the reasons for higher rates of transport walking in poorer neighbourhoods remain unclear. We investigated this issue using data from the HABITAT study of physical activity among 11,037 mid-aged residents of 200 neighbourhoods in Brisbane, Australia. Using a five-step mediation analysis and multilevel regression, we found that higher levels of walking for transport in disadvantaged neighbourhoods was associated with living in a built environment more conducive to walking

(i.e. greater street connectivity and land use mix) and residents of these neighbourhoods having more limited access to a motor vehicle. The health benefits that accrue to residents of disadvantaged neighbourhoods as a result of their higher levels of walking for transport might help offset the negative effects of less healthy behaviours (e.g. smoking, poor diet), thus serving to contain or reduce neighbourhood inequalities in chronic disease.

Publication: Health & Place

Volume: 19

Pages: 89-98

Date: 2013

Journal Abbr: Health & Place

DOI: 10.1016/j.healthplace.2012.10.008

ISSN: 1353-8292

URL: <http://www.sciencedirect.com/science/article/pii/S1353829212001876?v=s5>

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Date Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Built environment
- DONE
- Health inequalities
- Neighborhood
- Transport
- Walking

Notes:

- Setting: Australia
- Purpose: To understand why low income people engage in more utilitarian transport than non-low-income people. Apparently, this is the case in Brisbane.
- Main Finding: utilitarian walking among residents of disadvantaged neighborhoods was greater when connectivity and land use mix were greater.
However, in this particular setting, disadvantaged neighborhoods tended to have greater connectivity and land use mixes than non-disadvantaged neighborhoods.

The authors put a public health spin on the research - more walking is good for health. Disadvantaged people rarely engage in recreational walking, so it's a bonus when they can engage in more utilitarian walking. So, argument beyond mobility/accessibility for providing supportive built environments for disadvantage-prone populations.

- Useful Concepts: The authors used an index of neighborhood socioeconomic status provided by the Australian Bureau of Statistics. It's a compilation of 17 variables. The bottom 20% the authors considered disadvantaged.

Assets and opportunities structures for mobility. An analytical approach to the study of accessibility by public transport, welfare and equity

Type: Journal Article

Author: Diego Hernandez

Abstract

One of the major current challenges for mobility and transport studies in Latin America is the adoption of a multidimensional approach that goes beyond the narrower notion of trip and that does not neglect a broader discussion about mobility's effect on poverty and social exclusion. This article seeks to tackle this challenge and posits an analytical framework that takes into account the theoretical and empirical regional background on these phenomena. After reviewing existing literature and affiliating to some necessary assumptions, it proposes the assets and opportunities structures approach as a useful device to study accessibility. This concept is defined as the level of adjustment between the structures of opportunity for mobility and household's resource and assets to take advantage from them. I argue that this framework is adequate in order to maximize understanding of mobility's effect on welfare and the role of public transport.

Publication: Eure-Revista Latinoamericana De Estudios Urbano Regionales

Volume: 38

Issue: 115

Pages: 117-135

Date: SEP 2012

Journal Abbrv: Eure

Language: Spanish

ISSN: 0250-7161

Library Catalog: ISI Web of Knowledge

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Date Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- human development
- Mobility
- segregation
- spatial mismatch
- Urban transportation
- vulnerability

Attachments

- ISI Web of Knowledge Record

Neighborhood Social Inequalities in Road Traffic Injuries: The Influence of Traffic Volume and Road Design

Type:

Author: Patrick Morency, Lise Gauvin, Céline Plante, Michel Fournier, Catherine Morency

Abstract

The scientific study of how discrimination harms health requires theoretically grounded methods. At issue is how discrimination, as one form of societal injustice, becomes embodied

inequality and is manifested as health inequities. As clarified by ecosocial theory, methods must address the lived realities of discrimination as an exploitative and oppressive societal phenomenon operating at multiple levels and involving myriad pathways across both the life course and historical generations. An integrated embodied research approach hence must consider (1) the structural level—past and present de jure and de facto discrimination; (2) the individual level—issues of domains, nativity, and use of both explicit and implicit discrimination measures; and (3) how current research methods likely underestimate the impact of racism on health.

Publication: American Journal of Public Health

Volume: 102

Issue: 6

Pages: 1112-1119

Date: 06/2012

DOI: 10.2105/AJPH.2011.300528

ISSN: 0090-0036, 1541-0048

Short Title: Neighborhood Social Inequalities in Road Traffic Injuries

URL: <http://ajph.aphapublications.org.libproxy.lib.unc.edu/doi/abs/10.2105/AJPH.2011.300528>

Accessed: Thursday, November 15, 2012 8:34:16 AM

Library Catalog: CrossRef

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Date Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- DONE
- social inequalities
- traffic accidents

Notes:

- Overall: explains why poor/marginalized people more likely to experience transport-related injury than non-poor people.
- Urban areas with better public transit availability, more traffic, greater density of major roads, more traffic-generating activities have higher incidence of injured pedestrians.

- Users in poor neighborhoods have higher exposure to traffic and - traffic volume being equal - a greater risk of injury because of the presence of more major roads
- Poor neighborhoods have more traffic and more major roads
- Greater population density, walking, cycling, and public transit use in the poorest neighborhoods expose more pedestrians and cyclists to potential road traffic injuries
- Poor areas will benefit the most from traffic reduction and road redesign

Overview:

- Focus/purpose
 - Type of disadvantage (e.g., safety, access, exclusion, etc): exposure to traffic injuries/death
 - Population examined (poor, non-english speaking, etc): wealth (poor vs wealthy)
 - Goal of study: to determine if poor populations experience/face more risk to injury or death as pedestrians, cyclists, and motor vehicle occupants than non-poor populations
- Context
 - Location
 - incl. context of location (e.g., rural vs urban vs suburban; presence of physical/geographic barriers; prevailing SES) -Island of Montreal
 - scale, time period, etc
- How disadvantage is defined
 - Population (who, how identified)
 - Barriers faced (what, how identified)
- Methods
 - Quantitative/qualitative/mixed?
 - Research design & Conceptual framework
 - Unit of analysis
 - Data
 - Analytical approach

- Findings: Injuries were more common in poor census tracts, controlling for traffic volume, intersection geometry, and ped/bike volumes.
- Overall Impression of tool/measurement: NA
- Applicability & Generalizability (how does it inform our study?): Fodder. There is evidence that poor people are disproportionately at risk of traffic injury. The authors did not examine why, but we can probably speculate that facilities had a lot to do with it, at least for NMT. Vehicle safety probably influenced injury rates for occupants.
- Any other useful information from the study that may inform our approach

Methods for the scientific study of discrimination and health: an ecosocial approach

Type: Journal Article

Author: Nancy Krieger

Abstract

The scientific study of how discrimination harms health requires theoretically grounded methods. At issue is how discrimination, as one form of societal injustice, becomes embodied inequality and is manifested as health inequities. As clarified by ecosocial theory, methods must address the lived realities of discrimination as an exploitative and oppressive societal phenomenon operating at multiple levels and involving myriad pathways across both the life course and historical generations. An integrated embodied research approach hence must consider (1) the structural level-past and present de jure and de facto discrimination; (2) the individual level-issues of domains, nativity, and use of both explicit and implicit discrimination measures; and (3) how current research methods likely underestimate the impact of racism on health.

Publication: American journal of public health

Volume: 102

Issue: 5

Pages: 936-944

Date: May 2012

Journal Abbr: Am J Public Health

DOI: 2105/AJPH.2011.300544

ISSN: 1541-0048

Short Title: Methods for the scientific study of discrimination and health

Library Catalog: NCBI PubMed

Extra: PMID: 22420803

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Date Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Continental Population Groups
- ecosocial theory
- Health Services Research
- health status disparities
- Humans
- Prejudice
- Research Design
- Social environment
- societal injustice
- Sociology, Medical

Notes:

- Eco-social theory used as a framework by which to understand health racial inequity.
- Where does discrimination occur?
- Rigorous methods for the scientific study of discrimination and health
 - conceptual clarity about the exploitative and oppressive realities of racism and other forms of adverse discrimination
 - careful attention to domains, pathways, level, and spatio-temporal scale
 - structural level measures
 - individual level measures
 - an embodied analytical approach

Attachments

- PubMed Link

Social inequality, disadvantaged neighbourhoods and transport deprivation: an assessment of the historical influence of housing policies

Type: Journal Article

Author: Anne Power

Abstract

This paper argues that the drive to build housing and to clear crowded slums has led to the dispersal of population. The building of large subsidised housing estates as replacement housing for former slums has compounded social problems by concentrating low income households in cut-off communities. Low income households in poorer neighbourhoods have far lower levels of car ownership than average and yet suffer higher levels of traffic and environmental damage because the dispersal process encourages the growth of car traffic and the polarisation of neighbourhoods. Based on evidence from longitudinal studies of families bringing up children in low income neighbourhoods, and of unpopular housing estates in Britain and Europe, the author argues that social, economic, locational, and environmental problems interact in disadvantaged urban neighbourhoods with negative consequences for families and other vulnerable households. Current patterns of dispersal and low density building encourage the segregation of communities and at the extreme, the creation of 'ghettos' as the US demonstrates. Yet the built environment evolves only slowly, and urban communities are locked into patterns of settlements, energy use and inequality that are hard to change. More collective transport modes would reduce environmental damage while enhancing social integration. It is costly to introduce new transport infrastructure but essential if we are to equalise conditions and opportunities. There are alternatives to the prevailing pattern of outer suburban building and population dispersal: more compact, more mixed-use city neighbourhoods. Denser, more people-friendly, less traffic-dominated neighbourhoods would be more integrated and offer more opportunity. Their energy requirements and environmental impact would be lower, and low income families would not suffer such unequal conditions and their consequences.

Publication: Social Impacts and Equity Issues in Transport

Volume: 21

Pages: 39-48

Date: March 2012

Journal Abbr: Journal of Transport Geography

DOI: 10.1016/j.jtrangeo.2012.01.016

ISSN: 0966-6923

URL: <http://www.sciencedirect.com/science/article/pii/S096669231200021X>

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Date Modified: Thursday, January 03, 2013 10:11:55 AM

Tags:

- Connections
- Disadvantage
- Environment
- TDP-MOTIVATION
- Transport
- Urban neighbourhoods

Incorporating equity into the transit frequency-setting problem

Type: Journal Article

Author: Erin M. Ferguson, Jennifer Duthie, Avinash Unnikrishnan, S. Travis Waller

Abstract

This paper and the proposed formulation contribute to an apparent gap in transit research design by integrating equity considerations into the transit frequency-setting problem. The proposed approach provides a means to design transit service such that equitable access to basic amenities (e.g., employment, supermarkets, medical services) is provided for low-income populations or disadvantaged populations. The overarching purpose is to improve access via transit to basic amenities to: (1) reduce the disproportionate burden faced by transit dependent populations; and (2) create a more feasible transportation option for low-income households as an opportunity to increase financial security by reducing dependence on personal autos. The formulation is applied to data from a mid-sized US metropolitan area. The example application illustrates the formulation successfully increases access to employment opportunities for residents in areas with high percentages of low-income persons, as well as

demonstrates the importance of considering uncertainty in the locations of populations and employment.

Publication: Transportation Research Part A: Policy and Practice

Volume: 46

Issue: 1

Pages: 190-199

Date: January 2012

Journal Abbr: Transportation Research Part A: Policy and Practice

DOI: 10.1016/j.tra.2011.06.002

ISSN: 0965-8564

URL: <http://www.sciencedirect.com/science/article/pii/S0965856411000954>

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Monday, December 17, 2012 12:57:44 PM

Tags:

- Accessibility
- Amenities
- DONE
- Economic factors
- Employment
- Equity
- Equity (Justice)
- Formulas
- Grocery stores
- Low income groups
- Medical services
- Metropolitan areas
- Public transit
- Scheduling
- Transit dependency
- Transit network design
- United States

Notes:

OVERVIEW

Focus/purpose

- Type of disadvantage (e.g., safety, access, exclusion, etc): poor employment accessibility via transit
- Population examined (poor, non-english speaking, etc): low income
- Goal of study: To figure out how to assess and improve "access via transit to basic amenities" for low-income and/or disadvantaged populations. They develop an application to use in transit frequency setting and route design to make sure transit service "increases access to employment opportunities for residents in areas with high percentages of low-income persons". Most research on transit service focuses on operating efficiency, not equity. Studies that have examined equity have looked at access to the system for disadvantaged populations as a binary, not in terms of level/quality of access, or in terms of whether access to the system translates into access to basic amenities. The current paper seeks to fill this gap.

Context

- Location
 - incl. context of location (e.g., rural vs urban vs suburban; presence of physical/geographic barriers; prevailing SES)
 - scale, time period, etc

How disadvantage is defined

- Population (who, how identified)
- Barriers faced (what, how identified)

Methods:

- Unit of analysis: geographic. The authors suggest using TAZ or census block.
- Analytical approach:
 - transit accessibility vs. car accessibility. "compares access via transit to access via personal auto for selected origins and destinations."

- transit accessibility measured in terms of frequency, # of transit lines available for a given OD pair, and "the attractiveness of the destination based on travel time and concentration of amenities".
- Calculating accessibility ratio: For each origin (geography) in the study area, calculate accessibility via transit and car to each destination (every other geography in the study area). Calculate accessibility following techniques explained in TCRP 88. Synthesizing and weighting considerations explained in the article (section 2).

Findings

- Overall Impression of tool/measurement: useful for assessing relative transit service.
- Applicability & Generalizability (how does it inform our study?): comparing accessibility by transit vs. car is straightforward. Do advantaged populations have a more favorable ratio than disadvantaged populations? Can accommodate any type of disadvantage. Must be used in relation to non disadvantage-prone populations, as there is no "standard" or minimum acceptable transit-vs-car accessibility ratio.
- Any other useful information from the study that may inform our approach

Assessing Transportation Disadvantage and Public Transportation Opportunities in Rural Ontario: A Case Study of Huron County

Type: Thesis

Author: Eric Marr

Abstract

In virtually all rural areas in Ontario the limited transportation alternatives means that rural residents without access to a personal vehicle are at great risk of transportation disadvantage. The primary research method for this research involved

University: University of Guelph

Place: Toronto

Date: 2012

Short Title: Assessing Transportation Disadvantage and Public Transportation Opportunities in Rural Ontario

URL:

[http://www.academia.edu/1915098/Assessing Transportation Disadvantage and Public Transportation Opportunities in Rural Ontario A Case Study of Huron County](http://www.academia.edu/1915098/Assessing_Transportation_Disadvantage_and_Public_Transportation_Opportunities_in_Rural_Ontario_A_Case_Study_of_Huron_County)

Accessed: Monday, January 28, 2013 6:16:19 AM

Date Added: Monday, January 28, 2013 6:16:19 AM

Modified: Monday, January 28, 2013 6:17:47 AM

Tags:

- academia
- academics
- Biology
- Chemistry
- Computer Science
- Earth Sciences
- Economics
- English
- Geography
- History
- Law
- Math
- Medicine
- Philosophy
- Physics
- Political Science
- Psychology
- Religion
- research
- universities

Choice and disadvantage in low-car ownership households

Type: Journal Article

Author: Alexa Delbosc

Author: Graham Currie

Abstract

Although car ownership in general has been much studied, less is known specifically about households that must share a car between multiple drivers. This paper reports on a survey of households in Melbourne and the Latrobe Valley of Australia that contain one car but more than one adult. One-third of the survey sample said they could afford another car if they wanted but chose not to ("voluntary" one-car households), and there were important differences between these households and those that could not afford another car ("involuntary" one-car households). Low-car households travelled half the daily vehicle kilometres of households with at least as many cars as adults and the majority said they had no travel problems. Voluntary one-car households lived in areas with more alternatives to car-based transport and did not experience restrictions on their mobility. However, involuntary households did not have as many transport options, relied heavily on car-based travel, faced greater restrictions on their activities, had fewer social support networks and had lower psychological well-being. This provides an important caution to policies that attempt to limit car ownership if households cannot adjust to the negative consequences.

Publication: Transport Policy

Volume: 23

Pages: pp 8-14

Date: 2012

Journal Abbr: Transport Policy

URL: <http://dx.doi.org/10.1016/j.tranpol.2012.06.006>

Loc. in Archive: 01446247

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Australia
- Automobile ownership
- Households
- measuring transportation disadvantage
- Melbourne (Australia)
- mobility

- Mode choice
- Psychological aspects
- Social impacts
- Surveys
- Transportation disadvantaged persons
- Travel demand management
- Travel patterns

Notes:

- Doesn't offer much in the way of methodology or results, but does help somewhat in defining the concept of propensity to be disadvantaged, and explains the relationship between transport disadvantage and social exclusion.
- It also explains the difference between voluntary and involuntary low-car ownership.
- Unless we need to defend our decision to not use vehicle ownership status as a metric of propensity to be disadvantaged, I don't think we need this article.
- UR - <http://www.sciencedirect.com/science/article/pii/S0967070X1200090X>

Attachments:

- Delbosc & Currie 2012 - choice and disadvantage in low-car ownership households.pdf

The social impacts of poor access to transport in rural New Zealand

Type: Report

Author: G Fitzgerald

Abstract

Little social research on rural access to transport in rural communities has been carried out in New Zealand. With assistance from the New Zealand Transport Agency, the researchers addressed this issue and the social effects of poor access. Census and national travel survey data provided a picture of access to private and public transport, travel patterns and socio-economic characteristics of residents in areas with different levels of transport access. Two rural community case studies were conducted to document the social issues and impacts of poor access to transport, and to identify local attempts to solve transport problems. Options for addressing poor access to transport and its effects were explored with government and private sector transport specialists. Access to private motor vehicles was found to be nearly universal

among New Zealand rural households. However, some communities and sections of the rural population suffer from significant transport-related disadvantage. Two main types of strategy for mitigating the impacts are presented: a) those that set out to improve access to services, goods, activities and opportunities rural people need, and b) strategies that seek to change the context in which disadvantage is experienced. The authors propose the use of accessibility planning and anticipatory social impact assessment in rural services and district planning, along with more assistance to local communities to develop their own solutions to transport problems.

Report Number: 9780478394436

Date: 2012

Pages: 99p

URL: <http://www.nzta.govt.nz/resources/research/reports/484/index.html>

Loc. in Archive: 01380159

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Behavior
- Case studies
- Case study
- New Zealand
- Planning
- Policy and planning
- Rural area
- Rural areas
- Socioeconomic factors
- Sociology
- Transport disadvantaged
- Transport planning
- Transportation
- Transportation disadvantaged persons
- Transportation planning
- Travel
- Travel behavior
- Travel behaviour

Notes:

- IS - 484

Transport and social exclusion: Where are we now?

Type: Journal Article

Author: Karen Lucas

Abstract

The late 1990s and early 2000s witnessed a growing interest amongst UK academics and policy makers in the issue of transport disadvantage and, more innovatively, how this might relate to growing concerns about the social exclusion of low income groups and communities. Studies (predominantly in the United Kingdom) began to make more explicit the links policy between poverty, transport disadvantage, access to key services and economic and social exclusion. By 2003, the UK Social Exclusion Unit had published its now internationally recognised report on this subject, which subsequently resulted in the development of a set of transport policy guidances to local authorities in England to deliver what is now commonly referred to as accessibility planning as part of their Local Transport Plans (Department for Transport, 2006). Since this time, researchers, policy makers and practitioners in several other countries became interested in adopting a social exclusion approach to transport planning, largely because of its utility in identifying the role of transport, land use planning and service delivery decisions in creating and reinforcing poverty and social disadvantage. Eight years on from the SEU report, we can begin to reflect on the extent to which a social exclusion approach to the research of transport disadvantage has been successful in opening up new avenues of research enquiry and/or identifying new theoretical perspectives and/or methodological approaches. The paper begins by briefly revisiting the basic theories and core definitions which underpin and inform a social exclusion perspective. It then considers how these have been translated and understood in terms of transport. Secondly, it considers some of the emergent empirical research of transport-related exclusion that has attempted to measure and model the interactions between transport and mobility inequalities and relational negative social outcomes. Thirdly, it offers observations on progress in some key areas of policy and practice, with specific reference to the UK and Australia. It concludes by suggesting how further progress

might be made on this issue and considers whether the social exclusion agenda is still a relevant approach for achieving this.

Publication: Transport Policy

Volume: 20

Pages: pp 105-113

Date: 2012

Journal Abbr: Transport Policy

URL: <http://www.sciencedirect.com/science/article/pii/S0967070X12000145>

Loc. in Archive: 01369913

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Monday, December 17, 2012 12:59:09 PM

Tags:

- Accessibility
- Australia
- Case studies
- Delivery
- Equity (Justice)
- mobility
- Policy
- Policy analysis
- Social exclusion
- Social factors
- theory
- Transport disadvantage
- Transportation disadvantaged persons
- Transportation planning
- United Kingdom

Notes:

7 categories of transport-based social exclusion

1. physical exclusion: "whereby physical barriers, such as vehicle design, lack of disabled facilities or lack of timetable information, inhibit the accessibility of transport services"

2. geographical exclusion: "where a person lives can prevent them from accessing transport services, such as in rural areas or on peripheral urban estates"
3. exclusion from facilities: "the distance of key facilities such as shops, schools, health care or leisure services from where a person lives prevents their access"
4. economic exclusion: "the high monetary costs of travel can prevent or limit access to facilities or employment and thus impact on incomes"
5. time-based exclusion: "other demands on time, such as combined work, household and child-care duties, reduces the time available for travel (often referred to as time poverty in the literature)"
6. fear-based exclusion: "where fears for personal safety preclude the use of public spaces and/or transport services"
7. space exclusion: "where security or space management prevent certain groups access to public spaces, e.g., gated communities or first class waiting rooms at stations"

Accessibility and capability: the minimum transport needs and costs of rural households

Type: Journal Article

Author: Noel Smith, Donald Hirsch, Abigail Davis

Abstract

As a minimum, how much do rural households need to be able to afford adequate transport? This paper is drawn from the Minimum Income Standards (MIS) research program, which primarily involves groups of members of the public reaching consensus about what households need for a minimum, socially acceptable standard of living. The paper looks at the additional needs and costs of rural households, compared with their urban counterparts, and focuses on the methodology used to research these costs. This discussion is framed in terms of

transport disadvantage, and the Capability Approach. The results of the research are presented: how travel needs and costs vary for different household types; and how minimum transport costs impact on overall household budgets. The paper concludes by considering the possible application of the "MIS Rural" approach in practice.

Publication: Journal of Transport Geography

Volume: 21

Pages: pp 93-101

Date: 2012

Journal Abbr: Journal of Transport Geography

URL: <http://www.sciencedirect.com/science/article/pii/S0966692312000087>

Tags:

- Accessibility
- Capability Approach
- DONE
- establishing minimum standards for rural transportation
- Households
- Low income groups
- Methodology
- Minimum Income Standards
- Rural areas
- Rural transport
- Rural transportation
- Transport disadvantage
- Transportation disadvantaged persons
- Travel costs

Notes:

- Looking for interdependencies between accessibility and capability among rural populations in the UK
- The govt in UK establishes standards of accessibility to certain kinds of destinations, "based on distance and journey time" and accounting for LOS characteristics such as bus freq/availability
- Other scholars in the UK have been focusing on ways to assess the capability side (population characteristics). Smith et al are trying to figure out what capability

standards (focusing on minimum household income needed to have adequate access to services) should be for rural English households

- The UK minimum income standard is meant to establish raw numbers about how much money is needed to meet accepted standard of living. It's not relative to anything variable, like (eg) 60% of median hhld income, and it's not tied to minimum wages. They did/do extensive focus group work to determine how much money is needed for families with a variety of characteristics. The purpose of the current paper was to "identify the additional costs faced by rural households in order to achieve the same living standards as urban households". In other words, to construct the same standard, but specifically for rural households. The authors realized in this process that accessibility was one of the primary ways that rural households had different capabilities than urban households.
- METHODS:
 - the authors developed budgets for different types of households. They used a rigorous, tested methodology for validating the budgets via delphi method and focus groups. Focus group participants "identify the capabilities" needed to have their basic needs met AND to feel like full participants in society. They participants also identified themselves what kinds of service they needed to have access to in order to meet that sense of full participation.
 - The authors used 3 classifications of rural and developed standards for each.
 - Site selection: They measured accessibility using a "composite accessibility score." This was developed and detailed in Smith et al 2010. P. 95 of the current paper summarizes development of the score. Each "census output area" received an accessibility score, and study sites were chosen to ensure a range of scores across rural classes.
 - Compared to urban households (in which it was determined that public transit was sufficient to meet minimum mobility needs), groups determined that a car was required to do the same in rural areas. This, a higher minimum income standard was needed.

- P.96 shows how they came up with car travel budgets. They calculated distances in various ways depending on destination types. This is detailed in the right column of p.96; the detail is useful.
- The results aren't as useful as the methodology. Results basically lay out the number and types of cars needed for different household types in different locations, and the extra money needed to pay for their ownership and use.

Attachments

- Smith et al 2012 - minimum transport needs and costs of rural households.pdf

Analysis of rural activity spaces and transport disadvantage using a multi-method approach

Type: Journal Article

Author: Md. Kamruzzaman

Author: Julian Hine

Abstract

Current knowledge about the relationship between transport disadvantage and activity space size is limited to urban areas, and as a result, very little is known about this link in a rural context. In addition, although research has identified transport disadvantaged groups based on their size of activity space, these studies have, however, not empirically explained such differences and the result is often a poor identification of the problems facing disadvantaged groups. Research has shown that transport disadvantage varies over time. The static nature of analysis using the activity space concept in previous research studies has lacked the ability to identify transport disadvantage in time. Activity space is a dynamic concept; and therefore possesses a great potential in capturing temporal variations in behaviour and access opportunities. This research derives measures of the size and fullness of activity spaces for 157 individuals for weekdays, weekends, and for a week using weekly activity-travel diary data from three case study areas located in rural Northern Ireland. Four focus groups were also conducted in order to triangulate quantitative findings and to explain the differences between different

socio-spatial groups. The findings of this research show that despite having a smaller sized activity space, individuals were not disadvantaged because they were able to access their required activities locally. Car-ownership was found to be an important life line in rural areas. Temporal disaggregation of the data reveals that this is true only on weekends due to a lack of public transport services. In addition, despite activity spaces being at a similar size, the fullness of activity spaces of low-income individuals was found to be significantly lower compared to their high-income counterparts. Focus group data shows that financial constraint, poor connections both between public transport services and between transport routes and opportunities forced individuals to participate in activities located along the main transport corridors.

Publication: Transport Policy

Volume: 19

Issue: 1

Pages: pp 105-120

Date: 2012

Journal Abbr: Transport Policy

URL: <http://www.sciencedirect.com/science/article/pii/S0967070X11001107>

Loc. in Archive: 01361356

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Activity centers
- Activity choices
- Activity spaces
- Automobile ownership
- Focus groups
- identification of disadvantaged populations
- mobility
- Needs assessment
- Northern Ireland
- Policy making
- Rural areas

- Rural travel
- Socioeconomic factors
- Transportation disadvantaged persons
- Transportation planning
- Transportation policy
- Travel behavior

Notes:

- Focus is on usefulness of activity space size as a measure of disadvantage. Outcome is activity participation frequency.
- Premise: "Identifying transport disadvantage using the size of activity spaces as an indicator may be misleading if the activity space size is not explained in relation to the context in which people live."
- Objectives:
 1. "to identify patterns of transport disadvantage"
 2. "to validate and explain these quantitative findings based on the views of identified disadvantaged groups"
- Context: rural Northern Ireland.
 Unit of analysis: household
 data: household travel surveys
 travel dimension: activity space
 objective: "identify patterns of transport disadvantage in space and time"
 "test whether the size of activity spaces corresponds with those who are usually classified as transport disadvantaged in rural areas"
- Methods: GIS mapping of activity spaces corroborated against focus groups.
 Analysis: "using the size and fullness of activity spaces, a 7-factor ANOVA with a full factorial interaction between the explanatory factors was conducted using the general linear model (GLM) to identify patterns of transport disadvantage"
- Findings:
 1. Size of activity space was positively related to expressions of disadvantage from the focus group (individuals had to travel farther to meet needs). Key finding is that the construct of activity space, as traditionally viewed, may not

be valid: larger spaces do not necessarily mean more mobility esp. in the context of rural communities.

2. they did not find consistent sig relationships between SES characteristics and activity space size
 3. they did find sig. relationship between income & car ownership status and frequency of participation in local activities (no car, low income mean lower frequency)
- Overall: rejects the utility of activity space size as an indicator of disadvantage and of mobility in a rural context.
 - Findings
 - They did not find consistently significant relationship between activity space size and any of their SES characteristics.
 - But wrt frequency of participation in local activities, car-ownership, income, and renter-status all had expected relationship with activity participation.
 - Overall: the authors reject the utility of activity space size as an indicator of disadvantage and of mobility In a rural context (it may still be useful in highly urban contexts).

Attachments:

Kamruzzaman & Hine 2012 - Analysis of rural activity spaces and transport disadvantage using a multimethod approach.pdf

Transport accessibility and social inequities: a tool for identification of mobility needs and evaluation of transport investments

Type: Journal Article

Author: Juan Bocarejo S., Daniel Oviedo H.

Abstract

Although the concept of social equity seems to be ubiquitous in most mobility plans of major Latin American cities, when evaluating transport projects for financing and prioritization

there are no specific or solid indicators to measure how they can contribute to promoting better access to opportunities, particularly for the most vulnerable segments of the population. In response, the authors designed a methodology that uses the concepts of accessibility and affordability as a complementary means for evaluating public transport investment, and identifying transport disadvantages and priorities for project generation. This is based on the calculation of accessibility levels to the labor market for different zones of a given city, by introducing a function of impedance composed by travel time budget and the percentage of income spent on transportation. The characteristics of time and percentage of income spent for accessing work obtained from transportation surveys define the “real accessibility” to employment for all the zones of a city. Then, a stated preference survey was applied in order to determine the desired expenditure in both variables, and the accessibility to jobs in this new situation was subsequently calculated. The authors calculated a third type of accessibility, using “standard” values of travel time and expenditure budget. This methodology is therefore used to evaluate different policies in Bogota, corresponding to changes in the fare structure of the existing public transport system, by proposing the development of cross subsidies, and carrying out an appraisal on the impact of the development of a new bus rapid transit line. The results show that depending on the population, its location and purchasing power, the impact of a redistributive fare with respect to accessibility to the labor market can be greater than the expansion and improvement of the public transport network.

Publication: Journal of Transport Geography

Volume: 24

Pages: pp 142-154

Date: 2012

Journal Abbr: Journal of Transport Geography

URL: <http://www.sciencedirect.com/science/article/pii/S0966692311002286>

Loc. in Archive: 01450385

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Bogota (Colombia)
- Developing countries
- Equity (Justice)
- Fares
- mobility
- Stated preferences

Notes:

- PB - Elsevier

Poster: Identifying Transportation Disadvantage and Public Transportation Opportunities in Rural Ontario

Type: Web Page

Author: Eric Marr

Abstract

Public transportation in the rural areas of Ontario is very rare and in most areas a personal vehicle is required for the essentials of daily life. Indeed, those residing in rural areas are structurally dependent on personal vehicles creating a

Date: 2012

Short Title: Poster

URL:

[http://www.academia.edu/1598802/Poster Identifying Transportation Disadvantage and Public Transportation Opportunities in Rural Ontario](http://www.academia.edu/1598802/Poster_Identifying_Transportation_Disadvantage_and_Public_Transportation_Opportunities_in_Rural_Ontario)

Accessed: Monday, January 28, 2013 6:16:22 AM

Date Added

Monday, January 28, 2013 6:16:22 AM

Modified: Monday, January 28, 2013 6:17:03 AM

Tags:

- academia
- academics
- Biology
- Chemistry
- Computer Science
- Earth Sciences

- Economics
- English
- Geography
- History
- Law
- Math
- Medicine
- Philosophy
- Physics
- Political Science
- Psychology
- Religion
- research
- universities

Attachments

- Snapshot

Developing and applying interactive visual tools to enhance stakeholder engagement in accessibility planning for mobility disadvantaged groups

Type: Journal Article

Author: Peter Jones

Abstract

This paper presents findings from an English study that developed a range of visual tools to assist in investigating broader aspects of accessibility, through innovative forms of stakeholder engagement, comprising in-depth workshops with both public transport users and a wide range of professionals. As well as public transport operators, the latter included senior managers in the education, health and social service sectors, plus major private sector employers and the Regional Development Agency. A spreadsheet tool was developed to assist in codifying accessibility problems and potential solutions. The study identified ways in which the uncoordinated, day-to-day decisions of the various agencies caused considerable accessibility problems for different user groups, and how all parties would benefit from greater information exchange in the formative stages of their strategic planning processes if public transport is to play its part in meeting the mobility requirements of diverse population groups.

Publication: Accessibility in passenger transport: policy and management

Volume: 2

Pages: 29-41

Date: November 2011

Journal Abbr: Research in Transportation Business & Management

DOI: 10.1016/j.rtbm.2011.08.001

ISSN: 2210-5395

URL: <http://www.sciencedirect.com/science/article/pii/S2210539511000320>

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 18, 2012 7:52:26 AM

Tags:

- Accessibility planning
- Decision support tools
- Disadvantaged groups
- indicators of accessibility
- Stakeholder engagement

Notes:

- Overview

Overall Impression of tool/measurement: may serve as a useful guide for the qualitative part of the TDP

"Section 2 briefly reviews existing methods for measuring accessibility problems and ways in which stakeholders have been engaged. Section 3 describes the study area characteristics and Section 4 sets out the overall design of the study and outlines the main types of tools that were developed. Section 5 summarises the methods used in the focus groups with local residents to elicit accessibility problems and some possible solutions, and illustrates the kinds of findings which resulted, while Section 6 summarises the tool that was developed for use in the professional workshops that were held with service providers, and illustrates the outputs. A spreadsheet tool, described in Section 7, provides a way of summarising accessibility problems, for different population groups and in different areas, and for identifying appropriate solutions — drawing both on existing experience and using techniques to encourage the development of

innovative solutions. Section 8 considers the implications for managerial practice, with Section 9 providing general conclusions and ideas for future research directions."

- Focus/purpose

"to identify the accessibility problems and requirements of residents (particularly those without access to a car) living in some of the most socially excluded areas of the county, and to develop - in partnership with the residents and local service providers - a range of innovative and effective solutions to the various accessibility problems that were identified." The article also "describes the development of tools to assist professionals in viewing accessibility problems from the perspective of the client user group...."

- Context

Location- South Yorkshire, UK. The study site is a cluster of villages (total pop ~20k) in a rural/exurban area, with hourly transit service to nearby urban centers. High unemployment and >16% of the population is disabled. Lots of single parents & lots of petty crime; one of the most "deprived" areas in England.

How affordable is Transportation ? A Context-Sensitive Framework

Type: Report

Author: Yingling Fan, Arthur Huang

Abstract

Transportation affordability refers to the financial burden households bear in purchasing transportation services. Traditional measures, which focus on what share of household disposable income or total budget goes to transportation services, often fail to consider the wide variation in households' transportation needs and locational settings. In this project, we propose a contextualized transportation affordability analysis framework that differentiates population groups based upon their socio-demographics, the built environment, and the policy environment. The necessity of such a context-sensitive framework is demonstrated via a case study of the Twin Cities metropolitan area, which shows heterogeneity among different

population groups in terms of their transportation needs and resource availability. The proposed context-sensitive framework points to two dilemmas associated with transportation affordability. First, the socio-economically disadvantaged group has the lowest auto ownership rate, yet its transportation needs are better served by automobiles. Second, while automobiles can reduce transportation hardship for the socio-economically disadvantaged, the existing auto-oriented urban landscape in the U.S. requires more travel for access to destinations, which leads to higher transportation costs. The dilemmas call for a multi-modal transportation solution: reducing societal auto dependence and providing financial subsidies for car access among disadvantaged populations are equally important to enhance transportation affordability and social welfare.

Report Number: CTS 11-12

Series Title: Transitway Impacts Research Program

Date: May 2011

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- auto-dependency
- Transportation affordability
- Transportation disadvantaged persons

Notes:

Contextualized transportation affordability analysis framework that differentiates population groups based upon their socio-demographics, the built environment, and the policy environment

- Focus/purpose:

"In this research, we propose a new, contextualized framework for measuring transportation affordability. To be population-sensitive, we take into account the differences in households' transportation needs, time availabilities, and resource availabilities. The framework is also location-sensitive as it considers variation in the built and policy environments at different locations. The built environment is measured by accessibility, indicating the capacity to access desired services (e.g., housing, food, work, school, and healthcare) by different modes of

transportation. Overall, this new transportation affordability analysis framework aims to provide a foundation for policy making by asking how affordable transportation options are, for whom, and in what temporal and spatial settings."

- Type of disadvantage: cost (time and money) of transportation
 - Population examined: all populations, but with travel needs dependent upon household characteristics.
 - Goal of study: use overlap between travel needs and transportation costs to create a framework to measure transportation affordability
- Context
 - Location
 - incl. context of location (e.g., rural vs urban vs suburban; presence of physical/geographic barriers; prevailing SES)
 - scale, time period, etc
 - How disadvantage is defined
 - Population (who, how identified)
 - Barriers faced (what, how identified)
 - Methods
 - Quantitative/qualitative/mixed?
 - Research design & Conceptual framework
 - Unit of analysis
 - Data
 - Analytical approach
 - households classified into 4 classes: high income + high time availability, low income + low time availability, and the two cross-over classes. Within those classes, household socio-demographic status further differentiated according to characteristics, as detailed in Fig 4.2 on p13 of the report. p12-13 is useful for us wrt classifying how household characteristics relate to propensity to be disadvantaged.
- Findings

Overall Impression of tool/measurement:

- provides a useful way to incorporate travel costs (both time and money) into the disadvantage metric, and to pit travel costs against household needs to assess the overlap between provenance and propensity: "a household's total transportation cost depends on the amount of household travel needs (i.e., quantity of transportation needs) and the price of transportation. Household travel needs are directly influenced by household socio-demographics and the built environment, and indirectly influenced by the policy environment as the policy environment partly determines the built environment. The price of transportation is exogenous and thereby influenced by the built and policy environments but not socio-demographics. The availability of a household's resources (including both time and income) to accommodate transportation-related time and monetary costs is determined by the household's socio-demographics and the policy environment."

Applicability & Generalizability (how does it inform our study?)

Any other useful information from the study that may inform our approach:

- re: standards: - VTPI defines affordability as "when a household spends less than 20% of its budget on transportation and less than 45% of its budget on transportation and housing combined." But where do those numbers come from? Thin air? And what about trips deferred because they are too expensive to make? "It is also important to note that using observed transportation expenditures to measure transportation affordability could be misleading as low income households may suppress travel demand to save money. Such suppression may mean trip cancellations, changes in destinations, and reduced trip frequency, as well as shifts in mode choice and timing for trips. Focusing on observed/realized transportation expenditures and using a single benchmark for all types of households may overestimate transportation affordability among the most disadvantaged population groups." And Fan & Huang point out that such numbers don't take into account the time-value of money.

- Argument against the H+T (housing plus transportation) index: "does not respond to the complexity of individuals' transportation needs or to transportation resources available to them and is limited in providing policy implications"
- Travel demand varies by hhld characteristics: "the complexity of measuring and addressing transportation affordability lies in the various transportation needs associated with different population groups and different environmental settings. Household demand for transportation is heterogenous, closely related with household characteristics. For example, a single-mother household has very different needs in terms of travel time, destination, and mode than does an unmarried female who lives alone.... Making transportation affordable is not merely about maintaining a low cost of travel, but also about when, where, and how transportation assistance could be adequately provided to meet people's desire of accessing destinations. It is therefore important to develop population-specific standards against which to measure the affordability of transportation.... Dodson et al (2004) argue that transportation affordability should be examined in the context of jobs-housing balance, social and economic status, auto ownership, and quality of public transportation services. The population- and location-sensitive nature of transportation affordability calls for an analysis framework that incorporates the key factors that shape it."
- The authors do a good job of explaining how the built environment (provenance, in our formulation), the policy environment, and household characteristics (propensity to be disadvantaged) blend together to determine transportation affordability. If we need to defend our dual emphasis on location attributes and population attributes, this is the resource to lean on.
- The authors also talk about forced car ownership and how it can represent financial hardship - more fodder for our argument against using car ownership status as a way to identify disadvantage-prone populations. "The fact that the majority of low-income and poor households own cars does not mean cars are affordable transportation, but may instead indicate "forced car ownership" [22]. Using data

from the Iowa Transportation and Employment Survey, Fletcher, Garasky, and Nielsen (2005) illustrated how private vehicles, while important transportation assets, may exert hardship on families by laying claim to households' financial resources [23]. Gleeson and Randolph (2002) discussed the forced car ownership phenomenon as "transport poverty" -- meaning a household has to bear higher travel cost, especially the cost related with owning and using an automobile [24]."

Variant Concept of Transportation-Disadvantaged: Evidence from Aydin, Turkey, and Yamaga, Japan

Type: Journal Article

Author: Yavuz Duvarci, Tan Yigitcanlar, Yalcin Alver, Shoshi Mizokami

Abstract

Transportation-disadvantaged groups have been defined in previous studies as those who are low income earners, are family dependent, have limited access to private motor vehicles and public transport services, and are obliged to spend relatively more time and money on their trips. Additionally the disabled, young, and elderly are commonly considered to be among the transportation-disadvantaged. Although generally this definition seems correct, it is not specific enough to become a universal definition that could apply to all urban contexts. This paper investigates whether perceptions of travel difficulty vary as does the definition of transportation-disadvantaged in socioculturally different urban contexts. For this investigation, the writers undertake a series of statistical analyses in a case study of Yamaga, Japan, and compare the findings with a previous case study, in which the same methodology, hypothesis, and assumptions were applied to a culturally and demographically different settlement in Aydin, Turkey. After comparing the findings observed in Aydin with the statistical analysis results in Yamaga, this paper reveals that there can be no detailed, universal definition of the transportation-disadvantaged. The writers conclude that the characteristics of the transportation-disadvantaged are not globally identical, and policies and solutions that work in one locality may not have the same results in another sociocultural context. DOI: 10.1061/(ASCE)UP.1943-5444.0000044. (C) 2011 American Society of Civil Engineers.

Publication: Journal of Urban Planning and Development-Asce

Volume: 137

Issue: 1

Pages: 82-90

Date: MAR 2011

Journal Abbr: J. Urban Plan. Dev.-ASCE

Language: English

DOI: 10.1061/(ASCE)UP.1943-5444.0000044

ISSN: 0733-9488

Short Title: Variant Concept of Transportation-Disadvantaged

Library Catalog: ISI Web of Knowledge

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Cluster analysis
- Transportation-disadvantaged
- travel
- Travel behavior
- Travel demand models

Attachments

- ISI Web of Knowledge Record

Exploring the relative influences of transport disadvantage and social exclusion on well-being

Type: Journal Article

Author: Yavuz Duvarci, Tan Yigitcanlar, Yalcin Alver, Shoshi Mizokami

Abstract

Transportation-disadvantaged groups have been defined in previous studies as those who are low income earners, are family dependent, have limited access to private motor vehicles and public transport services, and are obliged to spend relatively more time and money

on their trips. Additionally the disabled, young, and elderly are commonly considered to be among the transportation-disadvantaged. Although generally this definition seems correct, it is not specific enough to become a universal definition that could apply to all urban contexts. This paper investigates whether perceptions of travel difficulty vary as does the definition of transportation-disadvantaged in socioculturally different urban contexts. For this investigation, the writers undertake a series of statistical analyses in a case study of Yamaga, Japan, and compare the findings with a previous case study, in which the same methodology, hypothesis, and assumptions were applied to a culturally and demographically different settlement in Aydin, Turkey. After comparing the findings observed in Aydin with the statistical analysis results in Yamaga, this paper reveals that there can be no detailed, universal definition of the transportation-disadvantaged. The writers conclude that the characteristics of the transportation-disadvantaged are not globally identical, and policies and solutions that work in one locality may not have the same results in another sociocultural context. DOI: 10.1061/(ASCE)UP.1943-5444.0000044. (C) 2011 American Society of Civil Engineers.

Publication: Journal of Urban Planning and Development-Asce

Volume: 137

Issue: 1

Pages: 82-90

Date: MAR 2011

Journal Abbr: J. Urban Plan. Dev.-ASCE

Language: English

DOI: 10.1061/(ASCE)UP.1943-5444.0000044

ISSN: 0733-9488

Short Title: Variant Concept of Transportation-Disadvantaged

Library Catalog: ISI Web of Knowledge

Date Added

Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- identification of disadvantaged populations

Location characteristics of inner-city neighborhoods and employment accessibility of low-wage workers

Type: Journal Article

Author: Q. Shen

Abstract

Studies that examine spatial characteristics of urban unemployment are often based on some simplistic measures of employment accessibility. In this paper a refined methodological framework for measuring accessibility is presented, which enables the researcher (1) to improve the measurement by accounting for job competition among workers commuting by different modes, and (2) to understand the outcome more thoroughly by distinguishing the effect of location from that of workers' auto ownership. This refined framework is applied to a case study of employment accessibility of low-wage workers living in Boston's inner-city neighborhoods, with primarily 1990 Census demographic and journey-to-work data. The empirical results show clearly that, although the central location of inner-city residence still gives the low-wage workers some advantage, auto ownership is the more important determinant. Low-wage workers living in inner-city neighborhoods on average do not have high employment accessibility because a large percentage of them do not own any motor vehicle and hence have limited spatial mobility. Implications of the findings are discussed and qualified in light of the limitation of the research.

Publication: Environment and planning B: Planning and Design

Volume: 25

Issue: 3

Pages: 345–365

Date: 2011

URL: <http://ideas.repec.org/libproxy.lib.unc.edu/a/pio/envirb/v25y1998i3p345-365.html>

Accessed: Tuesday, October 09, 2012 10:16:39 AM

Library Catalog: Google Scholar

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- measurement

Does accessibility planning address what matters? A review of current practice and practitioner perspectives

Type: Journal Article

Author: Angela Curl, John Nelson, Jillian Anable

Abstract

Accessibility² has become commonplace in transport planning and as such there is a plethora of interpretations of what accessibility means, what constitutes a good measure of accessibility, and how this might be applied in practice. This paper presents an overview of approaches to measuring accessibility and presents a case study of accessibility planning in England -- one approach to formalizing the concept of accessibility. Results of semi-structured interviews with local authority officers are discussed to establish whether current approaches, allow their desired outcomes to be met. This approach demonstrates where there might be gaps between measured or modeled accessibility and the perceptions of the individuals. Findings suggest that while the process is deemed useful in raising the profile of accessibility issues, measures of accessibility do not necessarily easily translate into quantifying benefits of those improvements that are perceived by practitioners to improve accessibility and reduce transport disadvantage.

Publication: Research in Transportation Business & Management

Volume: 2

Pages: pp 3-11

Date: 2011

Journal Abbr: Research in Transportation Business & Management

URL: <http://www.sciencedirect.com/science/article/pii/S2210539511000204>

Loc. in Archive: 01362589

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Case studies
- England
- indicators of accessibility
- Local government agencies
- Local transportation
- Transportation planning

Notes:

- PB - Elsevier

Attachments

- Curl et al 2011 - does accessibility planning address what matters - review.pdf

The spatial context of transport disadvantage, social exclusion and well-being

Type: Journal Article

Author: Alexa Delbosc

Author: Graham Currie

Abstract

This paper explores the spatial differences in measures of transport disadvantage, social exclusion and well-being in a survey of inner metropolitan, outer suburban, urban fringe and regional areas of Victoria, Australia. Its aim is to understand how geographic context may influence transport disadvantage which may in turn influence social exclusion and well-being. There were very clear differences in mobility and car reliance between geographic locations. Car reliance peaked in fringe Melbourne with regional areas showing slightly less car reliance. Mobility and kilometres travelled also increased with distance from central Melbourne, which in turn resulted in greater sensitivity to fuel price increases. Again these factors were greatest in fringe Melbourne. Links between transport disadvantage and social exclusion were small and inconsistent in this paper although they have been demonstrated in other research. Links between transport disadvantage and well-being were strongest in the regional sample. The implications of these findings and their connection to the transport literature are discussed.

Publication: Journal of Transport Geography

Volume: 19

Issue: 6

Pages: pp 1130-1137

Date: 2011

Journal Abbr: Journal of Transport Geography

URL: <http://www.sciencedirect.com/science/article/pii/S0966692311000469>

Loc. in Archive: 01360670

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Monday, December 17, 2012 12:59:22 PM

Tags:

- Automobile travel
- mobility
- Quality of life
- Regional transportation
- Rural
- Rural areas
- Social exclusion
- Social factors
- Spatial analysis
- Suburbs
- Surveys
- Transport disadvantage
- Transportation disadvantaged persons
- urban
- Urban areas
- Victoria (Australia)
- Well-being

Notes:

- PB - Elsevier

New Perspectives and Methods in Transport and Social Exclusion Research

Type: Report

Abstract

This book presents findings of a highly successful, international research project exploring links between social exclusion (SE), transport disadvantage (TD) and psychological well being (WB). It outlines previous methods and explains how new methods were developed and applied to assist readers in applying new methods in future research. New insights from results and their policy implications are explored by leading writers in the field. In each section the implications of the approaches and their applicability in other geographic contexts are discussed. New analytical perspectives include measuring the strength of links between SE, WB and TD and the disaggregate analysis of these to specific groups and spatial areas. The research also examines new perspectives in relation to social capital and WB and developing new economic methods to estimate the marginal value of additional travel and its links to SE. The project has numerous publications in diverse fields, however, the material presented here is new. This source brings all the work together into one volume and provides a consolidated set of the methods and outcomes of the project including the unpublished final results.

Report Number: 9781780522005

Date: 2011

Pages: 342p

URL: [http://books.emeraldinsight.com/display.asp? K=9781780522005&cur=USD](http://books.emeraldinsight.com/display.asp?K=9781780522005&cur=USD)

Loc. in Archive: 01364014

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Economic and social factors
- Equity (Justice)
- Social exclusion
- Transport disadvantaged
- Transportation policy
- Well being

Transport problems that matter - social and psychological links to transport disadvantage

Type: Journal Article

Author: Alexa Delbosc, Graham Currie

Abstract

This paper presents an analysis exploring self-reported measures of transport disadvantage and how these relate to social exclusion and well-being in Melbourne, Australia. A sample of 535 individuals sourced from a household survey explores ratings of 18 types of transport problems. The questionnaire also measured social exclusion represented in five dimensions including income, unemployment, political engagement, participation in activities and social support networks. Well-being was also measured adopting standard psychological measures of 'Satisfaction with Life', 'Personal Well-being Index,' 'Positive Affect' and 'Negative Affect'. A factor analysis of self-reported transport difficulties identified four statistically significant sub-scales ('transport disadvantage', 'transit disadvantage', 'vulnerable/impaired' and 'rely on others') which together account for 57% of the variance in the responses. Analysis established that those with high self-reported transport problems were more likely to be located in fringe and remote parts of the city and lived in areas where it was not possible to walk to a local shop. However all groups made an average number of trips per day (except the 'vulnerable/impaired' group which make fewer trips) suggesting that self-reported transport disadvantage is unrelated to realized mobility. Analysis further established that only the 'vulnerable/impaired' group was associated with social exclusion and that they also had the lowest values of well-being compared to other groups. Overall findings confirm the methodological concerns associated with the use of self-reported measures of transport problems as a basis for defining transport disadvantage. The majority of those with high self-reported transport problems did not travel less than the survey sample as a whole and they were not associated with social exclusion. However the 'vulnerable/impaired' group was the exception, displaying a significantly higher association with social exclusion and lower well-being. The findings suggest which aspects of transport disadvantage are likely to be of greater concern for social policy. A concentration of research and policy on issues and social groups associated with the 'vulnerable/impaired' factor would be more effective in reducing social exclusion. Transport problems associated with this group including physical access to transport, knowing where to go and feeling safe from theft or attack when traveling may deserve higher

priorities for attention. In addition those associated with the 'vulnerable/impaired' factor including older retired females and those who are more likely to be looking after someone with an illness or disability are clearly a high risk group and should warrant positive discrimination in transport and social policy.

Publication: Journal of Transport Geography

Volume: 19

Issue: 1

Pages: pp 170-178

Date: 2011

Journal Abbr: Journal of Transport Geography

URL:<http://www.sciencedirect.com/science/article/B6VG84YBX1KT2/2/9e2959f4663f8e423ce2f52b2b39ca31>

Loc. in Archive: 01324898

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Factor analysis
- Melbourne (Australia)
- Psychological aspects
- Social exclusion
- Social factors
- Surveys
- Transportation disadvantaged persons

Notes:

- PB - Elsevier

Using Lorenz curves to assess public transport equity

Type: Journal Article

Author: Alexa Delbosc

Author: Graham Currie

Abstract

Equity has been a major concern of public transport provision and is required by legislation in many countries. Several approaches measure equity in transit supply however none produce a simple system-wide measure of equity performance. A new approach is presented using Lorenz curves to measure the relative supply of transit to the population. Gini coefficients provide a single measure of overall equity using this method. A system-wide assessment of overall transit supply to the population in Melbourne, Australia shows that 70% of the population shares only 19% of the supply (Gini coefficient = .68). When employment is also taken into account, the situation is not much different; 70% of jobs and population share 23% of service ($G = .62$). In order to gain some understanding of vertical equity, the transit supply was compared between different age, income and vehicle ownership groups. There is some evidence of higher supply for youth and low-income groups in inner Melbourne, and in all parts of Melbourne no-vehicle households lived in areas of higher transit supply. Overall it is unclear how "fair" these distributions are compared to equity in other cities since this is the first time this method has been undertaken. Projects using similar approaches should provide a good basis for establishing comparative equity between cities.

Publication: Journal of Transport Geography

Volume: 19

Issue:6

Pages: pp. 1252-1259

Date: 2011

Journal Abbr: Journal of Transport Geography

URL: <http://www.sciencedirect.com/science/article/pii/S0966692311000202>

Loc. in Archive: 01360672

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Coefficients
- Equity (Justice)
- Melbourne (Australia)
- Methodology

- Public transit
- Socioeconomic factors

Notes:

- PB - Elsevier

Beyond the Inner City: New Form of Spatial Mismatch

Type: Journal Article

Author: Lingqian Hu

Author: Genevieve Giuliano

Abstract

In this study the job accessibility of low-income job seekers was compared with that of the affluent majority in a polycentric urban structure. Kain's spatial mismatch hypothesis was extended not only to examine where and why low-income job seekers have lower job accessibility than high-income job seekers but also to compare changes from 1990 to 2000 in the Los Angeles, California, metropolitan area. The job accessibility measure applied in this research captured travel impedance and both job supply and demand. The results suggested that spatial mismatch still existed and that it continued to increase over time. However, the spatial pattern of mismatch had changed. Low-income job seekers were more disadvantaged in the inner-ring suburbs, mainly because of the lag in the residential suburbanization of low-income job seekers. This research contributed to the understanding of the extent and consequences of urban spatial transformation and suggested that social equity problems be addressed from a broader spatial perspective.

Publication: Transportation Research Record: Journal of the Transportation Research Board

Issue: 2242

Pages: pp 98-105

Date: 2011

Journal Abbr: Transportation Research Record: Journal of the Transportation Research Board

ISSN: 9780309167628

URL: <http://dx.doi.org/10.3141/2242-12>

Loc. in Archive: 01337655

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Employment
- Equity (Justice)
- identification of disadvantaged populations
- Job access
- Los Angeles Metropolitan Area
- Low income groups
- measuring transportation disadvantage
- Polycentric urban areas
- Spatial analysis
- Spatial mismatch
- Suburbs

Notes:

- PB - Transportation Research Board

Attachments

- Hu and Giuliano 2011 TRR - new fom of spatial mismatch.pdf

Thematic Research Summary: Equity and Accessibility

Type: Report

Author: Damian Stantchev, Natasha Merat

Abstract

This paper reports on research regarding transportation equity and accessibility, in general, for people with special needs. This group may include people with low income, individuals who do not have access to an automobile, the elderly, and physically handicapped individuals.

Date: July 29, 2010

Pages: 46p

URL:

http://www.transportresearch.info/Upload/Documents/201008/20100809_172522_24665_TR_S-Equity_and_accessibility.pdf

Loc. in Archive: 01226601

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Equity (Justice)
- Research
- Transportation disadvantaged persons

Neighborhood Disadvantage and Physical Activity: Baseline Results from the HABITAT Multilevel Longitudinal Study

Type: Journal Article

Author: Gavin Turrell, Michele Haynes, Nicola W. Burton, Billie Giles-Corti, Brian Oldenburg, Lee-Ann Wilson, Katrina Giskes, Wendy J. Brown

Abstract

Purpose To examine the association between neighborhood disadvantage and physical activity (PA). **Methods** We use data from the HABITAT multilevel longitudinal study of PA among middle-aged (40–65 years) men and women (N = 11,037, 68.5% response rate) living in 200 neighborhoods in Brisbane, Australia. PA was measured using three questions from the Active Australia Survey (general walking, moderate, and vigorous activity), one indicator of total activity, and two questions about walking and cycling for transport. The PA measures were operationalized by using multiple categories based on time and estimated energy expenditure that were interpretable with reference to the latest PA recommendations. The association between neighborhood disadvantage and PA was examined with the use of multilevel multinomial logistic regression and Markov chain Monte Carlo simulation. The contribution of neighborhood disadvantage to between-neighborhood variation in PA was assessed using the 80% interval odds ratio. **Results** After adjustment for sex, age, living arrangement, education, occupation, and household income, reported participation in all measures and levels of PA

varied significantly across Brisbane's neighborhoods, and neighborhood disadvantage accounted for some of this variation. Residents of advantaged neighborhoods reported significantly higher levels of total activity, general walking, moderate, and vigorous activity; however, they were less likely to walk for transport. There was no statistically significant association between neighborhood disadvantage and cycling for transport. In terms of total PA, residents of advantaged neighborhoods were more likely to exceed PA recommendations. Conclusions Neighborhoods may exert a contextual effect on the likelihood of residents participating in PA. The greater propensity of residents in advantaged neighborhoods to do high levels of total PA may contribute to lower rates of cardiovascular disease and obesity in these areas.

Publication: Annals of Epidemiology

Volume: 20

Issue: 3

Pages: 171-181

Date: March 2010

Journal Abbr: Annals of Epidemiology

DOI: 10.1016/j.annepidem.2009.11.004

ISSN: 1047-2797

URL: <http://www.sciencedirect.com/science/article/pii/S1047279709003603>

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Markov Chains
- Multilevel Analysis
- Neighborhood
- Physical activity
- Socioeconomic factors

Quantifying spatial gaps in public transport supply based on social needs

Type: Journal Article

Author: G. Currie

Abstract

This paper concerns a research project to identify spatial gaps in public transport provision for people who are socially disadvantaged. The paper outlines the research context for measurement of public transport supply and needs, and then describes the methodology developed for an application in Melbourne, Australia. Results of the application are described including key findings on spatial gaps in services relative to social needs. The research identifies significant gaps between services supplied and social needs for transport services. Consistency of these findings with research in other Australian cities are noted. Implications for policy development are suggested.

Publication: Journal of Transport Geography

Volume: 18

Issue: 1

Pages: 31–41

Date: 2010

URL:

<http://www.sciencedirect.com.libproxy.lib.unc.edu/science/article/pii/S0966692308001518>

Accessed: Tuesday, October 09, 2012 9:37:34 AM

Library Catalog: Google Scholar

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- measurement

Attachments

- Snapshot

Relative accessibility deprivation indicators for urban settings: definitions and application to food deserts in Montreal

Type: Journal Article

Author: A. Páez, R. G. Mercado, S. Farber, C. Morency, M. Roorda

Abstract

Accessibility research, within the context of the social exclusion dimensions of transport, has provided valuable tools to understand the potential of people to reach daily life activity locations. In this paper, model-based estimates of distance travelled are used to calculate a cumulative opportunities measure of accessibility. Multivariate, spatially expanded models produce estimates of distance travelled that are specific to both geographical location and type of individual. Opportunity landscapes obtained based on these estimates are used for comparative accessibility analysis by means of what are termed relative accessibility deprivation indicators. The indicators proposed are demonstrated with a case study of food deserts in the city of Montreal, Canada. The results of the analysis illustrate the variations in accessibility between individuals in low-income households and the reference group, and the effect of vehicle ownership for accessibility to food services, thus highlighting the social exclusion implications of these factors.

Publication: Urban Studies

Volume: 47

Issue: 7

Pages: 1415–1438

Date: 2010

Short Title: Relative accessibility deprivation indicators for urban settings

URL: <http://usj.sagepub.com.libproxy.lib.unc.edu/content/47/7/1415.short>

Accessed: Tuesday, October 09, 2012 10:18:02 AM

Library Catalog: Google Scholar

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- measurement

Attachments

- Snapshot

The place, role and experience of mobility for people at high risk of social exclusion

Type: Conference Paper

Author: J Stanley

Abstract

This paper reports on some findings from a major Australian study, Investigating Transport Disadvantage, Social Exclusion and Wellbeing in Metropolitan, Regional and Rural Victoria. Information has been collected from three samples totalling 1019 respondents, from metropolitan Melbourne, a regional location in Victoria and a special sample which particularly targeted people likely to be at risk of social exclusion. The paper will report on the study findings about mobility in relation to those respondents who have the highest risk factors for social exclusion, particularly those who are aged, unemployed, have a low income, sole parent households and disadvantaged youth. An overview of the context and theoretical background for this research is given and the concepts defined, followed by a brief examination of the characteristics of those in this sample group who are commonly viewed as being at risk of social exclusion. The travel choices and mobility patterns of those who are at high risk of exclusion are explored, followed by a reflection as to whether this group shows similar travel patterns, community engagement and choices as those at a lower risk of social exclusion.

Date: 2010

Pages: 13p

ISBN: 9789899698604

URL: http://www.wctr2010.info/WCTR_General/int_04_papers_searchpapers.html

Loc. in Archive: 01380603

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- mobility
- Rural area
- Rural areas
- Socioeconomic factors

- Transport disadvantaged
- Transportation disadvantaged persons
- Travel behavior
- Travel behaviour
- Urban area
- Urban areas
- Victoria

Notes:

- IS - 01996
- U1 - World Congress on Transport Research, 12th, 2010, Lisbon, Portugal
StartDate:00000 EndDate:00000

Travel behavior patterns of different socially disadvantaged groups: analysis of household travel survey data for a dispersed metropolitan area

Type: Journal Article

Author: J Dodson, M Burke, R Evans, B Gleeson, N Sipe

Abstract

This paper contributes to the understanding of transport disadvantage and the transport dimensions of environmental justice by investigating the travel behavior patterns of socially disadvantaged groups by using household travel survey data. The study described in this paper goes beyond determining the basic descriptive statistics that are commonly reported in this area of research and instead uses cluster analysis to identify socially disadvantaged households. The study then uses the six clusters generated by the analysis to identify the differences in the travel behaviors between these groups. The paper shows considerable differences in travel behavior between socially disadvantaged households that must be recognized if scholars and policy makers are to describe and respond adequately to the experience of transport disadvantage for these groups. The paper concludes with some comparative observations about the travel behavior of the disadvantaged population in dispersed rapidly growing regions and the wider implications for ensuring environmental justice in transport.

Issue: 2163

Pages: 24-31

Date: 2010

ISSN: 9780309142939

URL: <http://dx.doi.org/10.3141/2163-03>

Loc. in Archive: 01380621

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Gold Coast, Queensland
- Socioeconomic factors
- Transport disadvantaged
- Transport network
- Transport planning
- Transportation disadvantaged persons
- Transportation operations
- Transportation planning
- Travel behavior
- Travel behaviour

Sustainable Urban and Transport Development for Transportation

Disadvantaged: A Review

Type: Journal Article

Author: Tan Yigitcanlar, Kushairi Rashid, Fatih Dur

Abstract

This literature review focuses on sustainable urban and transportation development as a strategy for solving accessibility and mobility problems, especially for those who do not own a motor vehicle or have access to public transportation services. The authors stress that current urban and transportation models have not adequately addressed the urban transportation problems that are often encountered by transportation-disadvantaged groups. They define transportation-disadvantage as a multi-dimensional problem that combines demographic, spatial and transportation service dimensions. However, most transportation models focusing on transportation disadvantage only employ demographic and transportation service dimensions and do not take spatial dimension into account. This literature review investigates the link between sustainable urban and transportation development and spatial dimension of

the transportation disadvantage problem. The authors identify a set of urban, development and policy characteristics to define spatial dimension of the transportation disadvantage problem. These characteristics include population, density, neighborhood type, city size and level of municipality, mix land use, parking availability, bicycle friendliness, walkability, distance to urban center, distance to local facilities, and distance to public transportation stops.

Publication: Open Transportation Journal

Volume: 4

Pages: pp 1-8

Date: 2010

Journal Abbr: Open Transportation Journal

URL: <http://www.bentham.org/open/totj/openaccess2.htm>

Loc. in Archive: 01158061

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Automobile ownership
- Equity (Justice)
- Land use
- mobility
- Public transit
- Social factors
- Socioeconomic factors
- Sustainable development
- Sustainable transportation
- Transportation disadvantaged persons
- Travel demand management
- Urban development

Notes:

- PB - Bentham Science Publishers Limited

Travel Behaviour Patterns of Different Socially Disadvantaged Groups: Analysis of Household Travel Survey Data in a Dispersed Metropolitan Area

Type: Journal Article

Author: Jago Dodson, Matthew Burke, Rick Evans, Brendan Gleeso, Neil Sipe

Abstract

This paper contributes to the understanding of transport disadvantage and the transport dimensions of environmental justice by investigating the travel behavior patterns of socially disadvantaged groups by using household travel survey data. The study described in this paper goes beyond determining the basic descriptive statistics that are commonly reported in this area of research and instead uses cluster analysis to identify socially disadvantaged households. The study then uses the six clusters generated by the analysis to identify the differences in the travel behaviors between these groups. The paper shows considerable differences in travel behavior between socially disadvantaged households that must be recognized if scholars and policy makers are to describe and respond adequately to the experience of transport disadvantage for these groups. The paper concludes with some comparative observations about the travel behavior of the disadvantaged population in dispersed rapidly growing regions and the wider implications for ensuring environmental justice in transport. Gold Coast City, Australia is the case study city used in this analysis.

Publication: Transportation Research Record: Journal of the Transportation Research Board

Issue: 2163

Pages: pp 24-31

Date: 2010

Journal Abbr: Transportation Research Record: Journal of the Transportation Research Board

ISSN: 9780309142939

URL: <http://dx.doi.org/10.3141/2163-03>

Loc. in Archive: 01157078

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Cluster analysis
- Disadvantaged persons
- Environmental justice
- Equity (Justice)
- Gold Coast City (Australia)

- Social factors
- Transportation disadvantaged persons
- Travel behavior
- Travel patterns
- Travel surveys

Notes:

- PB - Transportation Research Board

Evaluating pedestrian crashes in areas with high low-income or minority populations

• **Tags:**

- Accident exposure
- Behavior
- Chicago Metropolitan Area
- Demographics
- Environmental justice
- Low income groups
- Minorities
- Pedestrian accidents
- Pedestrians
- Poisson distributions
- Public transit
- Socioeconomic areas

Notes:

- PB – Elsevier

Transportation Difficulty of Black and White Rural Older Adults

Type: Journal Article

Author: Nan Park, Fei Sun, Lucinda Roff, Michael Parker, David Klemmack, Patricia Sawyer,
Richard Allman

Abstract

This study explores self-reported transportation difficulty among rural older adults, using data from the University of Alabama at Birmingham Study of Aging for community-dwelling participants (255 Black and 259 White) residing in rural areas. The authors examine the relationship of predisposing characteristics, enabling resources, and measures of need for care with self-reports of transportation difficulty. Blacks report having more transportation difficulty than Whites (24.7% vs. 11.6%; $p < .05$). When the authors introduce other variables, race differences disappear, but there is a race-by-income interaction with transportation difficulty. Whites with lower incomes are more likely to have transportation difficulty than Whites with higher incomes. When data from Blacks and Whites are analyzed separately, income is the only variable associated with transportation difficulty among Whites. Among Blacks, income is not related to transportation difficulty but several variables other than income (age, gender, marital status, Mini Mental State Exam scores, and depression) are.

Publication: Journal of Applied Gerontology

Volume: 29

Issue: 1

Pages: pp 70-87

Date: 2010

Journal Abbr: Journal of Applied Gerontology

Loc. in Archive: 01173283

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Aged
- Alabama
- Blacks
- Income
- mobility
- Race
- Rural areas
- Rural transportation

- Transportation
- Whites

Notes:

- PB - Sage Publications, Incorporated

**Incorporating equity considerations in transport infrastructure evaluation:
Current practice and a proposed methodology**

Type: Journal Article

Author: N. Thomopoulos, S. Grant-Muller, M. R. Tight

Abstract

Interest has re-emerged on the issue of how to incorporate equity considerations in the appraisal of transport projects and large road infrastructure projects in particular. This paper offers a way forward in addressing some of the theoretical and practical concerns that have presented difficulties to date in incorporating equity concerns in the appraisal of such projects. Initially an overview of current practice within transport regarding the appraisal of equity considerations in Europe is offered based on an extensive literature review. Acknowledging the value of a framework approach, research towards introducing a theoretical framework is then presented. The proposed framework is based on the well established MCA Analytic Hierarchy Process and is also contrasted with the use of a CBA based approach. The framework outlined here offers an additional support tool to decision makers who will be able to differentiate choices based on their views on specific equity principles and equity types. It also holds the potential to become a valuable tool for evaluators as a result of the option to assess predefined equity perspectives of decision makers against both the project objectives and the estimated project impacts. This framework may also be of further value to evaluators outside transport.

Publication: Evaluation and program planning

Volume: 32

Issue: 4

Pages: 351–359

Date: 2009

Short Title: Incorporating equity considerations in transport infrastructure evaluation

URL: <http://www.sciencedirect.com.libproxy.lib.unc.edu/science/article/pii/S0149718909000573>

Accessed: Tuesday, October 09, 2012 10:06:10 AM

Library Catalog: Google Scholar

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Attachments

- Snapshot

Growing bus patronage and addressing transport disadvantage—The Melbourne experience

Type: Journal Article

Author: C. Loader, J. Stanley

Abstract

Melbourne's bus network serves two-thirds of the city's population but, until recently, has generally had very poor service levels. The Victorian government has recently embarked on programs to (1) extend a network of premium trunk routes to address a 'mass transit' agenda and (2) upgrade local routes to 'safety net' minimum service levels, to address a 'social transit' agenda (reducing transport disadvantage and social exclusion). The paper reviews recent experience from the service upgrades to assess how effective they have been in terms of these agendas. Analysis of patronage growth trends and the impacts of these upgrade programs suggest reasonable minimum service levels are required to attract new riders in times of modal shift, and are effective at building social capital.

Publication: Transport policy

Volume: 16

Issue: 3

Pages: 106–114

Date: 2009

URL:

<http://www.sciencedirect.com.libproxy.lib.unc.edu/science/article/pii/S0967070X09000080>

Accessed: Tuesday, October 09, 2012 10:12:59 AM

Library Catalog: Google Scholar

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- assessment of effort to improve accessibility

Attachments

- Snapshot

A Comparison of Three Methods for Identifying Transport-Based Exclusion: A Case Study of Children's Access to Urban Opportunities in Erie and Niagara Counties, New York

Type: Journal Article

Author: Irene Casas, Mark Horner, Joe Weber

Abstract

Achieving transport sustainability is contingent on many factors, including transportation services being provided equitably regardless of race, income, gender, disability, and/or any other differentiating characteristics. A major risk of inequitable service provision is that without sufficient accessibility via transport, populations are put at a disadvantage, which may result in conditions of exclusion. At the present time, however, the dimensions of transport-based social exclusion are not fully understood, and the elusive nature of the concept renders it difficult to quantify. In this paper, three methods for identifying transport-excluded populations are examined and compared. The first follows a traditional approach to identifying disadvantaged groups by means of an inequality index based on deprivation. The other two techniques are accessibility-based, and work with a detailed travel diary data set. The study is conducted in the counties of Erie and Niagara, New York, and the population examined is composed of children between the ages of 5 and 18 years old. The results reveal how the

models differentially identify excluded populations and should inform planners and practitioners of the implications for choosing between these different approaches.

Publication: International Journal of Sustainable Transportation

Volume: 3

Issue: 4

Pages: pp 227-245

Date: 2009

Journal Abbr: International Journal of Sustainable Transportation

URL: <http://www.informaworld.com/10.1080/15568310802158761>

Loc. in Archive: 01137353

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Alternatives analysis
- Case studies
- Children
- Detection and identification
- Erie County (New York)
- identification of disadvantaged populations
- Mathematical models
- Methodology
- Niagara County (New York)
- Social exclusion
- Transportation Access

Notes:

- PB - Taylor & Francis

Attachments

- Casas et al 2009 - three methods for identifying transport-based exclusion.pdf

Disaggregating Race and Ethnicity: Toward a Better Understanding of the Social Impacts of Transport Decisions

Type: Journal Article

Author: Beverly Ward

Abstract

By 2042, racial and ethnic subgroups are predicted to make up more than half of the U.S. population. This shift in population distribution, along with population growth and an aging population, will present new challenges for all segments of society, including transportation. This paper provides an overview of the differences in and among ethnic and racial subgroups of the U.S. population and the intersections of these with age, functionality and geography. Adverse health outcomes may be anticipated where racial and ethnic minorities experience lack of access and mobility due to geographic isolation, income, and limited mental and physical functionality. Transportation's role in increasing access and mobility may aid in offsetting or mitigating these adverse effects. Greater investments in pedestrian and bicycle facilities may aid in offsetting adverse health outcomes by providing safe places to walk and bicycle. Coordination of human service and public transportation may also serve to mitigate some of the adverse conditions by improving access to health care facilities and other activities that improve mobility.

Publication: Public Works Management & Policy

Volume: 13

Issue: 4

Pages: pp 354-360

Date: 2009

Journal Abbr: Public Works Management & Policy

URL: <http://dx.doi.org/10.1177/1087724X09334495>

Loc. in Archive: 01141710

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Age
- Disaggregate analysis

- Ethnic groups
- Geography
- identification of disadvantaged populations
- mobility
- Population growth
- Population movements
- Public health
- Race
- Social impacts
- Transportation disadvantaged persons
- Transportation policy

Notes:

- PB - Sage Publications, Incorporated

Engaging Disadvantaged Populations in Transport Studies: Linking Modal Use and Perceptions of Safety to Activity Patterns

Type: Journal Article

Author: Talia McCray

Abstract

Accessibility measures are important planning tools. However, if the data is not available to adequately capture the mobility and accessibility challenges of disadvantaged populations, then the results of the model provide little to no direction for policymakers. This paper explores data collection techniques that have the potential to address the "why" underlining the activity behavior, especially linking personal safety perceptions to activities. The first study comes from a series of focus groups with low-income women in Quebec City, Canada. Self-mapping of individual spaces creates a framework to address spatial and temporal challenges that negatively impact transit dependent populations. The 2nd study focuses on the activity patterns of low-income immigrant youth in Providence, Rhode Island. A technique is presented to elicit formatted responses concerning perceptions of personal safety. With the help of GIS, this technique has the potential to link together activities and perceptions of safety for activity modeling.

Publication: Research in Transportation Economics

Volume: 25

Issue: 1

Pages: pp 3-7

Date: 2009

Journal Abbr: Research in Transportation Economics

URL:

<http://www.sciencedirect.com/science/article/B8JHM-4X6M9DJ-1/2/35402d46ea686fa1e96cf68e9de9836d>

Loc. in Archive: 01162669

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Activity choices
- indicators of accessibility
- Low income groups
- measuring transportation disadvantage
- mobility
- Modal analysis
- Mode choice
- Public transit
- Safety and security
- Transportation planning
- Travel behavior

Notes:

- PB - Elsevier

Attachments

- McCray 2009 - engaging disadvantaged populations in transport studies.pdf

A Case Study of Job Access and Reverse Commute Programs in the Chicago, Kansas City, and San Francisco Metropolitan Regions

Type: Journal Article

Author: JS Sandoval, Eric Petersen, Kim Hunt

Abstract

This paper presents three case studies that examine job accessibility and reverse commute transportation programs in the Chicago (Illinois), Kansas City (Missouri), and San Francisco (California) metropolitan regions. The authors explored how institutional and/or grassroots support prevented or fostered the innovation and implementation of non-traditional Access-to-Jobs and Reverse Commute (JARC) programs. The discussion focuses on the role public transportation can or should play in facilitating lower welfare rates. They conclude that institutional support and grassroots support are necessary ingredients for the implementation of innovative transportation programs for low-income families.

Publication: Journal of Public Transportation

Volume: 12

Issue: 4

Pages: pp 93-115

Date: 2009

Journal Abbr: Journal of Public Transportation

URL: <http://www.nctr.usf.edu/jpt/pdf/JPT12-4Sandoval.pdf>

Loc. in Archive: 01150419

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Economic and social factors
- Employment
- Government agencies
- Jobs
- Low income groups
- Public transit
- Reverse commuting
- Role of transit in employment access
- Stakeholders
- Urban areas
- Welfare recipients

Notes:

- PB - University of South Florida, Tampa

The Temporal and Social Dimension of Accessibility for New York City Residents

Type: Report

Author: Cynthia Chen

Abstract

While serving as an important measure in the transportation planning process, the calculation of accessibility typically does not take into account the temporal constraints faced by individuals. When temporal constraints are considered, the resulting accessibility can be vastly different for people of different demographic profiles, including gender, income, geographical location, and ethnicity. The objective of this project was to create a temporal-based accessibility measure and analyze the correlation between accessibility and one's demographic profile, using the New York City Residents Sample from the 1997/98 regional household travel survey.

Date: Final Report October 1, 2008

Pages: 17p

URL: <http://www.utrc2.org/research/assets/128/Final-Temporal1.pdf>

Loc. in Archive: 01135755

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Demographics
- New York (New York)
- Social factors
- Time constraints
- Transportation planning

Notes:

- FOCUS: "develop a space-time accessibility measure and apply it to a sample of NYC residents"
- provides a history of the measurement of accessibility
- does not really help us beyond the history piece (if that's at all helpful)
- UR - <http://ntl.bts.gov/lib/31000/31000/31058/Final-Temporal.pdf>

Transportation Infrastructure and Quality of Life for Disadvantage Populations: A Pilot Study of El Cenizo Colonia in Texas

Type: Report

Author: Cecilia Giusti, Chanam Lee, Dominique Lord, Meghan Wieters

Abstract

This research is a pilot study aimed to identify environmental characteristics in colonias that are related to infrastructure and safety, access to goods and services, and quality of life. A secondary objective consisted of evaluating a variety of tools that could be used to identify and assess these environmental characteristics. El Cenizo in Webb County, Texas, was selected as our study colonia after preliminary visits and investigations. A multidisciplinary approach framed this study, considering the transportation, urban design and planning, public health, and socioeconomic dimensions as potential determinants of the residents' mobility behaviors, environmental perception, and quality of life. Three instruments were developed to collect data for this research: 1) a survey, 2) an activity diary or travel diary, and 3) environmental audit instruments. Additionally, this study also included a small sub-group study testing the usability of wearable Global Positioning Systems (GPS) units as a research tool to capture spatial-behavioral data, combined with travel diary. First, the study has generated valuable data on transportation and mobility behaviors where almost no information is available. Second, the multidisciplinary approach has allowed a comprehensive approach towards a better understanding of the current needs of colonias, especially those related to pedestrians. Some of them could be easily addressed with direct short-term interventions while others require a more long-term plan. Third, the assessment of new research tools offers useful insights for future research in the context of similar low-income marginalized communities.

Date: Research Report September 2008

Pages: 126p

URL: <http://swuttc.tamu.edu/publications/technicalreports/167162-1.pdf>

Loc. in Archive: 01118463

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Colonias
- Disadvantaged persons
- El Cenizo (Texas)
- Global Positioning System
- Low income groups
- mobility
- Pedestrians
- Pilot studies
- Public health
- Quality of life
- Socioeconomic factors
- Spatial behavior
- Surveys
- Transportation infrastructure
- Travel diaries
- Urban design

Comparing alternative approaches to measuring the geographical accessibility of urban health services: Distance types and aggregation-error issues

Type: Journal Article

Author: P. Apparicio, M. Abdelmajid, M. Riva, R. Shearmur

Abstract

Background Over the past two decades, geographical accessibility of urban resources for population living in residential areas has received an increased focus in urban health studies. Operationalising and computing geographical accessibility measures depend on a set of four parameters, namely definition of residential areas, a method of aggregation, a measure of accessibility, and a type of distance. Yet, the choice of these parameters may potentially generate different results leading to significant measurement errors. The aim of this paper is to compare discrepancies in results for geographical accessibility of selected health care services for residential areas (i.e. census tracts) computed using different distance types and aggregation methods. Results First, the comparison of distance types demonstrates that Cartesian distances (Euclidean and Manhattan distances) are strongly correlated with more

accurate network distances (shortest network and shortest network time distances) across the metropolitan area (Pearson correlation greater than 0.95). However, important local variations in correlation between Cartesian and network distances were observed notably in suburban areas where Cartesian distances were less precise. Second, the choice of the aggregation method is also important: in comparison to the most accurate aggregation method (population-weighted mean of the accessibility measure for census blocks within census tracts), accessibility measures computed from census tract centroids, though not inaccurate, yield important measurement errors for 5% to 10% of census tracts. Conclusion Although errors associated to the choice of distance types and aggregation method are only important for about 10% of census tracts located mainly in suburban areas, we should not avoid using the best estimation method possible for evaluating geographical accessibility. This is especially so if these measures are to be included as a dimension of the built environment in studies investigating residential area effects on health. If these measures are not sufficiently precise, this could lead to errors or lack of precision in the estimation of residential area effects on health.

Publication: International Journal of Health Geographics

Volume: 7

Issue: 1

Pages: 7

Date: 2008

Short Title: Comparing alternative approaches to measuring the geographical accessibility of urban health services

URL: <http://ij-healthgeographics.com.libproxy.lib.unc.edu/content/7/1/7/>

Accessed: Tuesday, October 09, 2012 10:16:39 AM

Library Catalog: Google Scholar

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- indicators of accessibility
- measurement
- measuring transportation disadvantage

Notes:

- This paper examines the appropriate geographic scales for measuring access to opportunities (namely, health care).

Overall: aggregating accessibility measures derived at census block level up to the tract level yields a measurement error of up to 10%. Esp. beware of tract-level measures in suburban areas (vs. urban).

Accessibility measures:

- "most common approaches for defining geographical accessibility are based on distance or travel time to a resource...These measures assume that every member of the population is a potential user of the service..."
- methods: (5 most commonly used accessibility measures)
 - distance to closest service
 - # of svcs within specified distance or travel time
 - mean distance to all services
 - mean distance to the closest specified # of svcs
 - gravity model
 - authors offer equations for calculating each

This article may be useful to DF when calculating accessibility measures

Attachments

- Apparicio et al 2008 - Comparing alternative approaches to measuring the geographical accessibility of urban health services.pdf
- Full Text

Drivers of disadvantage and prosperity: is car ownership a good indicator?

Type: Conference Paper

Author: V Johnson, G Currie, J Stanley,

Abstract

Improved understanding of the multidimensional nature of disadvantage is leading to development of a wider range of measurement variables than traditional income poverty lines. One of the variables now commonly included in indices of disadvantage, is households that do not have a car. This paper questions the logic of including not having a car as an indicator of disadvantage. It argues that the inclusion of this variable distorts the true picture of the distribution of advantage and disadvantage in wealthy nations such as the UK and Australia. The purpose of this paper is not to undermine the development of multidimensional measures of disadvantage, but rather to open debate and contribute to the development of more accurate measures of disadvantage. An examination of such measures of disadvantage can also help to illuminate the role of transport in addressing disadvantage and delivering economic prosperity. (a) For the covering entry of this conference, please see ITRD abstract no. E217541.

Date: 2008

Proceedings Title: Australasian transport research forum (atrf), 31st,2008, gold coast, Queensland, Australia, vol 31

Conference Name: Australasian transport research forum (atrf), 31st,2008, gold coast, Queensland, Australia, vol 31

Place: Queensland, Australia

Pages: 11P

Loc. in Archive: 01129149

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Monday, December 17, 2012 11:50:03 AM

Tags:

- Behavior
- Behaviour
- carlessness does not equal disadvantage
- Conference
- Conferences
- Household
- Households
- identification of disadvantaged populations
- Journey
- Motor vehicles
- ownership

- Sociology
- Travel
- Vehicle ownership

Notes:

- Pb - Victoria. Department of transport

No Way to Go: A Review of the Literature on Transportation Barriers in Health Care

Type: Journal Article

Author: D Wright

Abstract

This article presents a systematic review of the literature on transportation barriers to health care access and transportation interventions designed to reduce these barriers. The author conducted a systematic review of the published, peer-reviewed literature on transportation and access to health care in the United States from 1965 to the present using the MEDLINE and TRIS databases. Of the 35 studies identified, 23 were cross-sectional, 9 were qualitative, and 3 were longitudinal. The author considers transportation as an enabling resource, the lack of transportation as an access barrier, and seeks to identify what transportation barriers exist, whom they effect, and what the consequences of those barriers are. The study showed that transportation barriers were greatest among those under the age of 18 and over the age of 65, those on low-income, the unemployed, and those in fair or poor health. The findings from several transportation interventions can be used to determine possible cost-effective approaches to increasing access to health care. The author concludes that transportation barriers prevent millions of Americans from accessing health care. These transportation barriers can be overcome by designing user-friendly, cost-effective interventions that achieve buy-in from the target community.

Publication: World Transport Policy & Practice

Volume: 14

Issue: 3

Pages: pp 7-23

Date: 2008

Journal Abbr: World Transport Policy & Practice

URL: <http://www.eco-logica.co.uk/pdf/wtpp14.3.pdf>

Loc. in Archive: 01115014

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Age groups
- Costs
- Demographics
- Health care
- Health care services
- Quality of life
- Socioeconomic factors
- Special user groups
- Transportation

Notes:

- PB - Eco-Logica Limited

Examining the Role of Urban Form In Shaping People's Accessibility to Opportunities: An Exploratory Spatial Data Analysis

Type: Journal Article

Author: Darren Scott

Author: Mark Horner

Abstract

This study employs a suite of accessibility indices to investigate whether American cities are designed in such a way that the locations of goods, services, and other opportunities favor certain socio-economic groups over others. In so doing, the study's findings contribute to pressing policy issues such as social exclusion. Seven counties of the Louisville, Kentucky-Indiana MSA serve as the study area for the investigation. Data are derived from three sources:

a geocoded travel diary survey, a geocoded database of all opportunities in the area, and a database of shortest-path travel times. Accessibility indices (gravity, cumulative opportunity, and proximity) are defined for 34 types of opportunities: four aggregate types and 30 disaggregate types representing the 10 most popular destinations for trips for each of the first three aggregate types. These indices are computed for households that responded to the trip-diary survey. Non-parametric Wilcoxon rank sum tests are used to compare the levels of accessibility experienced by five socio-economic groups (i.e., individuals residing in rural communities, individuals residing in single-person and single-parent households, individuals residing in low income households, women, and the elderly) to counterpart groups. Except for individuals residing in rural areas, the findings of this study indicate that groups conventionally considered to be at risk of social exclusion are not disadvantaged in terms of accessibility.

Publication: Journal of Transport and Land Use

Volume: 1

Issue: 2

Pages: pp 89-119

Date: 2008

Journal Abbr: Journal of Transport and Land Use

URL: <https://www.jtlu.org/index.php/jtlu/article/view/25/38>

Loc. in Archive: 01141986

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Freight traffic
- Indiana
- Kentucky
- Louisiana
- Low income groups
- Rural areas
- Socioeconomic factors
- Travel behavior
- Travel time
- Urban areas

- Urban development
- Urban goods movement

Notes:

- Focus/purpose:

- measuring accessibility (via 3 indices) to determine whether city structure "factors certain socio-economic groups over others." The three accessibility indices are: gravity, cumulative opportunity, and proximity. The study is purely a matter of geography, however:

"To disentangle accessibility and urban form from mobility, all measures are estimated using uncongested street network travel times between residences and potential activity locations. In this manner, the spatial nature of urban form can be assessed for all individuals in a common fashion irrespective of the mobility tools and options available to them.... the intention of this study is to explore how different groups of individuals vary in their geographical proximity to opportunities...."

- So, in other words, the authors are NOT interested in the people-side of disadvantage. Accessibility is measured in terms of travel times to destinations. This paper is useful in that it provides methodologies for measuring car-based accessibility, but not for assessing the degree to which accessibility is related to disadvantage. Nor does it assess other dimensions of accessibility (e.g., temporal)

- Context

- Location: greater Louisville (KY) area. Mix of urban and non-urban. Single point in time.

How disadvantage is defined

- Population (who, how identified): authors use 'conventional wisdom' to identify five potentially at-risk populations: rural residents, single-person/single-parent households, low-income households, women, and elderly.
- Barriers faced (what, how identified)

Methods

- Quantitative/qualitative/mixed?
- Research design & Conceptual framework:

- The authors focus on travel times between households and opportunities. They also offer a strident critique of geography-based accessibility analyses (particularly a study in London by Church et al 2000), as such an approach "exemplify the ecological fallacy, because not all residents of an area are at risk of social exclusion, nor do all residents have equal access to opportunities." IMO, this is a valid critique on some levels, but if the goal is to identify areas to target for interventions (rather than to provide a scholarly measure of extent of disadvantage), the ecological fallacy argument is less relevant. It doesn't go away, but it's less of a problem b/c DOT will be interested in improving areas, not improving people. In other words, the unit of *interest* is the area, not necessarily the household.
 - NOTEWORTHY: the authors compare the aforementioned potentially at-risk populations against not-at-risk populations (e.g., poor households vs. not poor households. rural vs. not rural)
- Unit of analysis: geographic points (locations of residences and 'opportunities')
- Data: geocoded database of all 'opportunities' (locations other than residences) with SIC codes (Table 1 on p.97 lists the SIC codes they used to choose & categories opportunities). They also used household travel diaries (n=4383) from which they derived O-D pairs for ~20,000 unique destinations ('opportunities' for conducting non-work/non-school activities). They used 4 types of opportunities: retail, service, leisure (this category includes schools because they are often used for recreation), and religious. They used these O-D pairs to compute gravity-based accessibility measure. Finally, they had a dataset of shortest-path free-flow travel times between the households and the opportunities (created in TransCAD).
- Analytical approach: 3 accessibility measures were created. If we want to replicate, refer to p.98 of the article for the relevant equations & variable needs.
 - gravity

- cumulative opportunity
 - proximity
- Findings:
 - they didn't find that certain sociodemographic groups experienced exclusion relative to the population as a whole, at least in urban areas. They discuss their results more in terms of differences in accessibility to different types of destinations, rather than for different types of people. Rural households have less accessibility than non-rural households - but, IMO, because they do not differentiate between rural poor and rural non-poor, this finding is meaningless.
 - Overall Impression of tool/measurement: It may have useful guidance on calculating accessibility measures, but assumes all travel is via car in free-flow conditions.
 - Applicability & Generalizability (how does it inform our study?): may offer methodological guidance. Maybe.
 - Any other useful information from the study that may inform our approach most of the accessibility literature (up until this article) focuses on job accessibility; less work on understanding access to the rest of the necessary life opportunities (necessary to avoid feelings of social exclusion).
 - Why the location of destinations in space (a) is not necessarily equitable, and (b) is germane to the equity problem: "The concept of opportunities is common to virtually all studies of accessibility. Opportunities for conducting activities are distributed in space; persons wish to reach these opportunities in order to fulfill their needs and desires. The spatial arrangement of opportunities within the city is generally referred to as urban form. Urban form is an increasingly complex proposition (Dear and Flusty 1998), with low density residential sprawl dominating many metropolitan landscapes in the United States (Tsai 2005). At the same

time, the business owners, entrepreneurs, governments, and other public and private entities who provide needed opportunities do so at locations chosen for practical or profit-maximizing objectives, and not necessarily based on social welfare or equity concerns. This results in a patchwork urban landscape in which individuals or groups may be disproportionately disadvantaged in terms of their proximity to needed activities when compared to other groups.

Estimating Transportation Costs by Characteristics of Neighborhood and Household

Type: Journal Article

Author: Peter Haas, Carrie Makarewicz, Albert Benedict, Scott Bernstein

Abstract

Since information on U.S. household expenditures was first collected, transport expenditures have risen from the sixth-highest share of household budgets, less than 2%, in 1917 to the second-highest share since the 1970s. This rise is linked to increased automobile purchase and automobile use and a relative decline in other costs, particularly food. Studies have also linked variations in the built environment to transport expenditures, but this influence cannot be tested by the federal Consumer Expenditure Survey since it is reported at the metropolitan level. Regional travel demand models recognize the dual influence of land use and household characteristics but do not include sufficient detail on the built environment of neighborhoods. Additionally, these models report travel time, distance, and frequency but not out-of-pocket household transportation expenditures. A study was launched to create a statistical model to predict household total annual transportation expenditures for each neighborhood in the largest metropolitan regions in the United States, controlling for the built environment and household size and income. The model specifies five independent variables—density, jobs access, neighborhood services, walkability, and transit connectivity. Model parameters were calibrated to measured vehicle ownership and transit use in the pilot region, Minneapolis–St. Paul, Minnesota, and to vehicle miles traveled by households at the block

group level in the National Household Travel Survey. Statistically significant results confirm the influence of the built environment and regional accessibility on transport expenditures. Intended users are households, policy makers, and planners making location, design, and investment decisions.

Publication: Transportation Research Record: Journal of the Transportation Research Board

Issue: 2077

Pages: pp 62-70

Date: 2008

Journal Abbr: Transportation Research Record: Journal of the Transportation Research Board

ISSN: 9780309125895

URL: <http://dx.doi.org/10.3141/2077-09>

Loc. in Archive: 01099509

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Accessibility
- Automobile ownership
- Built environment
- Estimating
- Expenditures
- Households
- Mathematical models
- measuring transportation costs
- measuring transportation disadvantage
- Metropolitan areas
- Neighborhoods
- Transit use
- Transportation costs
- Twin Cities Metropolitan Area (Minnesota)
- United States
- Vehicle miles of travel

Notes:

- PB - Transportation Research Board

Attachments

- Haas et al 2008 TRR - Estimating transportation costs by characteristics of nhood and household.pdf

Public Transport and Urban Poverty: A Synthetic Index of Adequate Service

Type: Conference Paper

Author: Alexandre de Avila Gomide, Sabina Leite, Jorge Rebelo

Abstract

The purpose of this paper is to develop a methodology to support the monitoring of the access of lower income populations to public transport services by means of a synthetic index, an index on geo-referenced information that can be adopted in Brazilian cities. The index not only measures the provisions of services, but can identify the areas of worst served by public transport and guide and prioritize solutions to the problems identified. To construct this index the paper adopts the international definition of adequacy of transport through the measurement of four attributes: (1) affordability; (2) availability; (3) accessibility; and (4) acceptability. In conclusion, this paper provides some recommendations regarding public policies, with the aim of improving the supply of and access to the services by the poor.

Date: First Edition 2007

Pages: pp 923-964

ISBN: 9780080450957

Loc. in Archive: 01051401

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Acceptability
- Accessibility
- affordability
- Affordable transportation
- Availability (Transit)
- Brazil
- Low income groups
- Public transit
- Quality of service

- Transit operating agencies
- Urban areas
- Urban transit
- Urban transportation

Notes:

- U1 - Competition and Ownership in Land Passenger Transport. 9th International Conference (Thredbo 9)Lisbon Technical UniversityLisbon,Portugal
StartDate:20050904 EndDate:20050908 Sponsors:Lisbon Technical University

Environmental justice and transportation equity: a review of MPOs

Type: Journal Article

Author: Thomas W. Sanchez

Abstract

Surface transportation policies at the local, regional, state, and national levels have a direct impact on urban land use and development patterns. The types of transportation facilities and services in which public funds are invested provide varying levels of access to meet basic social and economic needs. The way regions develop land dictates the need for certain types of transportation, and on the other hand, the transportation options in which regions invest influence patterns of urban development. While many lament the trend toward suburban sprawl as damaging to the environment or unaesthetic, those who support social equity should also be concerned about the associated impacts. Substantial investment in highway development and other transportation programs that encourage private automobile use has supported low-density developments that extend increasingly farther and farther from the central city, and to residential and commercial areas that are increasingly spread out, producing "edgeless cities" (Lang 2003). In addition to being costly to state and local governments, transportation policies that encourage these growth patterns play a substantial role in producing some indirect, negative social and economic effects, including perpetuating residential segregation and exacerbating the inability of minorities to access entry-level employment, which is increasingly found in suburban areas. MPOs are well suited to provide leadership in the areas of metropolitan development and civil rights.

Date: 2007

Language: English

Short Title: Environmental justice and transportation equity

URL: <http://content.lib.utah.edu/cdm/ref/collection/uspace/id/3353>

Accessed: Thursday, November 15, 2012 7:48:53 AM

Library Catalog: content.lib.utah.edu

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Environmental justice
- identification of disadvantaged populations
- Metropolitan planning organizations
- Social equity
- Transportation
- Transportation Investments
- Urban planning

Notes:

3 dimensions explored in terms of role of MPO in addressig equity issues:

- efforts aimed at addressing the fairness of planning outcomes and promotion of social equity
- citizen participation in MPO process
- extent to which MPO boards underrepresent social, economic, and racial groups

"Welfare to work" program (1996): Narrow definition of equity in most MPO documents; MPOs overrepresented by suburban interests.

Need for a broader view of social inequity. Social exclusion as a much broader concept that incorporates concerns about:

- physical (personal) exclusion
- geographic exclusion
- exclusion from facilities

- economic exclusion
- temporal exclusion
- fear-based exclusion
- space exclusion

Efforts to eradicate social exclusion address communities that are isolated from or marginalized by general society without being narrowly focused on race & class.

Addressing social exclusion includes addressing problems such as lack of access to jobs, education, and training; low levels of access to public transportation at particular times of the day; and limited access to public and private spaces because of unsafe conditions and design.

Attachments

- Full Text PDF
- Snapshot

Accessibility, mobility and transport-related social exclusion

Type: Journal Article

Author: J. Preston, F. Rajé

Abstract

This paper briefly reviews the inexorable rise of the social exclusion policy paradigm and uses an adaptation of Amartya Sen's theory of entitlement to determine appropriate policy responses. In particular, the promotion by the UK Department for Transport of accessibility planning is examined. Although this initiative is not totally without merit, the resulting analysis may be too aggregate, both spatially and socially. The weakness of such an approach is that transport-related social exclusion is not always a socially and spatially concentrated process. Instead we suggest a matrix of area accessibility, area mobility and individual mobility as a possible schema for identifying concentrated and scattered manifestations of social exclusion and inclusion and for suggesting appropriate policy responses. This schema helps produce a more spatially and socially differentiated conceptualisation of social exclusion, helps identify policy responses and most critically highlights that the problems of the socially excluded immobile should not be analysed in isolation from the socially included mobile

Publication: Journal of Transport Geography

Volume: 15

Issue: 3

Pages: 151–160

Date: 2007

URL:

<http://www.sciencedirect.com.libproxy.lib.unc.edu/science/article/pii/S0966692306000512>

Accessed: Tuesday, October 09, 2012 10:04:17 AM

Library Catalog: Google Scholar

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- commentary
- identification of disadvantaged populations
- indicators of accessibility

Attachments

- Snapshot

Developing indicators for comprehensive and sustainable transport planning

Type: Journal Article

Author: T. Litman

Abstract

This paper discusses the selection of indicators for comprehensive and sustainable transportation planning. It discusses the concept of sustainability and the role of indicators in planning, describes factors to consider in selecting indicators, identifies potential problems with conventional indicators, describes examples of indicators, and provides recommendations for selecting indicators for use in a particular situation.

Publication: Transportation Research Record: Journal of the Transportation Research Board

Volume: 2017

Issue: 1

Pages: 10–15

Date: 2007

URL: <http://trb.metapress.com.libproxy.lib.unc.edu/index/604721j12711j20v.pdf>

Accessed: Tuesday, October 09, 2012 10:06:10 AM

Library Catalog: Google Scholar

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- indicators

Attachments

- Snapshot

Investigating the social dimensions of transport disadvantage II: from concepts to methods through an empirical case study

Type: Journal Article

Author: J. Dodson, B. Gleeson, R. Evans, N. Sipe

Abstract

This article is the second of two papers that review the field of spatially sensitive social scientific research into the links between social status and transport disadvantage. The first paper undertook a comprehensive review of the social scientific and transport planning literature to mark the level of development in the field and identify conceptual and methodological issues and constraints in this field of inquiry. The present article supports the advancement of socially and geographically sensitive transport research by opportunities for the development of more sophisticated spatial analytical methodologies. The approach we present is able to account for factors not previously addressed in either social or transport planning research, in particular the temporal dimensions of transport service accessibility. The article articulates the methodology through an empirical case study of socio-spatial transport disadvantage within the Gold Coast City. The article demonstrates that there are important theoretical and practical lessons to be gained for researchers and policy makers in addressing

the social dimensions of transport and infrastructure provision. Further, the article argues that an attentiveness to new ways of combining and representing social and transport data-sets can promote policy relevant empirical social inquiry. The article also contributes in a productive way to the empirical knowledge of Australia's sixth-largest metropolitan area, which is often overlooked by urban scholars.

Publication: Urban policy and research

Volume: 25

Issue: 1

Pages: 63–89

Date: 2007

Short Title: Investigating the social dimensions of transport disadvantage II

URL: <http://www.tandfonline.com.libproxy.lib.unc.edu/doi/abs/10.1080/08111140701225511>

Accessed: Tuesday, October 09, 2012 10:12:59 AM

Library Catalog: Google Scholar

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- identification of disadvantaged populations
- measurement

Attachments

- Snapshot

The case of Montréal's missing food deserts: Evaluation of accessibility to food supermarkets

Type: Journal Article

Author: P. Apparicio, M. S. Cloutier, R. Shearmur

Abstract

Background Access to varied, healthy and inexpensive foods is an important public health concern that has been widely documented. Consequently, there is an increasing interest

in identifying food deserts, that is, socially deprived areas within cities that have poor access to food retailers. In this paper we propose a methodology based on three measures of accessibility to supermarkets calculated using geographic information systems (GIS), and on exploratory multivariate statistical analysis (hierarchical cluster analysis), which we use to identify food deserts in Montréal. Results First, the use of three measures of accessibility to supermarkets is very helpful in identifying food deserts according to several dimensions: proximity (distance to the nearest supermarket), diversity (number of supermarkets within a distance of less than 1000 metres) and variety in terms of food and prices (average distance to the three closest different chain-name supermarkets). Next, the cluster analysis applied to the three measures of accessibility to supermarkets and to a social deprivation index demonstrates that there are very few problematic food deserts in Montréal. In fact, census tracts classified as socially deprived and with low accessibility to supermarkets are, on average, 816 metres away from the nearest supermarket and within 1.34 kilometres of three different chain-name supermarkets. Conclusion We conclude that food deserts do not represent a major problem in Montréal. Since geographic accessibility to healthy food is not a major issue in Montréal, prevention efforts should be directed toward the understanding of other mechanisms leading to an unhealthy diet, rather than attempting to promote an even spatial distribution of supermarkets.

Publication: International journal of health geographics

Volume: 6

Issue: 1

Pages: 4

Date: 2007

Short Title: The case of Montréal's missing food deserts

URL: <http://www.biomedcentral.com.libproxy.lib.unc.edu/1476-072X/6/4>

Accessed: Tuesday, October 09, 2012 10:16:39 AM

Library Catalog: Google Scholar

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- food deserts
- measurement

Attachments

- Full Text

Integrated Modeling Approach for the Transportation Disadvantaged**Type:** Journal Article**Author:** Yavuz Duvarci, Tan Yigitcanlar**Abstract**

Transportation models have not been adequate in addressing severe long-term urban transportation problems that transportation disadvantaged groups overwhelmingly encounter, and the negative impacts of transportation on the disadvantaged have not been effectively considered in the modeling studies. Therefore this paper aims to develop a transportation modeling approach in order to understand the travel patterns of the transportation disadvantaged, and help in developing policies to solve the problems of the disadvantaged. Effectiveness of this approach is tested in a pilot study in Aydin, Turkey. After determining disadvantaged groups by a series of spatial and statistical analyses, the approach is integrated with a travel demand model. The model is run for both disadvantaged and nondisadvantaged populations to examine the differences between their travel behaviors. The findings of the pilot study reveal that almost two thirds of the population is disadvantaged, and this modeling approach could be particularly useful in disadvantage-sensitive planning studies to deploy relevant land use and transportation policies for disadvantaged groups.

Publication: Journal of Urban Planning and Development**Volume:** 133**Issue:** 3**Pages:** pp 188-200**Date:** 2007**Journal Abbr:** Journal of Urban Planning and Development**Loc. in Archive:** 01055712

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Environmental policy
- Impacts
- Integration
- Mathematical models
- Planning
- Problems
- Spatial analysis
- Statistical analysis
- Transportation disadvantaged persons
- Travel demand
- Travel patterns
- Turkey
- Urban transportation

Notes:

- PB - American Society of Civil Engineers

Humboldt County Transportation-Disadvantaged Populations Report

Type: Report

Author: Natural Resources Services

Institution: The County of Humboldt Public Works Department

Date: May 2006

URL:

http://www.naturalresourceservices.org/assets/files/Documents/HRR1/2010UpdatedPATHDo cs/HRR2_HumCoTDPReport_03-15-2010_ce.pdf

Extra: Multivariate transportation disadvantage identified through overlaying of GIS maps

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Community Transportation
- Disadvantaged
- Transportation Access

Notes:

Transportation disadvantaged:

- Car-less
- Low-income
- mobility-impaired
- youth under 15yrs
- seniors over 62yrs
- ethnic minority
- low English
- geographically isolated

Effort to identify geographic location of these groups was mapped by Census block group (except geographically isolated areas). Overlaid indicators of potentially high concentrations of transportation disadvantaged populations.

Investigating the Social Dimensions of Transport Disadvantage—I. Towards New Concepts and Methods 1

Type: Journal Article

Author: J. Dodson, N. Buchanan, B. Gleeson, N. Sipe

Abstract

This article is the first of two papers that engage critically and productively with the relationship between the socio-economic transformations of cities, the differentiation of vulnerable groups within urban space and the distribution of transport services. This article undertakes a comprehensive review of the major conceptual and methodological approaches by which scholars and policy researchers have sought to address the connection between social disadvantage and access to transport. The article critically assesses the relative merits of various spatial analytical methodologies in illuminating social–transport links. The study finds that there is a need for greater sophistication in the use of analytical methods in transport research as well as an imperative for greater sensitivity to social differentiation within urban

areas and relative to infrastructure and services. The article concludes by developing a method for combining spatial social and transport service data that is then deployed in the empirical case study reported in the second paper.

Publication: Urban Policy and Research

Volume: 24

Issue: 4

Pages: 433–453

Date: 2006

URL: <http://www.tandfonline.com.libproxy.lib.unc.edu/doi/abs/10.1080/08111140601035317>

Accessed: Tuesday, October 09, 2012 9:37:34 AM

Library Catalog: Google Scholar

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- measurement
- overlap between geography and population
- review

Neighbourhoods and health: a GIS approach to measuring community resource accessibility

Type: Journal Article

Author: J. Pearce, K. Witten, P. Bartie

Abstract

Objective: Recent studies suggest an association between the contextual attributes of neighbourhoods and the health status of residents. However, there has been a scarcity of studies that have directly measured the material characteristics of neighbourhoods theorised to have an impact on health and health inequalities. This paper describes the development of an innovative methodology to measure geographical access to a range of community resources that have been empirically linked to health. Geographical information systems (GIS) were applied to develop precise measures of community resource accessibility for small areas at a national scale. Design: Locational access to shopping, education, recreation, and health facilities

was established for all 38 350 census meshblocks across New Zealand. Using GIS, distance measures were calculated from the population weighted centroid of each meshblock to 16 specific types of facilities theorised as potentially health related. From these data, indices of community resource accessibility for all New Zealand neighbourhoods were constructed. Results: Clear regional variations in geographical accessibility to community resources exist across the country, particularly between urban and rural areas of New Zealand. For example, the average travel time to the nearest food shop ranged from less than one minute to more than 244 minutes. Noticeable differences were also apparent between neighbourhoods within urban areas. Conclusions: Recent advances in GIS and computing capacity have made it feasible to directly measure access to health related community resources at the neighbourhood level. The construction of access indices for specific community resources will enable health researchers to examine with greater precision, variations in the material characteristics of neighbourhoods and the pathways through which neighbourhoods impact on specific health outcomes.

Publication: Journal of epidemiology and community health

Volume: 60

Issue: 5

Pages: 389–395

Date: 2006

Short Title: Neighbourhoods and health

URL: <http://jech.bmj.com.libproxy.lib.unc.edu/content/60/5/389.short>

Accessed: Tuesday, October 09, 2012 10:16:39 AM

Library Catalog: Google Scholar

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- measurement

Attachments

- Snapshot

Measuring the accessibility of services and facilities for residents of public housing in Montréal

Type: Journal Article

Author: P. Apparicio, A. M. Séguin

Abstract

For the residents of public housing, whose mobility is often reduced due to their precarious economic situation and their stage in the life cycle, the accessibility of services and facilities is a fundamental concern. Moreover, in Montreal, public housing is dispersed throughout the city. Accessibility thus varies greatly from one building to the next. The aims of this study are first to evaluate the accessibility of various urban resources using spatial data analysis in geographical information systems and then to develop an indicator of the accessibility of services and facilities for each public housing project using multivariate data analysis. The final results show that there are eight sub-types of landscape facilities around public housing buildings. Overall, half of the residents of public housing buildings have very good or good accessibility to services and facilities. Most of these residents live in public housing in some of the central or relatively central districts. On the other hand, for 45 per cent of public housing residents, there is a low level of access and 5 per cent have very limited service accessibility.

Publication: Urban Studies

Volume: 43

Issue: 1

Pages: 187–211

Date: 2006

URL: <http://usj.sagepub.com.libproxy.lib.unc.edu/content/43/1/187.short>

Accessed: Tuesday, October 09, 2012 10:17:33 AM

Library Catalog: Google Scholar

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- measurement

Notes:

- Focus/purpose
 - Type of disadvantage (e.g., safety, access, exclusion, etc): access to destinations
 - Population examined (poor, non-english speaking, etc): none, explicitly. The authors examine access to destinations around housing projects, but they explicitly do not examine needs. Supply only. Reasoning - City of Montreal wishes to assign people to housing projects based in part on how well the environment will meet their mobility needs
 - Goal of study: to understand/assess distribution of services & facilities around housing projects. Driven by compensatory rationale for equity.
- Context
 - Location: Montreal. Focus is areas surrounding public housing projects. Urban.
 - Population (who, how identified): public housing residents. Actually, just the location of public housing projects. It is assumed that the residents will have mobility needs above and beyond (or at least different and less-well-served) than people that don't qualify for public housing.
 - Provenance (what, how identified)
- Methods
 - Quantitative
 - They measured accessibility from public housing projects (geocoded) to destinations of pre-determined types (geocoded). 40 kinds of destinations were collapsed into 6 categories: cultural services, educational services, health services, sport & recreational facilities, banks, and 'other' (including a wide range of things, from subway stations to supermarkets). See Table 1 in the article for more detail. They measured network distance (and argued against using travel time as it assumes equal access to cars) to closest facility of each of the 40 types of destination. When comparing distances among housing projects, they use standard distances (standard deviation of distance) to account for differences in

concentrations & distributions of different kinds of facilities (IOW, some kinds of facilities are naturally dispersed, while others tend to be more concentrated).

- Unit of analysis: public housing project location
- Analytical approach:
 - They generated a 40 x 747 cell spreadsheet (747 housing projects, 40 facility types) with each cell showing distance between project and closest facility). They then used principal components analysis and agglomerative hierarchical clustering to create "a typology of the 747 public housing buildings based on the degree of accessibility"
- Findings:
 - The authors summarize accessibility by type of facility. Findings not really relevant to us (context is way to different anyway). Methods of measurement are relevant to us. Applicability & Generalizability (how does it inform our study?): provides & explains rationale for ways of measuring access to destinations. Not sure the PCA is relevant, but perhaps it is a useful way to quickly summarize accessibility to variety of destination types. Any other useful information from the study that may inform our approach
 - p.198 provides background info on the importance of understanding the provenance of the built environment & why it's relevant to potentially disadvantaged households. Includes phrasing such as: "Whether or not people have easy access to these public resources can make a considerable difference..."
 - Also provides various framings of 'equity' Talen (1998, p. 24) identifies four conceptions of equity that determine four types of accessibility. The first conception defines equity in terms of equality: everyone receives the same public benefit regardless of his or her socioeconomic status or willingness or ability to pay. This definition comes close to the idea of equality of opportunity and implies that the distribution of resources should be proportional to the distribution of the population or the number of households in the territory.

The second conception is tied to the notion of need: in this case, the distribution of the public benefit is based on need and one can speak of a 'compensatory' equity. This second definition is not dissimilar to the notion of equality of outcomes. From this viewpoint, the most deprived neighbourhoods should have the best supply of services and facilities. The third conception defines equity according to demand. This demand may be expressed politically as well as economically. Wealthier neighbourhoods will thus have more or better municipal libraries—for example, since the demand for this type of service is greater in these areas and the capacity successfully to demand this type of facility is also greater. The fourth conception of equity is based on the notion of market. The cost of the service is the key factor here, along with the users' willingness and ability to pay for the service. Efficiency is the most important aspect. A distribution is equitable if it is adapted to the market. Talen pertinently remarks that distributions that meet the criterion of efficiency rarely coincide with distributions based on need. Furthermore, distributions based on demand rarely match distributions based on need because underprivileged populations usually have low levels of the economic and political resources that are required for making demands based on their considerable needs (Small and Newman, 2001)." [Apparicio & Seguin's approach follows the second conception - equity based on need]

- on p.191, the authors give solid argument for objectively assessing the built environment (particularly the location of facilities) without first consulting disadvantage-prone populations about the importance of certain kinds of destinations. IOW, they make the argument that non-specific measures of the environment, not dependent upon perceived needs of the population, are a priori necessary.
- There are 4 ways to measure accessibility to destinations: gravity, average distance b/w O-D pairs, minimum distance to closest destination, and # of

destinations within x distance. And 4 ways to calculate distances: euclidean, manhattan, shortest network distance, and shortest network time.

Attachments

- Snapshot

Evaluating accessibility using house-level data: A spatial equity perspective

Type: Journal Article

Author: I. Omer

Abstract

This paper presents a framework for evaluating house-level accessibility to urban services based on detailed geo-referenced socio-demographic census data. The framework is applied to assess spatial equity regarding the accessibility of individuals and social groups to urban parks in the city of Tel Aviv. Availability of house-level data was found to be essential for identifying differential accessibility of social groups according to income and national-ethnic identity as well as for evaluating the validity of accessibility assessments based on traditional aggregated measurement at the administrative district level. Also discussed are data usability issues arising when employing local-scale geo-referenced census data, including the potential effect on decisions regarding allocation of local urban services as well as spatial equity practice and discourse.

Publication: Computers, environment and urban systems

Volume: 30

Issue: 3

Pages: 254–274

Date: 2006

Short Title: Evaluating accessibility using house-level data

URL:

<http://www.sciencedirect.com.libproxy.lib.unc.edu/science/article/pii/S0198971505000530>

Accessed: Tuesday, October 09, 2012 10:18:02 AM

Library Catalog: Google Scholar

Extra: setting is Tel-Aviv, but concepts are relevant to NC

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- identification of disadvantaged populations
- indicators of accessibility
- measurement
- measuring transportation disadvantage

Attachments

- Omer 2006 - Evaluating accessibility using house-level data - Tel Aviv.pdf
- Snapshot

Transportation-disadvantaged seniors : efforts to enhance senior mobility could benefit from additional guidance and information : report to the Chairman, Special Committee on Aging, U.S. Senate

Type: Book

Author: United States. Government Accountability Office, United States. Congress. Senate. Special Committee on Aging

Place: Washington, D.C.

Publisher: GAO

Date: 2004

Language: English

Short Title: Transportation-disadvantaged seniors

Library Catalog: Open WorldCat

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- Senior mobility
- Transport disadvantage

Notes:

Report identifies:

- federal programs that address seniors' mobility issues
- extent to which these programs meet needs
- program practices that enhance seniors' mobility and the cost-effectiveness of service delivery
- obstacles to addressing seniors' mobility needs and strategies for overcoming these obstacles

The 5 A's of senior-friendly transportation

- availability
- accessibility
- affordability
- acceptability
- adaptability

Obstacles to senior mobility:

- seniors are not sufficiently encouraged to plan for driving alternatives
- govt policies do not always address seniors' varied needs
- funding constraints limit local agencies' ability to address needs.

Definition of Mobility Impaired population: those who cannot drive or have limited their driving and who have income constraint, disability, or medical condition that limits their ability to travel.

Gap analysis of public transport needs: measuring spatial distribution of public transport needs and identifying gaps in the quality of public transport provision

Type: Journal Article

Author: G. Currie

Abstract

A new approach to assessing the performance of public transport in meeting the needs of transport-disadvantaged people in the community is described. It reviews previous and current research in this area and describes how a new approach has been developed and applied with Hobart, Australia, as a study area. The approach aims to identify geographical gaps

in public transport provision where travel needs are high but services are poor or nonexistent. It involves the use of readily available socioeconomic statistics to quantify the distribution of needs in the community with a single transport needs index. A public transport network model measures the public transport accessibility to these groups and a geographical information systems approach is used to display the distribution of the identified gaps between service and needs. The technique is highly relevant for smaller urban centers where the justification of public transport subsidies is largely social-needs-based—that is, where congestion and environmental benefits of transit are less critical. It is also relevant to recent work in transport accessibility audits and in the assessment of community impacts of alternative transit development strategies.

Publication: Transportation Research Record: Journal of the Transportation Research Board

Volume: 1895

Issue: 1

Pages: 137–146

Date: 2004

Short Title: Gap analysis of public transport needs

URL: <http://trb.metapress.com.libproxy.lib.unc.edu/index/i07q2m7121792075.pdf>

Accessed: Tuesday, October 09, 2012 10:18:02 AM

Library Catalog: Google Scholar

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Tags:

- measurement

Notes:

For TDP: I recommend replicating the methodology described in this study to measure accessibility via public transit. It provides a very clear framework for assessing accessibility, and the purpose of the study aligns well with our own. This is an excellent place to not try to reinvent the wheel.

- Focus/purpose

- Type of disadvantage (e.g., safety, access, exclusion, etc)
- Population examined (poor, non-english speaking, etc)
- Goal of study: "identify geographical gaps in public transport provision where travel needs are high but services are poor or nonexistent", using "readily available socioeconomic statistics to quantify the distribution of needs in the community within a single transport needs index"
- Context
 - Location: Hobart, Tasmania (small city)
 - incl. context of location (e.g., rural vs urban vs suburban; presence of physical/geographic barriers; prevailing SES)
 - scale, time period, etc

How disadvantage is defined:

- carless adults, persons >60, persons on disability, low-income adults, unemployed adults, students, people located far from CBD. These were measured at the CCD (census collector district) level. Each # is calculated and given a weight (shown p.141 of article) and summed to produce an overall score.

How provenance is defined:

- accessibility to destinations via bus service

- Methods
 - Research design & Conceptual framework (see p.139 of article)
 - Unit of analysis: Census collector district
- Findings

Overall Impression of tool/measurement

Applicability & Generalizability (how does it inform our study?)

Any other useful information from the study that may inform our approach:

Attachments

- Currie et al 2004 TRR - Gap analysis of public transport needs.pdf
- Snapshot

Measuring accessibility for people with a disability

Type: Journal Article

Author: R. L. Church, J. R. Marston

Publication: Geographical Analysis

Volume: 35

Issue: 1

Pages: 83–96

Date: 2003

URL:

<http://onlinelibrary.wiley.com.libproxy.lib.unc.edu/doi/10.1111/j.1538-4632.2003.tb01102.x/abstract>

Accessed: Tuesday, October 09, 2012 10:16:39 AM

Library Catalog: Google Scholar

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Attachments: Snapshot

Identifying winners and losers in transportation

Type: Journal Article

Author: D. Levinson

Publication: Transportation Research Record: Journal of the Transportation Research Board

Volume: 1812

Issue: -1

Pages: 179–185

Date: 2002

URL: <http://trb.metapress.com.libproxy.lib.unc.edu/index/CM617242P7T346R2.pdf>

Accessed: Tuesday, October 09, 2012 10:10:37 AM

Library Catalog: Google Scholar

Date Added: Tuesday, December 04, 2012 9:59:06 AM

Modified: Tuesday, December 04, 2012 9:59:06 AM

Attachments

- Snapshot

Equity in Regional Service Provision

Type: Journal Article

Author: Alan T. Murray

Author: Rex Davis

Abstract

Most transportation agencies stipulate that an important planning goal is to provide equitable and just public transport services. However, who is to be served and the type of service that should be provided has been ambiguous. This paper develops a methodology for examining equity in the provision of public transportation services. An approach for identifying areas in need of public transport is developed based upon the use of socio-demographic and economic information. Public transport need is then related to levels of access to service. This approach makes it possible to establish the degree to which public transport services may be considered equitable in relation to need and suitable access. A detailed analysis of the southeast Queensland region of Australia illustrates how this approach may be used to inform public transport decision making.

Publication: Journal of Regional Science

Volume: 41

Issue: 4

Pages: 557–600

Date: 2001

Language: en

DOI: 10.1111/0022-4146.00233

ISSN: 1467-9787

URL: <http://onlinelibrary.wiley.com/doi/10.1111/0022-4146.00233/abstract>

Accessed: Wednesday, January 02, 2013 2:30:56 PM

Library Catalog: Wiley Online Library

Date Added: Wednesday, January 02, 2013 2:30:56 PM

Modified: Wednesday, January 02, 2013 2:30:56 PM

Attachments

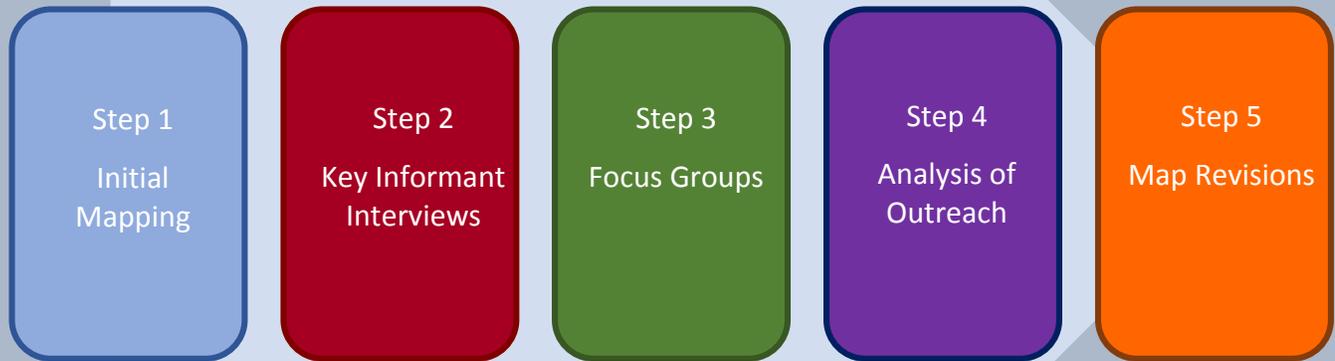
- Full Text PDF
- Snapshot

Code Dictionary: Appendix

Code list	Definition
access to amenities	Ability to get to grocery store, routine shopping, banks, conveniences, various services (appointments with lawyers, for example) and amenities.
access to health care	Ability to get to medical appointments, doctor's visits, routine health check-ups, and specialty care in clinics, hospitals, and other health centers.
access to school	Ability to get to school, all ages.
access to work	Ability to get to job sites. Includes employment trips and access to major employers.
barriers	Physical barriers (not broad "challenges"); includes geographic divides, difficult roads, reliance on ferry.
BELU	Built Environment and Land Use. Refers to sprawl, density, urban form, mixed use, wide lanes or narrow lanes, uses happening in the area
challenges of paratransit	Paratransit—for people who cannot use regular scheduled transit. Usually not free; cannot be more than twice the cost of regular transit. Can be scheduled/regular service or on-demand transit. Usually for elderly/disabled. "Challenges of paratransit"—anything challenging to the user. Includes fares, costs, limits on eligibility, long travel days, trip type silo-ing, any challenges of using paratransit (i.e., not being able to use a medical trip for additional errands). Can describe the usefulness
community identity	A sense of place
community resources	Community capital, public funding challenges, public funding challenges (like city or county funding of public transit)
connections and corridors	Refers to major thoroughfares that connect communities or households to goods and services, major corridors of activity.
cost of travel	Refers to household/individual expenses, not the county's budget. When payment is a burden or obstacle to get to where you are going. Includes time cost.
decline	Economic decline and population decline.
demographic changes	Any discussion of changes in the socio-demographic makeup of the community.
economic development	Includes positive growth or development of the economy. Moderate growth, any positive change, growth or development, efforts to improve the economy, positive intent, job creation. Does not refer to decline.
governance	Who is in charge of making decisions, specifically about allocation of resources? Refers to the processes, roles, and responsibilities of different agencies, jurisdictions, government entities with regard to transportation. Separate from "politics" code.
hazards	Physical hazards, typically weather-related.
informal solutions	Any informal or self-organized transportation (carpooling, friends/neighbors, taxis, employer-provided, private transportation, private ferries). Presence or absence of informal solution. <i>Does not include</i> formal transit or paratransit or walking and biking.
isolation	Can be physical or social.

long distance	Long distances traveled (includes into and out of county or within county).
map	Interviewee agrees or disagrees with TD map or parts of the map. Map accuracy subcodes— <i>agree, disagree, mixed feelings</i>
marketing transit	Efforts to get people to ride transit (includes marketing and stigma against transit that marketing tries to combat). Increasing awareness about transit and paratransit services.
pedbike	Anything related to travel by foot/bike, including conditions and safety, planning, and trip purpose.
politics	Any discussion of tensions between people, newcomers & outsiders: us vs. them, politics, political divide.
road conditions	Dirt roads, crumbling infrastructure, improvements needed. Effect on transportation.
rural self-sufficiency	People may have chosen to live in transportation-underserved areas. Also refers to people making do with what they have.
rural vs urban	Discussion of maps being skewed toward urban areas
SV	Socially vulnerable populations; populations that DOT calls traditionally disadvantaged. Does not include populations not traditionally identified as at risk for disadvantage (defined below in SV: non-traditional).
SV	Elderly, aging.
SV	Disabled populations
SV	LEP (low English proficiency) or non-native English speakers.
SV	Migrant workers.
SV	Carless households.
SV	Minority
SV: nontraditional	New (previously unidentified) populations that experience disadvantage-- includes community college, migrant workers, uncounted populations.
transit challenges	Challenges people face when using transit: user-oriented, that is, NOT referring to the provider.
transit demand	User-oriented.
transit supply	Transit supply (includes limited rural services, paratransit capacity); can refer to paratransit or transit; can be used for a LACK of supply or an availability of supply.
transportation planning	Evaluation, assessment, design and siting of transport facilities (generally streets, highways, bike lanes and public transport lines).
trip chaining	Incorporation of multiple stops into one trip, instead of several individual trips.
wealth gap	Difference between rich and poor. People who are wealthy don't need and might not support public transit: somewhat isolated, us vs. them, wealthy people might be outsiders, newcomers excluding old-timers from using the land, don't interact with locals, often against public spending.

Practitioner Guide: Appendix



Identifying Transportation-Disadvantaged Populations
Practitioner Guide

Prepared
for
NCDOT by



May 02, 2014

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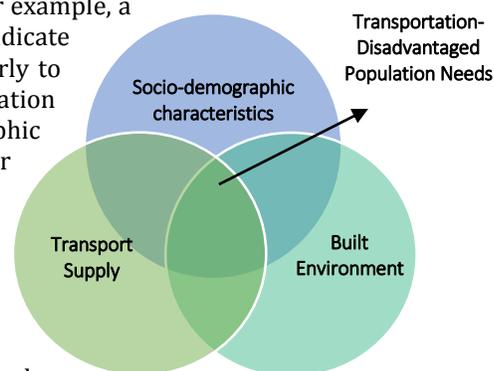


Overview

Identifying Transportation-Disadvantaged Populations | Practitioner Guide

Safe, reliable, and affordable transportation is an important component of maintaining high quality of life for households and communities across North Carolina. However, some populations are at a significant disadvantage and face greater challenges in meeting their transportation needs. But, who are these *transportation-disadvantaged* populations and where are they located?

Within a given region, socio-demographic, transportation supply, and built environment characteristics shed light on the needs of transportation-disadvantaged populations, when analyzed together. For example, a socio-demographic characteristic such as age could indicate that an individual may be either too young or too elderly to drive. Thus, a region with little or no transportation alternatives to driving could put anyone in that demographic category at a transportation disadvantage. On the other hand, if this scenario were to play out in a region where there was a robust offering of public transportation alternatives to driving, individuals in this demographic category may not be disadvantaged, or relatively less so. This is a very simple example for illustrative purposes; however, it suffices to show that the transportation needs of a given population depend not only on socio-demographic characteristics, but also on transportation supply, and built environment considerations.



The purpose of this guide is to show planning, land-use, and other transportation practitioners how to identify transportation-disadvantaged populations. Identifying these populations includes examination of issues related to why they

may be disadvantaged including transportation costs, the availability and accessibility of transportation services and infrastructure as well as their perceptions about the suitability of their transportation options.

The arrow with the five steps (on the previous page) illustrates a process that can be used to identify and map populations that may be at risk of being transportation-disadvantaged. This includes populations that are protected under United States Department of Transportation (USDOT) Title VI/Nondiscrimination requirements (defined by income, race, and disability), but also include the elderly, children, populations with limited English or low-English proficiency, and ethnic minorities.

The process involves five steps:

- (1) Preparing maps using Census data and Geographic Information Systems (GIS)
- (2) Ground-truthing or validating the maps with key informant interviews
- (3) Ground-truthing or validating the maps with focus groups
- (4) Analyzing information from key informant interviews and focus groups
- (5) Revising maps based on information obtained during outreach

Steps 1-5 provide practitioners with the necessary information to identify transportation-disadvantaged populations in North Carolina. From there, practitioners are presented with a conceptual framework that concisely and succinctly organizes key issues of potential concern to transportation disadvantaged populations.

How to Use this Guide

This guide is organized as an instruction manual that will take practitioners through the process of identifying transportation-disadvantaged (TD) populations. It is divided into five sections; each section corresponds to and describes one of five steps used to aid practitioners in identifying TD populations. Steps 1-5 will result in maps that indicate potentially higher risk of populations being transportation-disadvantaged. Following these five steps there is a conceptual framework that practitioners may find useful for planning action after identifying transportation-disadvantaged populations.

This guide was developed from a research project: "Defining North Carolina's Transportation-Disadvantaged Populations." The information presented is derived from case study applications in six counties (Beaufort, Chatham, Graham, Wake, Warren, and Wilson). While the county geography was used for the research project, analysis and evaluation of any geography can be utilized using the process described in this guide.

Initial Mapping

This section of the Practitioner Guide will demonstrate how to create initial maps showing relative risk of transportation-disadvantage. These maps are a starting place for practitioners to see where transportation-disadvantaged (TD) populations are located within a given geography. To create the initial maps, practitioners will undergo the following processes:

- *Select TD indicators*
- *Determine thresholds for mapping these indicators*
- *Generate maps with mapping software*



Determine TD
indicators



Use Census data to
determine thresholds
for mapping



Use mapping software
to create TD maps

Determine TD indicators based on local needs. Significant TD indicators might include:



- Households with mobility-limited individuals
- Households with youth of non-driving age
- Low English Proficiency (LEP) households
- Low-income households
- Households with seniors
- Ethnic minority households*
- Carless households**



Create map thresholds using U.S. Census data. For each TD indicator, North Carolina county average data are used as a baseline for mapping (see pages 3 and 4).

Use county averages to create maps of two different types:

- *Individual indicator maps*
- *Compilation maps*

Practitioner's Note: *Through policy to advance environmental justice (EJ) principles, Bill Clinton enacted Executive Order 12898 to ensure that minority populations do not experience disproportionately high and adverse human health or environmental effects from its programs, policies, and activities. Though ethnic minority populations are not necessarily indicative of transportation-disadvantage, they are included in this list to ensure EJ best-practice.

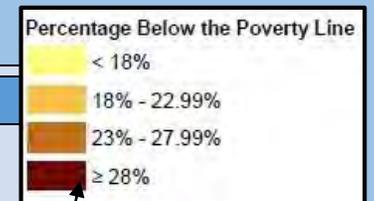
**In some urban contexts, the carless households' indicator may bias the resulting maps and analysis. This is because carlessness may be both a cause of transportation disadvantage and an effect of transportation *advantage*, so including it in the analysis could muddy the results. Further, age and poverty characteristics are strongly correlated with carlessness; therefore, adding carlessness as an indicator to age and poverty could skew mapping results.

Individual indicator maps display one TD indicator, such as income, or “one piece of the puzzle.” These maps can demonstrate only one of the many factors that may lead to transportation disadvantage in a region.

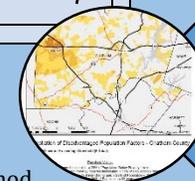
Compilation maps display multiple TD indicators on one map. Areas where more than one indicator are mapped denote “hot spots,” where there is a greater likelihood for transportation disadvantage.

Mapping parameters for *individual indicator* and *compilation* maps are shown below and on the following page:

Map type	Thresholds (Mapping Parameters)
Individual Indicator	<p>Maps are created showing coloration for an indicator based on the following threshold values:</p> <ul style="list-style-type: none"> • Less than North Carolina county average • North Carolina county average up to one standard deviation • One standard deviation up to two standard deviations of North Carolina county average • Greater than or equal to two standard deviations of North Carolina county average
Compilation	<p>Maps are created showing coloration for multiple indicators if an indicator is greater than or equal to 2 standard deviations of the North Carolina county average.</p>



In this instance, household income is used for an individual indicator map. The greater the percentage below the poverty line, the darker the color on the map.

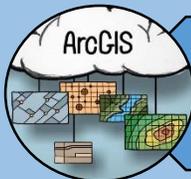


For map examples see page 5.

Practitioner’s Note: In a normal distribution of data, 95 percent of data points exist within two standard deviations from the mean. In statistical practice, any data points that are outside two standard deviations from the mean denote instances that are infrequent, because they only occur 5 percent of the time. This method is often used for isolating data points of interest, as a measure of statistical best practice. This method was used in the practitioner guide’s application of mapping transportation-disadvantaged (TD) population indicators. For example, TD population indicators were mapped in any instances where indicator values were greater than two standards of the statewide county average. For instructions on how to calculate the standard deviation for a given indicator see appendix, page 73.

Data source and mapping parameters are found in the table below. Practitioners will require familiarity with mapping software to use this information to generate maps.

Disadvantaged Population Indicator	Census Data Source(s)	Analysis Threshold
Low-income households	S1701: Poverty Status in the Past 12 Months – Tract (US Census Bureau, American Community Survey 2011 5-Year Estimates) C17002: Ratio of Income to Poverty Level in the Past 12 Months – Tract (US Census Bureau, American Community Survey 2011 5-Year Estimates)	S1701: Percentage of Population Below Poverty Level NC County Average = 18% (SD 5%) Maps of <18%, 18%-22.99%, 23%-27.99%, and ≥ 28%
Households with mobility-impaired individuals	S1801: Disability Characteristics – Cities/Towns, County (2007 American Community Survey 3-Year Estimates) S1810: Disability Characteristics – Cities/Towns, County (2011 American Community Survey 3-Year Estimates) S1811: Selected Economic Characteristics for the Civilian Non-institutionalized Population by Disability Status – Cities/Towns, County (2011 American Community Survey 3-Year Estimates)	S1801: Population 5 Years and Over Without Any Disability (sensory, physical, mental, self-care, go-outside-home, employment) NC County Average = 81% (SD 4%) Maps of <73%, 73%-76.99%, 77%-80.99%, ≥81% (Higher is more desirable)
Households with youth of non-driving age	P12: Sex by Age – Block (2010 Census Summary File 1)	P12: Male and Female Population ≤ 14 years old NC County Average = 19% (SD 2%) Maps of <19%, 19%-20.99%, 21%-22.99%, and ≥ 23%
Households with seniors	P12: Sex by Age – Block (2010 Census Summary File 1)	P12: Male and Female Population ≥ 62 years old NC County Average = 19% (SD 5%) Maps of <19%, 19%-23.99%, 24%-28.99%, and ≥ 29%
Ethnic minority households*	QT-P6: Race Alone or in Combination and Hispanic or Latino: 2010 (US Census Bureau) B02001: Race – Tract (US Census Bureau, American Community Survey 2011 5-Year Estimates) B03002: Hispanic or Latino Origin by Race – Tract (US Census Bureau, American Community Survey 5-Year Estimates (2006-2010))*	QT-P6: 100% - Percentage of White Alone NC County Average = 28% (SD 18%) Maps of <28%, 28%-45.99%, 46%-63.99%, and ≥ 64%
LEP households**	B16001: Language Spoken at Home by Ability to Speak English for the Population 5 Years and Over – Tract (US Census Bureau, American Community Survey 2011 5-Year Estimates)	B16001: Percentage of all Languages Comprised of Speaking English less than “Very Well” ≥ 8% of Population or >1000 persons per tract speaking English less than “Very Well”
Carless households***	B08021: Percentage of Households Without Cars : Tract (US Census Bureau, American Community Survey 2011 5-Year Estimates)	B08021: Percentage of Households Without Cars NC County Average = 7% (SD 3%) Maps of <7%, 7%-9.99%, 10%-12.99%, and ≥ 13%



Instructions for using ArcGIS are included in the appendix, p. 81.

Practitioner’s Note: *To address environmental justice federal guidance, counties with more than 50 percent minority should be considered minority areas. The mapping approach with two standard deviations should be used in conjunction with mapping areas 50 percent minority or greater. This includes the following 11 counties: Anson, Bertie, Edgecombe, Halifax, Hertford, Northampton, Robeson, Scotland, Vance, Warren, and Washington.

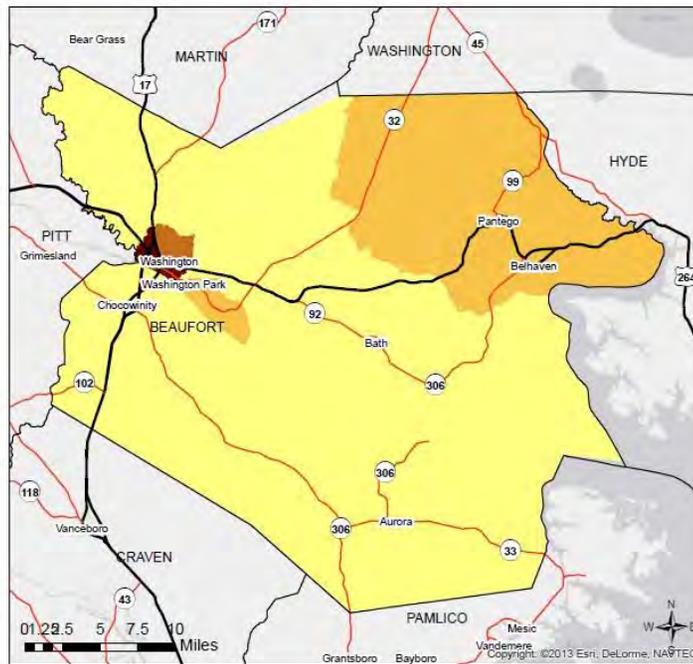
**While the statewide county average is 8% for LEP households, NCDOT requested using a threshold of 5% (LEP requirement) for the case study applications.

***Carless households were not included as an indicator for maps included in the research project’s case study applications. The practitioner’s note on page two provides the explanation for why it was not included.



Maps generated in Step 1 provide support for key informant interviews, which are discussed in Step 2. The map on the left was prepared using a single indicator, household income, while the map on the right represents a compilation of several individual indicators.

Individual Indicator Map



Low Income Distribution - Beaufort County

Percentage Below the Poverty Line

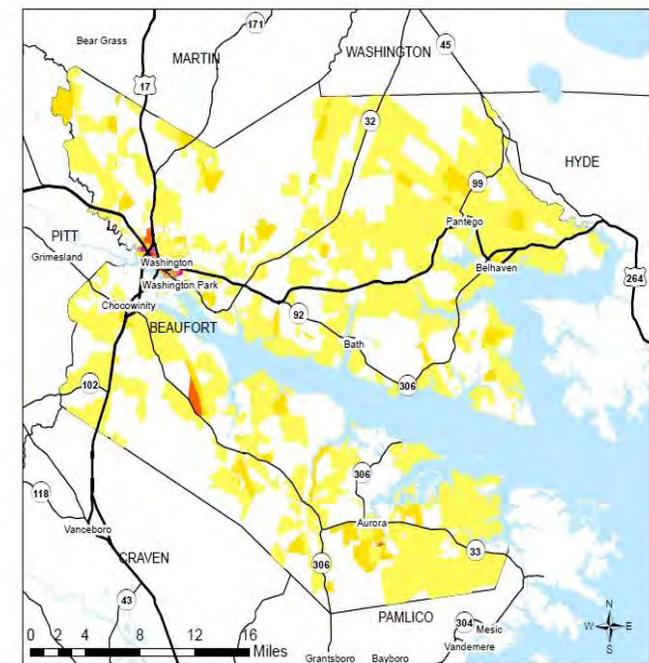
- < 18%
- 18% - 22.99%
- 23% - 27.99%
- ≥ 28%

Roads
— NC
— US



Beaufort County Average: 18.7%
Data Source: 2011 Census Data Table S1701

Compilation Map



Compilation of Disadvantaged Population Factors – Beaufort County

Number of Factors Exceeding Thresholds (6 Total)

Indicators	Threshold Values
0	
1	Household Income Low Income: ≥ 28% of Population Below Poverty Level High Income: < 8% of Population Below Poverty Level (Negative Factor)*
2	Households with mobility-impaired individuals Households with youth of non-driving age ≥ 73% of Population 5 Years and Over Without Any Disability ≥ 23 % of Population ≤ 14 years old
3	Households with seniors Ethnic minority households ≥ 29% of Population ≥ 62 years old ≥ 64% Minority Population
4	LEP households ≥ 5% of Population or >1000 persons per tract speaking English less than "Very Well"
5	
6	*Applied in response to key informant interviews



Beaufort County Average: 0.59 indicators

Practitioner's Note: More map examples can be found in the appendix, pages 75-76.

Key Informant Interviews

Elected officials, community leaders, and other key informants can help practitioners better ascertain the level of transportation disadvantage within a specific region. Key informants can provide feedback about the initial maps created in Step 1, as well as provide insights on transportation supply and demand, demographic characteristics, and other factors that may increase the likelihood of transportation disadvantage. This section describes how to identify and interview key informants and to analyze the information gathered for use in the subsequent steps. This section focuses on:

- Identifying key informants
- Asking questions that are likely to gain further insights into TD populations
- Field-testing maps through outreach



Identify key
informants



Ask the right
questions



Test maps during
outreach

Step 2
Key Informant Interviews



Identify key informants who have differing perspectives and expertise related to transportation disadvantage.

Informants may include but are not limited to:

- **Government Officials**
 Director of Planning
 Director of Transportation
 Director of Transportation Operations
 Director of Public Health
 Director of Emergency Management
 Director of Social Services
 Director of Senior Services
 City Manager
 County Manager
- **Elected Officials**
 City Council Member
 Mayor
 County Commissioner
- **Community Leaders Involved With:**
 Regional Councils of Government
 Community Development Commissions
 Non-profits serving vulnerable populations
 Education
 Community Health Clinics
 Faith-based Groups

Key Informant Interviews – Chatham County*

Key informant interviews involved nine interviews with 10 people, including representatives of

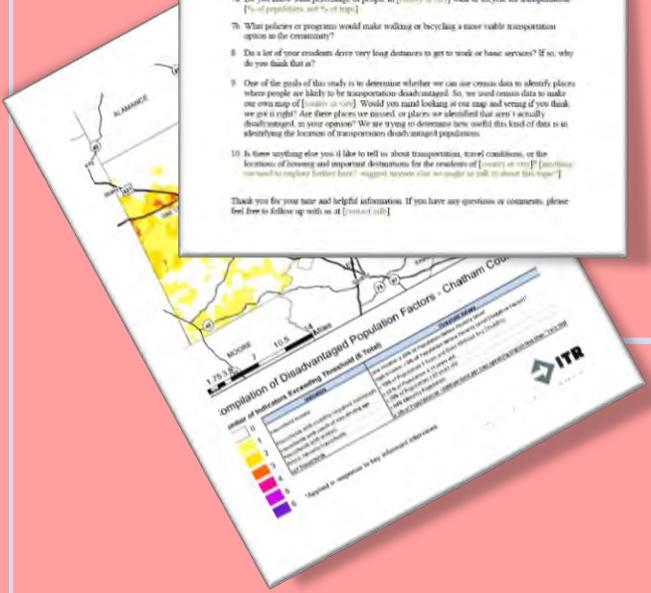
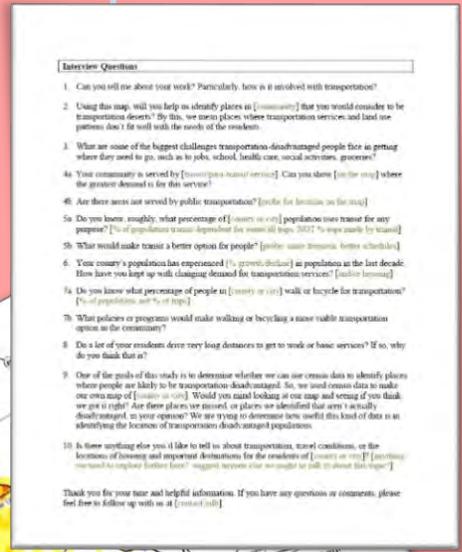
- Economic Development
- Triangle Area Rural Planning Organization (TARPO)
- Pittsboro planning
- Chatham County planning
- Transportation Advisory Committee
- Council on Aging
- Adult Education
- Chatham Transit
- Chatham County Public Health

* The box above shows the key informants interviewed in Chatham County, for this study.



Conducting an effective interview

Interview questions and maps of potential TD hotspots developed in Step 1 provide support for effective interviews with key informants. Asking the right questions and getting pointed feedback can help a practitioner better grasp the level of transportation disadvantage within a specific geography. The next page contains sample questions for key informant interviews.



Practitioner's Note: In the research conducted that informed the contents of this guide, key informants' professional and expert opinions were taken at face value. In order to deal with any informational gaps or biases that an informant may have, it is recommended that multiple key informant interview are held. It is imperative that interview findings are compared to one another and vetted for inconsistencies.

Interview Questions

1. Can you tell me about your work? Particularly, how is it involved with transportation?
2. Using this map, will you help us identify places in [community] that you would consider to be transportation deserts? By this, we mean places where transportation services and land use patterns don't fit well with the needs of the residents.
3. What are some of the biggest challenges transportation-disadvantaged people face in getting where they need to go, such as to jobs, school, health care, social activities, groceries?
- 4a. Your community is served by [transit/para-transit service]. Can you show [on the map] where the greatest demand is for this service?
- 4b. Are there areas not served by public transportation? [probe for location on the map]
- 5a. Do you know, roughly, what percentage of [county or city] population uses transit for any purpose? [% of population transit-dependent for some/all trips. NOT % trips made by transit]
- 5b. What would make transit a better option for people? [probe: more frequent, better schedules]
6. Your county's population has experienced [% growth/decline] in population in the last decade. How have you kept up with changing demand for transportation services? [and/or housing]
- 7a. Do you know what percentage of people in [county or city] walk or bicycle for transportation? [% of population, not % of trips]
- 7b. What policies or programs would make walking or bicycling a more viable transportation option in the community?
8. Do a lot of your residents drive very long distances to get to work or basic services? If so, why do you think that is?
9. One of the goals of this study is to determine whether we can use census data to identify places where people are likely to be transportation-disadvantaged. So, we used census data to make our own map of [county or city]. Would you mind looking at our map and seeing if you think we got it right? Are there places we missed, or places we identified that aren't actually disadvantaged, in your opinion? We are trying to determine how useful this kind of data is in identifying the location of transportation disadvantaged populations.
10. Is there anything else you'd like to tell us about transportation, travel conditions, or the locations of housing and important destinations for the residents of [county or city]? [anything we need to explore further here? suggest anyone else we might talk to about this topic?]

Thank you for your time and helpful information. If you have any questions or comments, please feel free to follow up with us at [contact info].

Asking the Right Questions

Although most people share common goals of access to goods, services and valued activities, transportation-disadvantaged populations may have specific needs (such as access to overnight work shifts or need for medical services), which are exacerbated by more limited travel options.

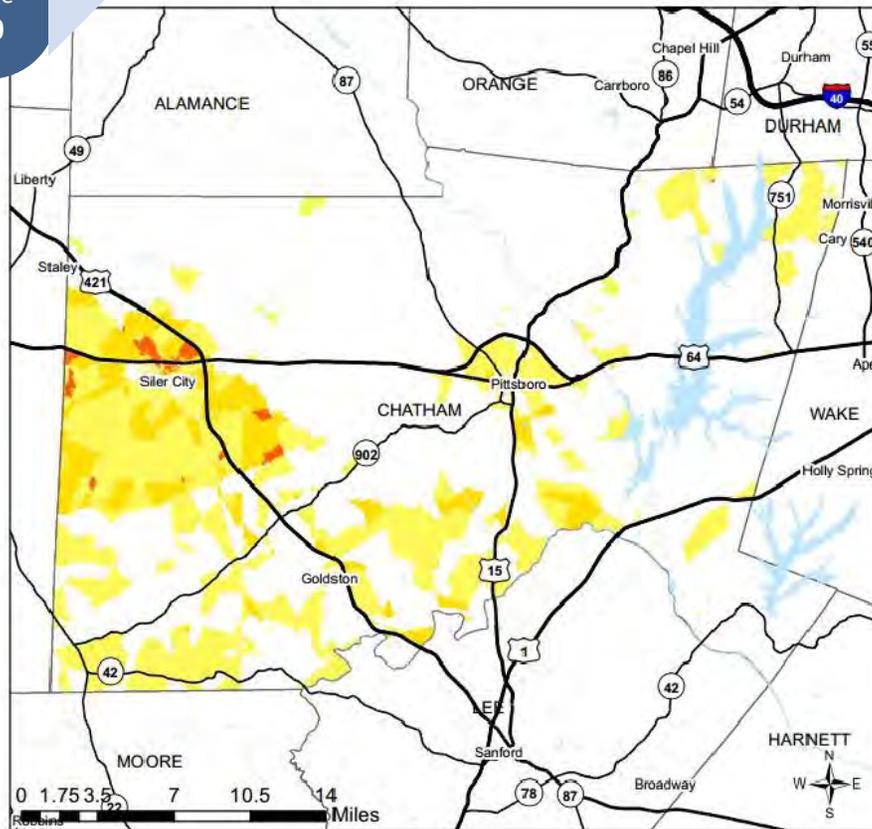
The goal of key informant interviews is to learn about the needs of transportation-disadvantaged populations as understood by local experts whose work relates directly or indirectly to transportation systems and services. Asking the right questions may help inform practitioners of the degree to which a certain population is transportation-disadvantaged. The search for actionable information on TD populations requires a balance between asking common and easily repeatable questions with probing for locally relevant information.

As part of the research project, a sample set of interview questions for a practitioner are provided to the left. These questions were replicated in six counties in North Carolina, and constitute a set of questions that can be expected to elicit useful responses. In addition, they allow room for discussion of locally specific conditions.

The full key informant interview script can be found in the appendix of the guide (p. 34).



To synthesize information from key informant interviews in a meaningful format, see "Step 4."



Compilation of Disadvantaged Population Factors - Chatham County

Number of Indicators Exceeding Threshold (6 Total)

Number of Indicators	Indicators	Threshold Values
0		
1	Household Income	Low Income: ≥ 28% of Population Below Poverty Level High Income: < 8% of Population Below Poverty Level (Negative Factor)*
2	Households with mobility-impaired individuals	< 73% of Population 5 Years and Over Without Any Disability
3	Households with youth of non-driving age	≥ 23 % of Population ≤ 14 years old
3	Households with seniors	≥ 29% of Population ≥ 62 years old
3	Ethnic minority households	≥ 64% Minority Population
4	LEP households	≥ 5% of Population or >1000 persons per tract speaking English less than "Very Well"
5		
6		

*Applied in response to key informant interviews



Chatham County Average: 0.40 indicators

Data Source: 2011 Census Data Table S1701, S1801, P12, B02001, B16001, B08201

Test Maps During Outreach

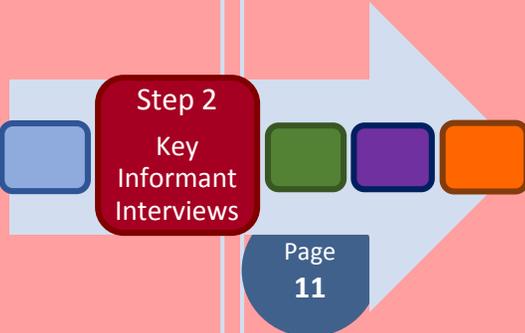
The initial maps generated with Census data provide a great starting place for determining where transportation-disadvantaged populations may be. Key informant interviews provides information that allows map revisions for greater accuracy and local relevance. Local experts provide feedback on the strengths and weaknesses of the compilation maps, and suggest useful and feasible revisions. Residents provide feedback that, combined with key informant information, can serve as a check on the accuracy and relevance of the maps.

Lessons Learned

Key informant interviews revealed that some areas in Chatham County are home to concentrated pockets of higher-income residents, including some retirement communities. To reduce bias and distortion of mapping in these areas with high shares of older residents, which may show up in initial analysis as likely TD hotspots, a correction factor was applied to high-income Census block groups. Similar findings and map revisions were performed in Beaufort County. The application of the correction factor is fully explained in Step 5 (p. 23).



Map information obtained during interviews can be used to revise maps. See "Step 5."



Step 2
Key
Informant
Interviews

Page
11

The next step will discuss how to conduct focus groups. Once focus groups are complete (Step 3), both key informant interviews and focus groups may be analyzed for information that will support map revisions and inform Steps 4-5.

Focus Groups

A focus group is a semi-structured, focused discussion involving 8-12 people selected from the community. In contrast to key informant interviews, where professionals in the community speak on behalf of their constituents, focus group participants speak for themselves. Thus, one of the advantages of focus groups is that they provide a relatively fast way to obtain qualitative data that is rich with personal experiences and grounded in the local community. Another advantage is that the interplay of participants often leads to exploration of issues that may not come to light in one-on-one interviews. On the downside, focus groups can be time-consuming—groups can be difficult to assemble—and the data may be difficult to analyze or interpret.

This section explains how to conduct focus groups by carrying out the following:

- Organizing and convening the focus group
- Undergoing a focus group mapping exercise
- Holding a focus group discussion



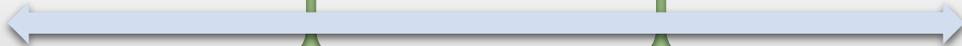
Organize & convene
focus group



Undergo mapping
exercise



Hold discussion



Conducting an effective focus group

In designing a focus group, practitioners should decide whether they want to invite a cross-section of people from the community or a homogenous group, such as the elderly or people with disabilities. In any case, the first step should be to contact a local official, such as a representative of local nonprofit organization or government agency, who is respected and trusted by the community and who is willing to help organize the focus group. Without the assistance of a local partner, it can be difficult to get people to attend the focus group. Offering participants refreshments as well as an incentive, such as a \$20 gift card, will boost attendance. Choosing the right time and venue matters.* Holding the focus group during the day, for example, will exclude those who work from 9-5. One option is to piggy-back the focus group onto an existing meeting, e.g., at the end of a once-a-month meeting of senior citizens.

When conducting a focus group, bring a set of questions, such as those shown at left, that can be used to better understand the dimensions of transportation disadvantage within a community or county. It also helps to prepare, in advance, a hands-on exercise that will get participants thinking and sharing about their own transportation habits, needs and experiences. One option is to engage participants in a mapping exercise, as described on the next page. Finally, it helps to have a trained facilitator lead the focus group—someone who can keep the group on track and encourage everyone to participate.

Directions

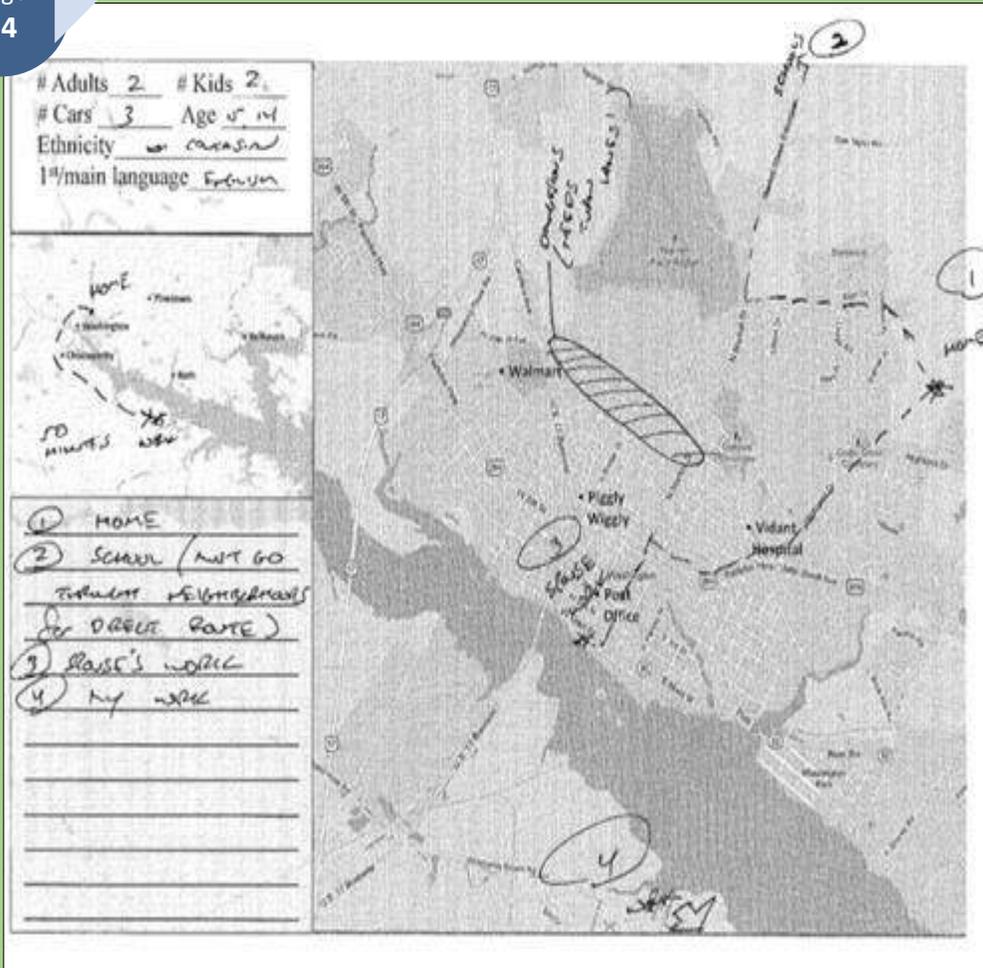
Thank you for taking time to map out your routine travel. After our discussion, we'll return to the maps, and ask for some additional comments.

We'd like to ask a few questions about your transportation options and whether it is easy or difficult for you to get around to your important destinations. We'll write down answers and comments on this card, and also take notes on a laptop. But you may also give comments to any of the team members who are here, and we'll make a note of it. A few ground rules: one person talking at a time, and everyone gets a turn—or turns—if they want to speak up.

- 1) Where do you travel on a routine basis? To get a sense for major destinations, would some of you briefly share what you draw on your maps?
 - a) How about weekend travel? Are your destinations and travel different from weekdays?
 - b) What about rare but important destinations: airport or hospital? How would you get there?
- 2) If on the whole, good? Do you ever use the bus? If no, why not? If yes, how often? Where do you typically go on the bus?
- 3) What works well with your public transportation? What would you like to see improved?
- 4) Is public transit reliable enough to use for important trips, like getting to work or school?
- 5) How often do you walk or bike somewhere? Is it safe? Are there times you can't walk or bike? Why? [probe shelters, crosswalks, sidewalks, lights, facilities, traffic, crime, etc.] Would you let your children walk or bike? Where? Under what conditions? [same, with child]
- 6) Can you recall a situation when you had trouble getting to work, school, or some other place because of a lack of adequate transportation? If yes, ask some to tell the group about their particular situation. How often does this happen?
 - a) Can you describe trips that work well for you, that is, where it's easy, affordable, and convenient for you to get where you need to go?
- 7) For those of you with a car: Could you get around reasonably well without it? Do you spend more, less, or about the same amount of time driving as most people in [county or city]?
 - a) For those of you without a car: In what situations would access to a car be most helpful?
- 8) Are there places you would like to go to, but can't reach? Where?



***Practitioner's Note:** Focus group meetings can be held in conjunction with other public involvement activities that the North Carolina Department of Transportation (NCDOT) undertakes as part of planning and project development activities. For example, during the environmental review process NCDOT conducts Citizen Informational Workshops (CIW). These workshops can provide an excellent opportunity for a focus group session. NCDOT is completing a Public Engagement Toolkit which can also be used to identify synergistic opportunities for outreach associated with identifying transportation-disadvantaged populations. Please contact Jamille Robbins at jarobbins@ncdot.gov for more information on the toolkit.



Mapping Exercise

The goal of focus groups is to obtain actionable information about the needs of transportation-disadvantaged populations, including challenges regarding the availability, accessibility, affordability, and acceptability of transportation options provided in the county.

A mapping exercise helps engage focus group participants—it encourages them to be active participants rather than passive listeners. It also can provide useful information about the specific transportation challenges faced by participants—challenges that may be shared by others in the community. A snapshot of a map is provided at left. For information on how to conduct the focus group mapping exercise see the following page.

How to Conduct the Focus Group Mapping Exercise

1. General Introductions
 - a. Practitioner Name and Title
 - b. Participant Introductions
 - c. Purpose of Exercise: Why are we here?
2. Individual Map Exercise: 10-15 minutes
 - a. Review general information about the map (provide map hints that show major destinations and route to familiarize participants)
 - b. Using your own individual map (anonymous responses):
 - i. Write down number of children and adults in your home
 - ii. Write down your age, ethnicity, first or main language
 - iii. Mark your key locations (home, work, school, recreation, etc.)
 - iv. Draw a line to show what roads you travel on and how (car, foot, bus, etc.)
 - v. Note travel conditions: good or bad sidewalks, heavy traffic, shade, sun or steep slopes
3. General Discussion (Questions on transportation options and how easy or hard it is to get to where you need to go): 30-45 minutes
 - a. Provide rules for discussion (one person at a time, everyone gets a turn if they want to speak, show respect to others)
 - b. Use easel to write responses
 - c. Questions can be found in the appendix, page 36
4. Back of the Map Questions (These questions provide more detailed responses on the availability and accessibility of transportation options as well as challenges and opportunities associated with travel options): 10-15 minutes
 - a. Refer participants to the questions on the back of the original map exercise
 - b. Questions can be found in the appendix materials
5. Wrap up Discussion
 - a. Explain how the information will be utilized in the future
 - b. Provide an opportunity for last minute thoughts or comments
 - c. Provide a follow-up contact

Practitioner's Note: The map and questions were generated for the outreach component of the "Defining North Carolina's Transportation Disadvantaged Populations" project for the North Carolina Department of Transportation. The full focus group script can be found in the appendix of the guide, page 36.

Discussion

Thank you for taking time to map out your routine travel. *After our discussion, we'll return to the maps, and ask for some additional comments.*

We'd like to ask a few questions about your transportation options and whether it is easy or difficult for you to get around to your important destinations. We'll write down answers and comments on this easel, and also take notes on a laptop. But you may also give comments to any of the team members who are here, and we'll make a note of it. A few ground rules: one person talking at a time, and everyone gets a turn—or turns—if they want to speak up.

- 1) Where do you travel on a routine basis? To get a sense for major destinations, would some of you briefly share what you drew on your maps?
 - 1a) How about weekend travel? Are your destinations and travel different from weekdays?
 - 1b) What about rare but important destinations: airport or hospital? How would you get there?
- 2) [For the whole group] Do you ever use the bus? If no, why not? If yes, how often? Where do you typically go on the bus?
- 3) What works well with your public transportation? What would you like to see improved?
- 4) Is public transit reliable enough to use for important trips, like getting to work or school?
- 5) How often do you walk or bike somewhere? Is it safe? Are there times you can't walk or bike? Why? [probe shelters, crosswalks, sidewalks, lights, facilities, traffic, crime, etc.] Would you let your children walk or bike? Where? Under what conditions? [alone, with adult]
- 6) Can you recall a situation when you had trouble getting to work, school, or some other place because of a lack of adequate transportation? [If yes, ask some to tell the group about their particular situation] How often does this happen?
 - 6a) Can you describe trips that work well for you, that is, where it's easy, affordable, and convenient for you to get where you need to go?
- 7) For those of you with a car: Could you get around reasonably well without it? Do you spend more, less, or about the same amount of time driving as most people in [county or city]?
 - 7a) For those of you without a car: In what situations would access to a car be most helpful?
- 8) Are there places you would like to go to, but can't reach? Where?



To synthesize information from focus groups in a meaningful format, see Step 4.

Discussion Questions

The goal of focus group discussions is to encourage dialogue and bring out the rich insights that local populations may have about their transportation challenges. Information obtained from focus groups can help practitioners better serve the transportation needs of vulnerable populations.

A sample set of discussion questions is provided at left. Responses to these questions from focus groups in Beaufort, Chatham, Graham, Warren, and Wilson County can be found in the “Defining North Carolina’s Transportation Disadvantaged Populations” report for the North Carolina Department of Transportation.

Key Findings

In the case studies, focus group discussions brought to light the many transportation challenges faced by different people and some of the ways in which they overcame or coped with these challenges. Some findings were common across county lines, while others were unique to specific counties. A quick snapshot of significant findings from focus group discussions is shown to the left.

Example Key Findings:

- The elderly as well as people with health conditions have a high demand for transportation services
- Under-served populations may reflect local land uses or socioeconomic patterns; examples include community college students or seasonal laborers.
- Eligibility requirements for paratransit are restrictive and often prohibit vulnerable populations
- People attempt to find creative solutions to meet their transportation challenges, but with varying degrees of success.



Step 3
Focus
Groups

Page
17

The next step will discuss how to synthesize information obtained in focus groups and key informant interviews (Step 2) in a way to effectively capture the dimensions of transportation disadvantage within a given area.

Analysis of Outreach

This step discusses a method for organizing and analyzing the information obtained during key informant interviews and focus groups. It demonstrates how to organize the information obtained in the outreach process into themes that reveal unique characteristics of transportation disadvantage within a specific area. This section discusses the following:

- Identifying common themes that emerged during outreach
- Consolidating findings into a brief memo describing unique local features

It is important to remember that key informant interviews and focus groups are an iterative process. The more interviews and focus groups conducted, the more informed a practitioner will likely be regarding the dimensions of transportation disadvantage within a given geography. If a practitioner is missing information about certain aspects of transportation – after organizing and analyzing notes obtained during the outreach process –conducting more interviews or focus groups may be desirable.



Step 4
Analysis of Outreach

Identifying Common Themes

Dominant codes in Beaufort County	Frequency
Informal Solutions	20
Barriers	17
Long distance	17
Ped/Bike	16
SV	15
Transit Supply	13
Access to health care	12
Cost of travel	11

Dominant codes in Wake County	Frequency
Ped/Bike	19
Transit Supply	18
Transportation Planning	12
BELU	8
SV	7
Cost of Travel	6
Long Distance	5
Elderly	5
Informal Solutions	5
Access to Health Care	5

Dominant codes in Graham County	Frequency
Access to health care	14
Informal Solutions	11
Ped/Bike	11
Community Resources	10
Transit Supply	10
SV	7
Challenges of Paratransit	7
Transportation Planning	6
Politics	6
Road Conditions	6
Long Distance	6

Key informant interview and focus group notes should be organized into themes or patterns that reveal the most common transportation issues. The themes that emerge with the highest frequency can be used to indicate transportation issues of the highest priority.

When organizing notes from the outreach process, the following considerations may help common themes emerge:

- Review notes to get an overall picture of salient and common themes
- Highlight important quotations – identify what themes are being discussed
- Determine what topics appear frequently in discussion

The three tables to the left demonstrate the dominant themes that emerged as a result of key informant interviews and focus groups in Wake County, Beaufort County, and Graham County.*

Once dominant themes have been determined, these findings should be recorded and shared. An effective way to display these findings is by composing a brief memo. The components of a memo are discussed on the next page.

Practitioner’s Note: *The research project included case studies of 6 counties. The themes for each county were coded using Atlas software. The method discussed above, obviates the practitioner’s need to purchase AtlasTI software. Themes that emerge with the highest frequency may indicate important areas that need more investigation.

Step 4
Analysis of
Outreach

Creating an effective memo



Consolidate findings into a brief memo that includes:

Practitioners can use a brief memo as a tool to share their main findings from key informant interviews and focus groups. An effective memo will include the following findings:

- Common themes that emerged during the outreach process
- Suggestions on how initial maps can be improved
- Other considerations unique to a specific region

Altogether, these items will provide a meaningful analysis that helps demonstrate the root causes of transportation disadvantage within a given area. This memo will then be used in Step 5.



Unique Considerations

Transportation Challenges specific to Chatham County
Chatham is a Piedmont county with two main small-urban centers: Pittsboro (the county seat with 3,743 people in the 2010 Census) and Siler City (the largest municipality, with 7,857).

- Most of the growth is in Pittsboro and the northeast corner, with heavy demand putting great pressure on the transportation system. The residential and commuting corridor between Pittsboro and Chapel Hill is growing steadily and is home to relatively affluent residents, including several retirement communities. There is also a steady flow of Chatham residents traveling to Chapel Hill's medical campus for employment and care.
- The approved development pipeline includes a million square feet between Pittsboro and Orange County, and over 7000 acres in Chatham Park. Large-scale future development is being promoted NW of Siler City along Route 421, where residents commute out to work.
- The SE corner, near Moncure, is an employment hub; most drive to work in Moncure, which is rural but thriving. Some commute from Sanford; others from Moncure to Sanford.
- Very rural settlements (Goldston, Bennett and Bear Creek) have limited goods, services

Solutions—formal and informal
Chatham ranges from small-urban to very rural, with the latter home to residents who are largely self-sufficient. The county is largely auto-dependent, but some cannot drive.

- With limited transit available, or people unaware or reluctant to use it, carpooling and other shared travel is sometimes the mode employed.
- There is evidence of interest in independent transportation service providers—an opportunity for fostering small independent businesses that would create jobs and fill a service gap.
- The County doesn't provide transportation as part of the Health Department's mothers-and-infants program, so providers go to them. Two-thirds of the clients are located in Siler City.



Map Suggestions

TDF-generated county map
Key informants in Chatham County found the first-round maps of transportation disadvantage to be generally reasonable and in line with their view of where transportation-poor residents may be clustered. They also provided insightful comments on where—and why—the maps diverged from their professional knowledge, and made useful suggestions on revisions to the mapping protocol to bring the maps closer into alignment with conditions on the ground in the county.

- SE Siler City could be expected to be darker than it is, because of job loss and the large Hispanic population; dark colors in N and NW Siler match up with populations located there.
- Some rural areas in the southwest county show up lighter than might be expected.
- A colored area SW of Pittsboro is not surprising, given the elderly there, but Pittsboro proper isn't as dark as might be expected given the many elderly, including retirement communities.
- Colored areas near Moncure may be industrial or utility, rather than transportation deserts.
- The colored areas between Pittsboro and Chapel Hill likely reflect the large share of older residents, but some are affluent residents of Governors Club, Carolina Meadows, and others.
- Transportation deserts in Goldston, Bear Creek, Silk Hope, Bontlee, and Bennett (not entirely clear on maps) may be a result of the gap in service connections for rural residents.
- Mapping could be improved with some filters, such as high-income retirees, presence of numerous services/destinations, or property values. Clipping out irrelevant parcels (federal property like Corps of Engineers or game lands) would make colored areas more informative.



Common Themes

Memoranda from the interviews
Chatham has an active planning culture with a distinctive socio-demographic challenge, given its location near Chapel Hill to the northeast and the associated growth, pressure, and its rural character and less affluent population in most of the rest of the county.

- The county has a complex study underway for US-501 between Pittsboro and Chapel Hill, where it anticipates more traffic and congestion, given planned and future development. Possible solutions to counter and anticipate congestion include signal timing, intersection improvements and new lights. A study of route 711 is looking at the case of 4-laning, Route 66 currently is well-controlled, with travel from Pittsboro to Apex taking only 20 minutes.
- Proposals for CMAQ (congestion mitigation and air quality) funds are more likely to flow to Chapel Hill-Carroll/Durham MPO (Metropolitan Planning Organization) than to TARPO. TARPO has a technical committee linking all planners working in that use.

Pittsboro population in Chatham County
Chatham County has significant populations of some traditionally vulnerable populations, with some specific features:

- The elderly in Chatham include relatively affluent retirees in the northeast and around Lake Jordan, and less affluent (often Chatham natives) elsewhere.
- Although Siler City is the largest municipality, Pittsboro is home to most county social and medical services, including the only DHS office, Sanford has a Social Security office.
- Siler City has a large Hispanic population, many of whom moved on after areas after several major employers left the county (such as a plastics processor that took down 2002 plant); so Siler's population remains mostly white. Siler has a community college, satellite health clinics, and several non-profits: Hospice Lincoln, Chatham Together, Chatham Trades. Some residents reside in Siler but travel often to Randolph County for work, or near to Moncure.

Transportation infrastructure and supply
Chatham County's transportation network reflects its proximity to bustling Chapel Hill as well as its more rural and underdeveloped reaches to the south and west.

- Chapel Hill Transit runs fee-based services in Pittsboro, serving commuting employees of UNC-Chapel Hill and UNC Hospitals, as well as patients.
- Transistar serves the county with small vans, but demand exceeds supply. There is no transit from Siler to Goldston, and perceived poor connections from Siler City's W-8-Siler (not used) to the rest of the county are unaware of Chatham Transit's fee-for-service to downtown Siler. Fee-for-service to Chapel Hill Transit is under-developed. Transit would benefit from more routes, better timeliness, and possible service to Sanford and aspects.
- Non-outdoor-travel frequency is low—possibly lower than transit use. Walking accidents also is very low, there is little sidewalk mileage outside of the towns. Planners must improve bicycle and pedestrian capacity, but dollars and political support are still lacking.
- Bicycling activity is largely recreational, including Jordan Lake tri-cycle-walks, although there are some commuters in the northeast toward Orange and Durham counties. Infrastructure currently is limited. Pittsboro has a bike plan, and Goldston has one on the way.

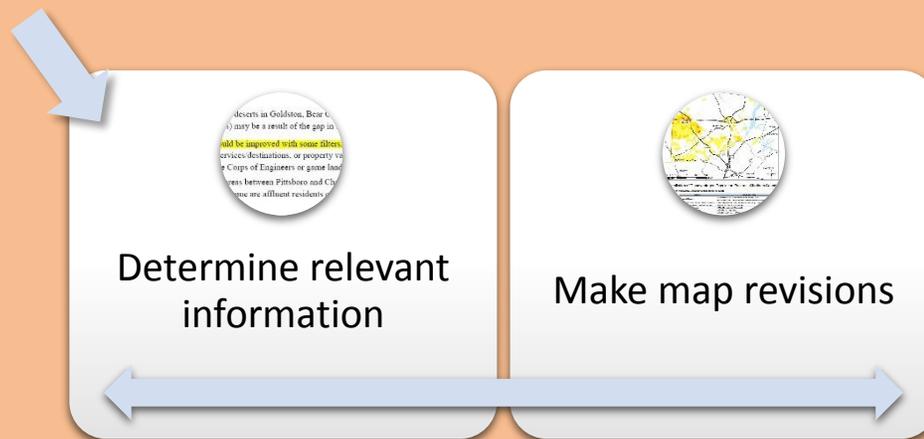


For information on drafting a memo see examples in the appendix, page 38.

Map Revisions

This step discusses refining the initial Census data maps (Step 1) in light of information gained during the outreach process (Steps 2-4). The brief memo, created in Step 4, may be useful in making map revisions. This section discusses the following:

- Determining what information is relevant for map revisions
- Making map revisions



Guiding information for map revisions

After the completion of Step 4, a practitioner should have unique regional considerations, common themes, and map suggestions from the outreach process consolidated into a brief memo. This information can be used to inform any necessary map revisions.

Example information from research project case study counties that may be helpful when considering map revisions:

- **Areas on the map that key informants felt were inaccurate or limited:**
 - Irrelevant parcels of land like federal property, forests, farmland, or game lands
 - Concentrations of affluent elderly populations
 - Areas of deep job loss or unemployment due to business migration
 - Trailer parks or other temporarily populated areas that are not captured in Census data
- **Potentially vulnerable populations that were not initially tracked:**
 - Transient or short-term laborers
 - College students
 - Populations with medical needs
 - Isolated rural individuals
 - Urban poor individuals
 - Other populations discussed during the outreach process
- **Locally specific characteristics:**
 - Geographic or built environment factors that increase the risk of transportation disadvantage (rivers or land features that affect a specific region, interstates or high-traffic corridors, etc.)
 - Urban/rural divide

The bullet points above convey the types of information that can guide map revisions. On the following page, information obtained from the outreach process in Chatham County is used as an example for making map revisions.

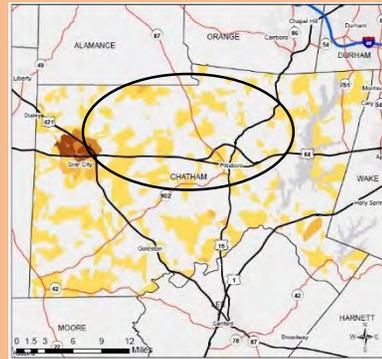
Chatham County map revisions

Key informant interviews in Chatham County led to a new way to think about income as an indicator for transportation-disadvantage. Unlike other indicators, income can signify advantage or disadvantage. For example, in instances where individuals possessed a high degree of wealth, key informants suggested that wealth can compensate to pay for transportation services that others cannot afford. In Chatham County, specifically, it was reasoned that this was the case for wealthy seniors in the Governor's Club, Carolina Meadows, and the Preserve at Amberly. In order to systematically address the advantage that high-income provides, a correction factor of -1 was applied to populations beyond two standard deviations of the statewide county average for houses below the poverty level. Once the correction factor was applied the circled areas were no longer of potential concern.

High-income as an Indicator for Map Revisions

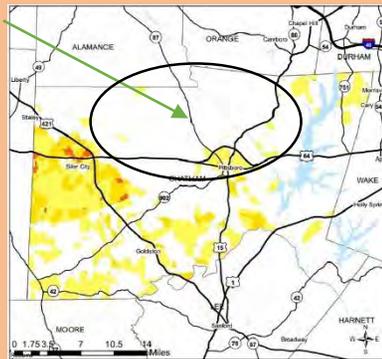
Step 1: Initial Mapping

The circled area shows pockets from preliminary mapping, in which key informants felt did not truly capture disadvantage.



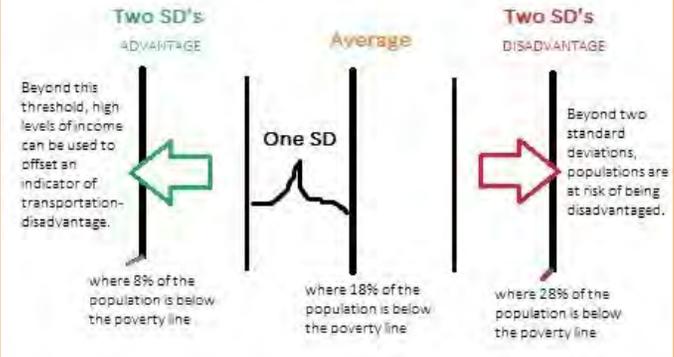
Step 5: Map Revisions

A factor of -1 was applied to areas where ≤ 8 percent of the population is below poverty level. After the factor was applied, the circled areas were no longer of potential concern.



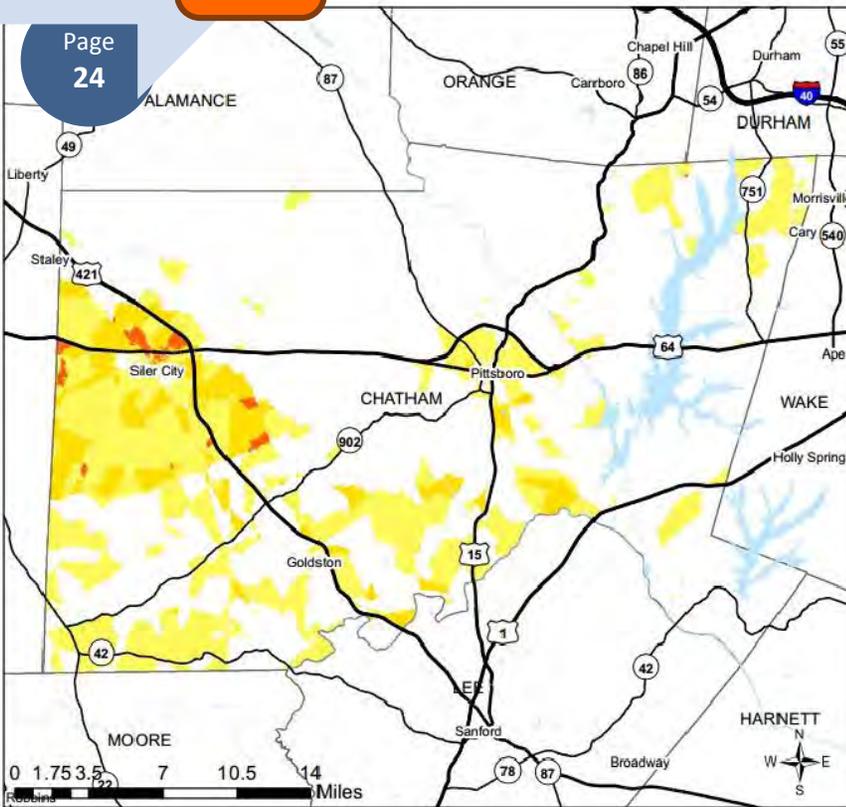
Income Example

Statewide County Average = 18%
Standard Deviation (SD) = 5%



The image above shows how income level can be used to map transportation-advantage or- disadvantage. For step-by-step instructions on how to map indicators with the standard deviation process see following page.

Step 5
Map
Revisions



Compilation of Disadvantaged Population Factors - Chatham County

Number of Indicators Exceeding Threshold (6 Total)

Number of Indicators	Indicators	Threshold Values
0		
1	Household Income	Low Income: $\geq 28\%$ of Population Below Poverty Level High Income: $< 8\%$ of Population Below Poverty Level (Negative Factor)*
2	Households with mobility-impaired individuals	$< 73\%$ of Population 5 Years and Over Without Any Disability
2	Households with youth of non-driving age	$\geq 23\%$ of Population ≤ 14 years old
3	Households with seniors	$\geq 29\%$ of Population ≥ 62 years old
3	Ethnic minority households	$\geq 64\%$ Minority Population
3	LEP households	$\geq 5\%$ of Population or >1000 persons per tract speaking English less than "Very Well"
4		
5		
6		

*Applied in response to key informant interviews



Chatham County Average: **0.40 indicators**

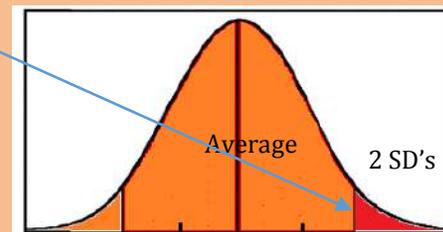
Data Source: 2011 Census Data Table S1701, S1801, P12, B02001, B16001, B08201

The Mapping Process: Pulling It All Together

At this point, initial maps have been revised based on information gained from key informant interviews and focus groups. The goal of the iterative mapping process, carried out in Steps 1-5, is to identify where populations may be in the greatest need of transportation infrastructure and services.

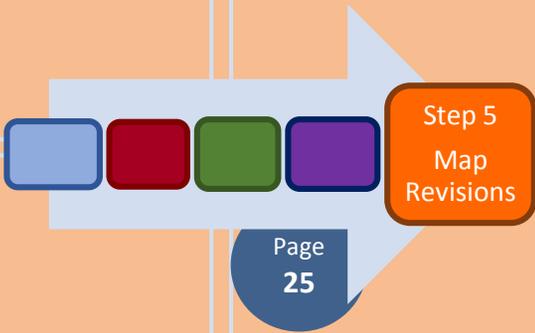
The map to the left shows a revised map of where transportation-disadvantaged populations are most likely to exist within Chatham County. The colored areas on the map denote locations where one or more indicators have reached a critical threshold.

For each indicator, the statewide average was calculated. Then two standard deviations away from this average is set as the critical threshold. In instances where an indicator has reached the critical threshold, it is given a factor of positive one, and then factors are mapped. In Chatham County, for example (map on left), up to four indicators reached a critical threshold in certain areas. A factor of +1 was mapped for low-income, households with youth of non-driving age, households with seniors, Limited-English Proficiency households and a -1 was mapped for high-income. (Considerations for a factor of -1, are discussed on the previous page.)



Indicators are mapped when populations exceed the two standard deviation threshold.

The image above shows a statistical rendering of how indicators are mapped. For step-by-step instructions on how to calculate the standard deviation see the appendix, page 73.



Step 5
Map
Revisions

Page
25

After completing steps 1-5, practitioners will have a brief memo of findings and a revised compilation map, which demonstrate areas with populations at risk of being transportation disadvantaged. Further considerations for addressing transportation disadvantage are discussed in a conceptual framework discussed in the next section of this guide.

The graphic features the text 'The 4A Conceptual Framework' in a large, bold, black serif font. To the right of the text, four interlocking puzzle pieces are arranged in a cluster. The pieces are dark grey, with one piece in the center being a light tan color. Each piece is labeled with one of the four dimensions: 'Availability' (top-left), 'Affordability' (top-right), 'Accessibility' (center, on the tan piece), and 'Acceptability' (bottom-right).

The 4A Conceptual Framework

The focus of this guide has been on locating and defining populations that are transportation-disadvantaged. The process described to this point provided step-by-step instructions on how to collect preliminary information on the characteristics of these populations as well as other useful information that can help practitioners begin to understand why these populations may be disadvantaged. However, in order to understand how transportation programs, policies and activities may affect these populations a framework that concisely organizes key considerations of transportation disadvantaged populations is important. Just such a framework emerged from research conducted by Konstantinos Panou in 2012.

This framework is simple yet brilliant in that it succinctly captures all dimensions of concern that may be experienced by transportation-disadvantaged populations. It also reflects both built environment and transportation supply considerations that are central to identifying the needs of these populations. This framework's four dimensions, known as the 4As, include the following:

- **Availability** - *Are transportation services offered and are they provided at a time that meets users' needs?*
- **Affordability** - *Is mobility available at a cost that is proportionate to users' ability to pay?*
- **Accessibility** - *Are transportation services and facilities usable and within users' proximity?*
- **Acceptability** - *Are transportation services and facilities appropriate to meet the needs of intended users?*

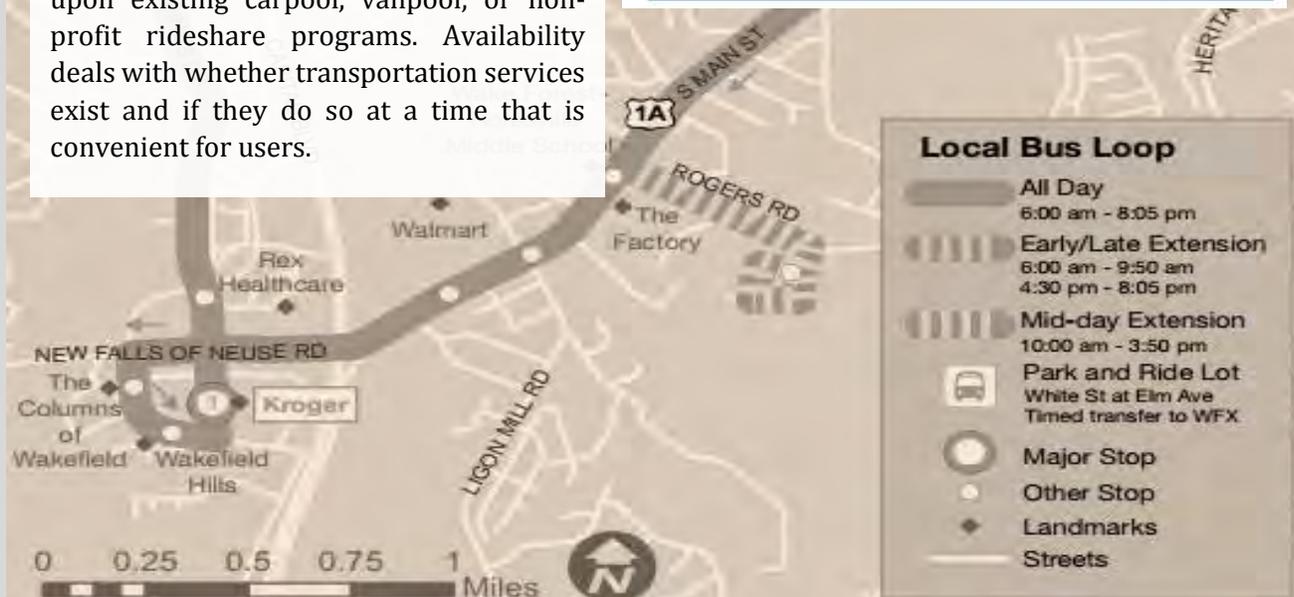
The novelty of the 4A framework is not in its subject matter – most transportation processes already consider availability, affordability, accessibility, and acceptability in some manner. However, when considering the many phases in transportation decision-making from planning to project development, construction, operations and maintenance these dimensions may be characterized differently by varying procedural terminology. The 4A framework provides practitioners with a standard language from planning through to operations and maintenance such that issues of concern to transportation disadvantaged populations can be articulated consistently, systematically and concisely for the benefit of identifying meaningful solutions. The framework's dimensions can also be used to benchmark performance metrics for different geographies over time to evaluate the effects of transportation investments on transportation-disadvantaged populations. In addition, these dimensions can be used as evaluation criteria to compare different scenarios or alternatives. The following information is provided to help practitioners understand each dimension of the 4A framework. It is only a starting point to help frame considerations that may be useful.

Availability:

Are transportation services offered and are they provided at a time that meets users' needs?

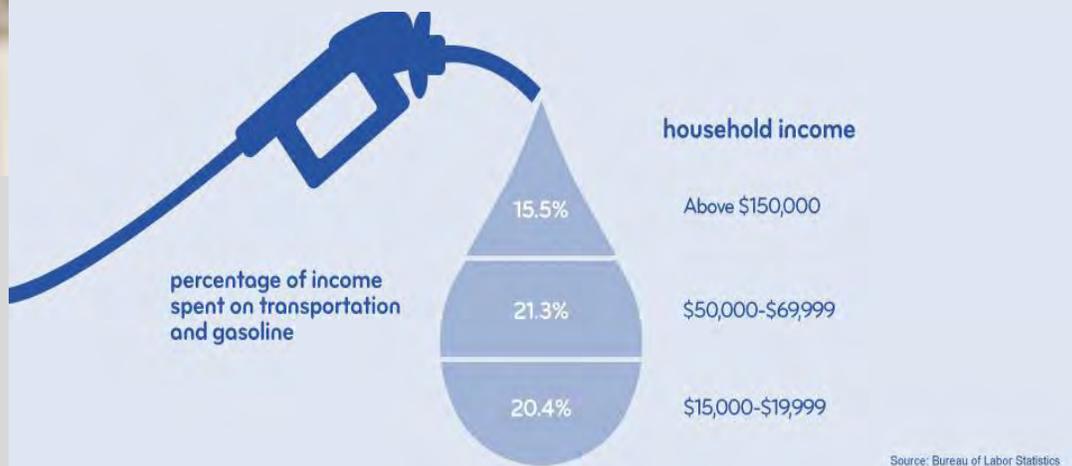
The key overarching considerations related to availability includes evaluating if transportation services exist and whether they are provided at a time that meets users' needs. For example, does a county provide sufficient public transportation or sidewalk and bike facilities for its residents? Another way to look at availability is to ask if bus or other transit services are available when users need to commute to or from work? For instance, a night-shift employee may desire to bus to work, but may not have this service available at the time s/he requires. This could also be applicable to a community college student who wishes to bike to class or work, but does not have bike or sidewalk facilities available to do so. Other issues with availability may include expanding upon existing carpool, vanpool, or non-profit rideshare programs. Availability deals with whether transportation services exist and if they do so at a time that is convenient for users.

Departure Times at Major Stops					
Park and Ride Lot South White Street and Elm Avenue	Kroger Wakefield Commons 14460 New Falls of Neuse Rd.	Lowes Foods 12524 Capital Blvd.	CVS Pharmacy North White Street and Roosevelt	Park and Ride Lot South White Street and Elm Avenue	
Mid-day Extension		1	2	3	Early/Late Extension
6:00 am	6:15 am	6:30 am	6:35 am	6:50 am	
7:00 am	7:15 am	7:30 am	7:35 am	7:50 am	
8:00 am	8:15 am	8:30 am	8:35 am	8:50 am	
9:00 am	9:15 am	9:30 am	9:35 am	9:50 am	
10:00 am	10:15 am	10:30 am	10:35 am	10:50 am	
11:00 am	11:15 am	11:30 am	11:35 am	11:50 am	
12:00 pm	12:15 pm	12:30 pm	12:35 pm	12:50 pm	
1:00 pm	1:15 pm	1:30 pm	1:35 pm	1:50 pm	
2:00 pm	2:15 pm	2:30 pm	2:35 pm	2:50 pm	
3:00 pm	3:15 pm	3:30 pm	3:35 pm	3:50 pm	
4:30 pm	4:45 pm	5:00 pm	5:05 pm	5:20 pm	
5:30 pm	5:45 pm	6:00 pm	6:05 pm	6:20 pm	
6:30 pm	6:45 pm	7:00 pm	7:05 pm	7:20 pm	
7:30 pm	7:45 pm	8:00 pm	8:05 pm	by request	



Affordability:

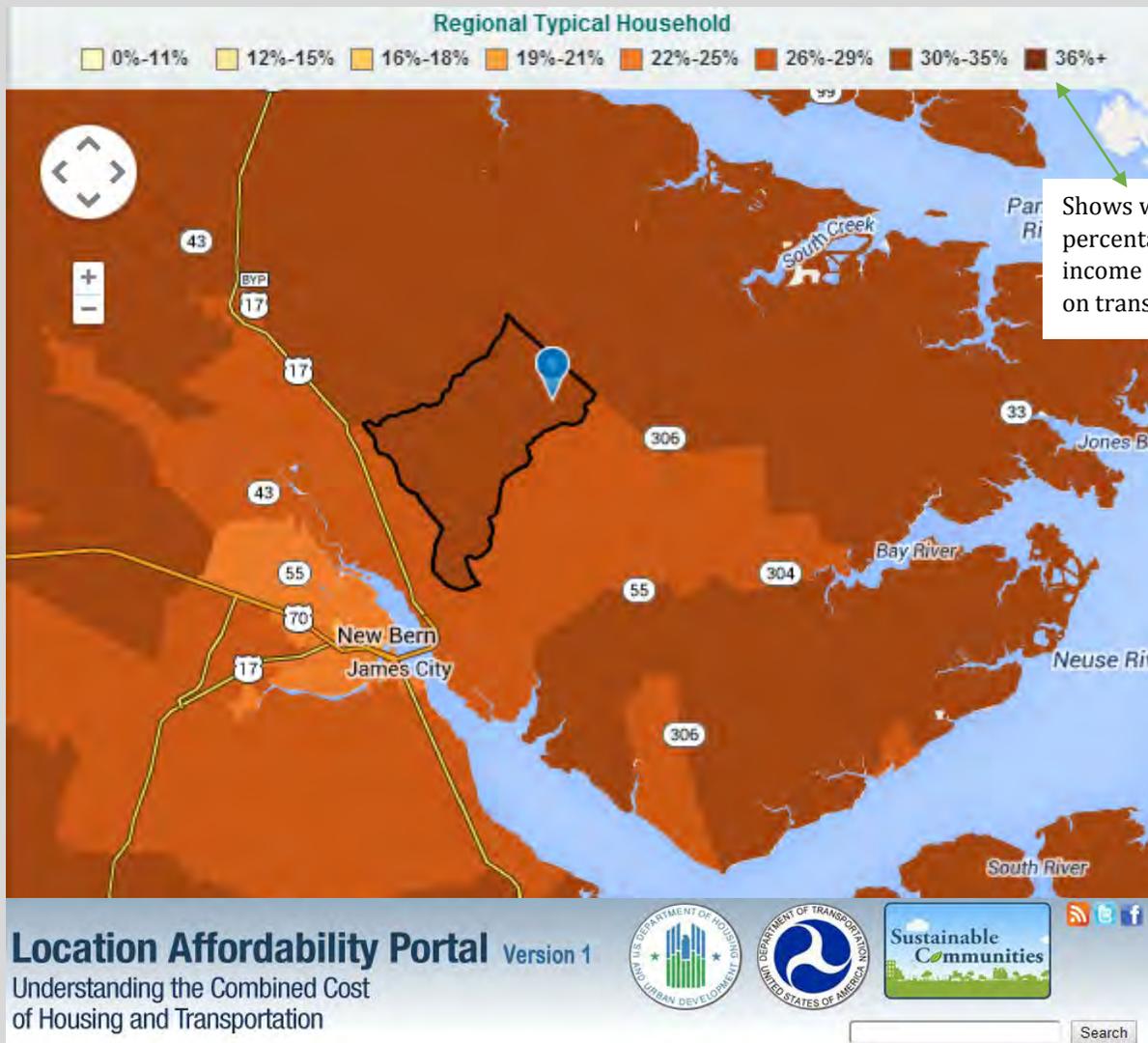
Is mobility available at a cost that is proportionate to users' ability to pay?



Flat-Rate Fares	
Downtown Cary (Train St.) - RDU	\$19.00
Downtown Apex - RDU	\$29.00
Downtown Holly Springs - RDU	\$45.00
Downtown Morrisville - RDU	\$15.00
Downtown Raleigh - RDU	\$29.00
Downtown Knightdale - RDU	\$45.00
Downtown Durham - RDU	\$29.00

The key overarching consideration related to affordability is whether transportation services are available at a cost proportionate to users' ability to pay. For example, paratransit service may be available for a senior in need of a medical trip; however, that service may be provided at a cost that is too high for that service. For instance, a round-trip paratransit fare from Watauga County to Charlotte would cost a senior \$50, which may be too high for his/her living situation. Other issues with affordability may include how transportation project alternatives may affect vulnerable populations. For example, express-lane tolling, cordon pricing, or other forms of traffic demand management may disproportionately affect transportation-disadvantaged populations if affordability issues are not taken into consideration.

A great tool that practitioners can use to understand affordability issues at the county, city, or regional level is available through the U.S. Department of Housing and Urban Development's Location Affordability Portal. This online application is discussed on the following page.



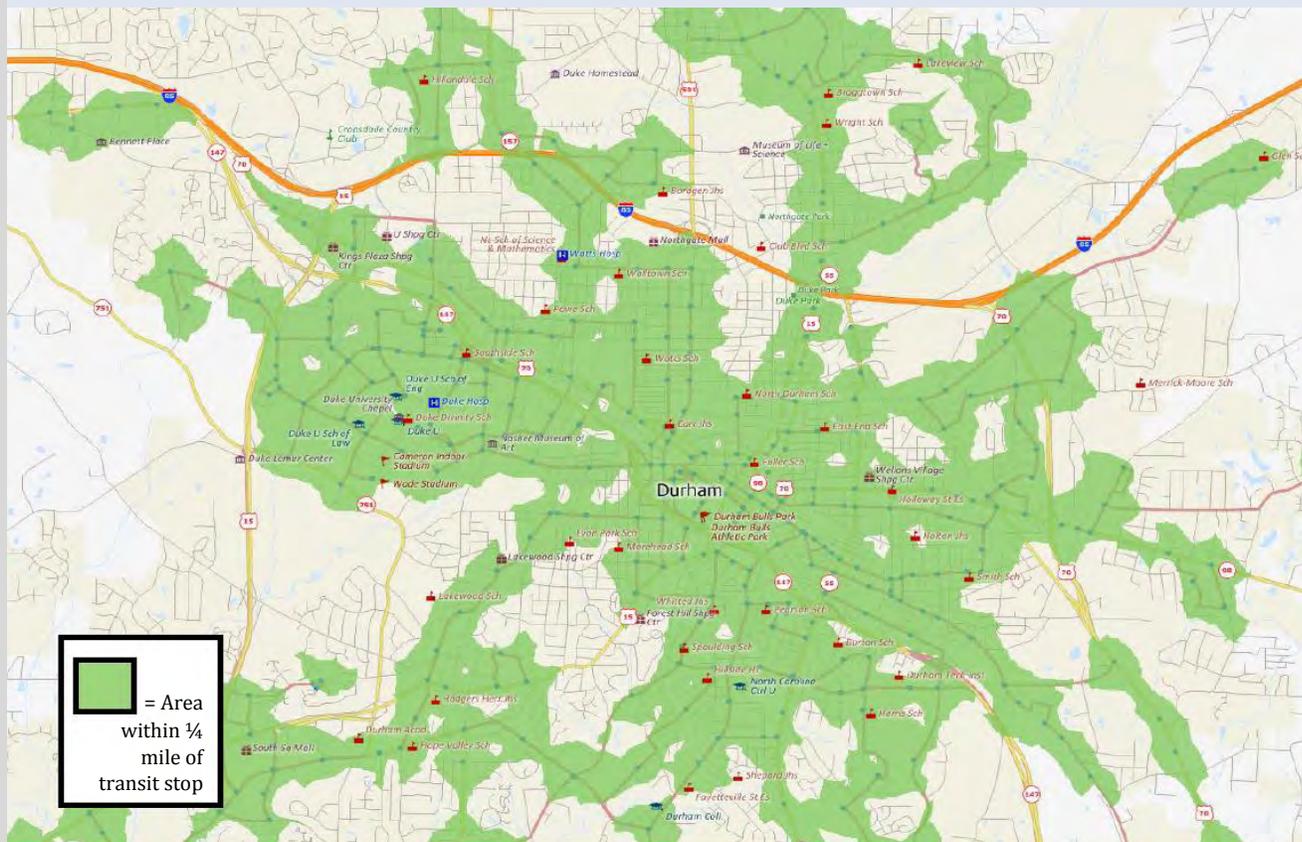
The U.S. Department of Housing and Urban Development's Location Affordability Portal enables practitioners to see housing and transportation costs, as a share of a household's income. For example, the image above shows that the households within, and surrounding, Craven County spend around 30 percent of their income on transportation. When visiting the portal a practitioner can see the typical annual income for a household within a particular county, city, or region, the typical household size, the typical number of commuters within that household, and how much a typical household spends on housing and/or transportation.* For instance, in Craven County, the average annual income is \$43,534, the average household size is 2.36 people, there are 0.98 commuters per household, and the average household spends 30 percent of its income on transportation.

This portal is a good starting place to grasp the overall cost of transportation for users within a specific area.

Practitioner's Note: *The Location Affordability Portal is constructed at the Census block group level using the 2010 American Community Survey (ACS) 5-year estimates as the primary dataset for input parameters and measured data for the dependent variables. The portal is constructed to cover all metropolitan and micropolitan areas in the United States, or Core Based Statistical Areas (CBSAs), as defined by the Office of Management and Budget (OMB). The portal can be accessed via the web: http://www.locationaffordability.info/lai.aspx?url=user_guide.php.

Accessibility:

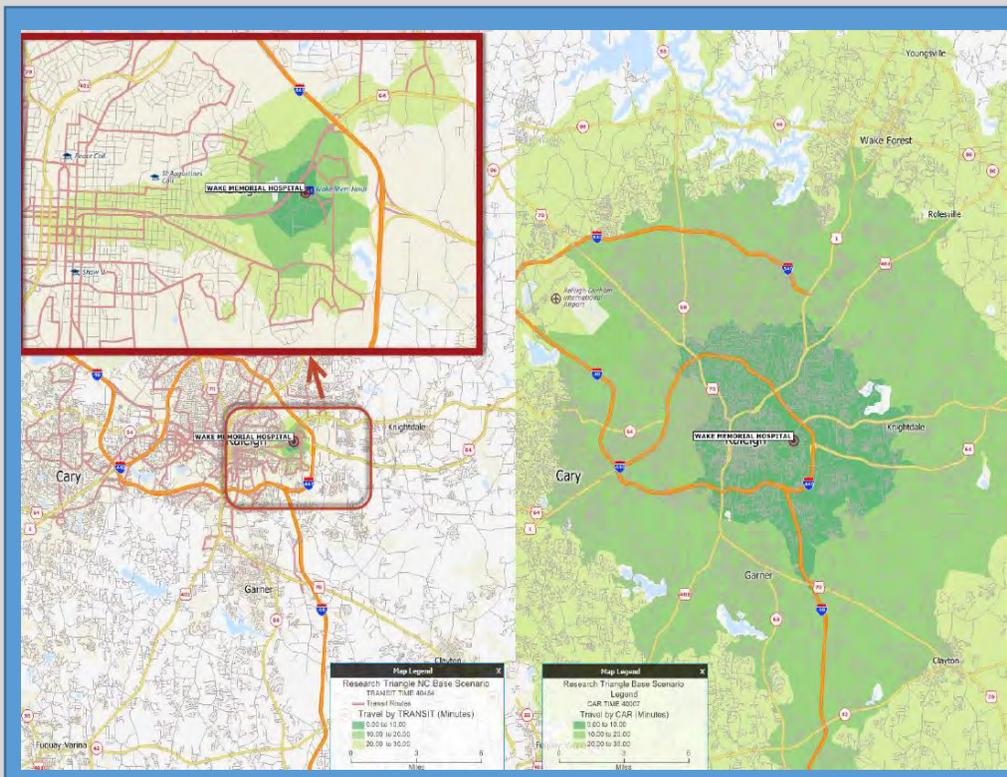
Are transportation services and facilities usable and within users' proximity?



The image above shows which locations are within a quarter-mile of a transit stop. The image was taken from Morgan State University's presentation on the Environmental Justice in Transportation Toolkit Project in July 2013.

The key overarching considerations related to accessibility includes evaluating if transportation services and facilities are provided within a proximity that meets the needs of users, and whether built environment or geographical features limit individuals' abilities to access nearby destinations. For example, is there a bus stop within a half-mile walk of its intended users? Or, does the location of an interstate or a river prevent individuals from reaching a desired location? Another way to gauge accessibility is to pinpoint what challenges arise for users who are trying to get from their origins to their destinations. For example, for individuals interested in walking to a nearby grocery store, are sidewalks available for their trips?

Another component of accessibility deals with how accessible destinations are given current transportation services and facilities. The *Accessibility Calculator* discussed on the following page, deals with the accessibility of destinations within a given area. It is a useful tool for practitioners to understand many of the accessibility considerations within a given area.



The images show how accessible WakeMed is to individuals living in and around Raleigh by car and bus. The image to the far left corner shows accessibility by transit; it is smaller, reflecting a dimension of less accessibility.

Field	Value (1/4 mile)	Whole Region	Percentage
Population	277,384	1,641,484	16%
Hispanic Origin	38,514	169,924	22%
White	129,845	1,000,210	13%
Black	88,460	370,809	24%
American Indian	1,294	8,984	14%
Asian	16,751	79,224	21%
Median Income	43,027	60,785	
Avg. Per Capita Income	25,795	30,379	
Median Family Income	59,037	73,080	

The table to the left shows how accessible transit stops are to populations within a given region. In this instance, 16 percent of the total population is within a quarter-mile of a transit stop. Meanwhile 22% Hispanic origin, 13 % white, 24% Black, 14 % American Indian, and 21% Asian are within a quarter-mile of a transit stop.

The Accessibility Calculator (under development), created by the Transportation Equity Cooperative Research Program, demonstrates the number of destinations (jobs, schools, medical facilities, etc.) that can be reached from a neighborhood in a given amount of time. In addition to providing the number of destinations that can be reached, the calculator gives a composite score based on reachable destinations by public transportation. The images above show different ways the accessibility calculator enables the practitioner to conceptualize accessibility within a region.

Acceptability:

Are transportation services and facilities appropriate to meet the needs of intended users?



The key overarching considerations related to acceptability includes evaluating if services and facilities are appropriate to meet the needs of the intended users. This is similar to accessibility but more focused on the perception of the user. For example, a non-driving senior may desire to walk a short distance to purchase a few groceries or eat at a nearby restaurant, but the sidewalk condition intimidates the senior due to fear of injury. This could also be applicable to a senior who desires to drive specific location, but his/her destination route is a high-speed roadway of which s/he feels uncomfortable driving for fear of collision. Other issues with acceptability may include safety considerations for youth desiring to walk or bike to school, events, or to a friend's house. For example, multi-lane roadways that must be crossed could be viewed as a barrier that is considered unacceptable to parents of children who desire to travel to a destination by foot or bike. Other acceptability considerations include weather and sense of security at transit stops or other public transportation access points. Acceptability is more about how people perceive their journeys rather than how much time it takes them or how much it costs them. Surveys, focus groups, and site visits with affected populations are all good tools to use to understand how affected populations view their acceptability of potential transportation options.

Practitioner's Note: This research did not fully operationalize the 4A framework. However, the general philosophy of each dimension was incorporated in the qualitative research conducted through the outreach effort. Future research could develop more quantitative information related to the four dimensions.

Appendix

Identifying Transportation-Disadvantaged Populations | Practitioner Guide

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Transportation deserts and transportation disadvantage

Key informant script and questions

These interviews are part of a project to understand what factors may explain which citizens are at risk of “transportation disadvantage,” meaning that their transportation options do not match well with their needs to travel to work, shopping, services and other activities. For this project, “key informants” are professionals such as planners or local government officials, or other local leaders knowledgeable about the residents of the community and about transportation patterns and options.

We are interested in learning about how easy or difficult it is for residents to get around to important destinations. In addition to interviewing key informants, we are meeting separately with a group of citizens to ask about their travel habits and needs.

Informed Consent

We appreciate your willingness to share your time and knowledge with us. This interview will last about a half-hour. We have taken steps to assure careful handling of the information you share with us. This includes limited access to the audiotapes and transcribed interviews (limited to seven undergraduate students, two graduate students, and three faculty advisors). You may choose not to answer any questions that you do not wish to answer. You may end this interview at any time for any reason. We will provide you with a transcript of the interview to review for accuracy.

We will not identify you or use any information that would make it possible for anyone to identify you in any presentation or written reports about this study. However, we note that you are a key informant with exposure in your community, and as such your views already may be well-known and your identity guessed by readers. There is no known potential harm to you for participating in this interview. There is no compensation for your participation. We will ask for your oral consent to be interviewed and recorded before we begin asking questions.

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject, or if you would like to obtain information or offer input, you may contact the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu. This project is IRB study #13-1531.

Interview Questions

Thank you for taking the time to meet with us today. I’m [name], and this is my colleague [name].

We are here in [county or city] today as part of a project to understand the factors that may help explain which people are at risk of experiencing “transportation-disadvantage,” meaning that their need to travel to get to goods, services, and activities they value does not match well with their available transportation options.

We'd like to audiotape this conversation, so that we can refer back to it for accuracy. Is that ok with you? If so, we'll start taping now.

1. Can you tell me about your work? Particularly, how is it involved with transportation?
2. Using this map, will you help us identify places in [community] that you would consider to be transportation deserts? By this, we mean places where transportation services and land use patterns don't fit well with the needs of the residents.
3. What are some of the biggest challenges transportation-disadvantaged people face in getting where they need to go, such as to jobs, school, health care, social activities, groceries?
- 4a. Your community is served by [transit/para-transit service]. Can you show [on the map] where the greatest demand is for this service?
- 4b. Are there areas not served by public transportation? [probe for location on the map]
- 5a. Do you know, roughly, what percentage of [county or city] population uses transit for any purpose? [% of population transit-dependent for some/all trips, NOT % trips made by transit]
- 5b. What would make transit a better option for people? [probe: more frequent, better schedules]
6. Your county's population has experienced [% growth/decline] in population in the last decade. How have you kept up with changing demand for transportation services? [and/or housing]
- 7a. Do you know what percentage of people in [county or city] walk or bicycle for transportation? [% of population, not % of trips]
- 7b. What policies or programs would make walking or bicycling a more viable transportation option in the community?
8. Do a lot of your residents drive very long distances to get to work or basic services? If so, why do you think that is?
9. One of the goals of this study is to determine whether we can use census data to identify places where people are likely to be transportation-disadvantaged. So, we used census data to make our own map of [county or city]. Would you mind looking at our map and seeing if you think we got it right? Are there places we missed, or places we identified that aren't actually disadvantaged, in your opinion? We are trying to determine how useful this kind of data is in identifying the location of transportation disadvantaged populations.
10. Is there anything else you'd like to tell us about transportation, travel conditions, or the locations of housing and important destinations for the residents of [county or city]? [anything we need to explore further here? suggest anyone else we might to talk to about this topic?]

Thank you for your time and helpful information. If you have any questions or comments, please feel free to follow up with us at [contact info].



Transportation deserts and transportation poverty

Focus group—mapping exercise and discussion

Mapping exercise

Thank you for taking time to meet with us this [afternoon or evening]. My name is [name], and I'm here with my co-workers [name] and [name]. We are here [in county or city] today as part of a project to understand what factors may explain which citizens are at risk of “transportation disadvantage,” meaning that their transportation options do not match well with their needs to travel to work, shopping, services and other activities. We'd like to do quick introductions, just going around the room: your first name [and, if appropriate, city of residence, or some other item].

We are interested in learning about how easy or difficult it is for you here in [county or city] to get around to important destinations. We want to start by spending 10 minutes on individual maps of [county or city], then have a discussion about your daily lives and routines and your travel options.

You each have a map of [county or city and nearby region], showing roads and major features [provide some map-reading hints, like: “here's the intersection of Columbia and Franklin; here's the municipal parking deck; and here's MLK heading north toward Timberlyne”].

We don't need your name or address; the maps will be kept anonymous. But please write down the number of children and adults in your household here [hold up map and show blank lines] and how many cars you have, if any. We'd also like to know your age, ethnicity, and your first or main language. This may be useful context as we learn about why residents of some areas find it easier or harder to get around and meet their routine household needs and participate in various activities.

Please mark your own key locations, like home, work, school, recreation or other common destinations. Then draw in your connections from home to major regular destinations, and write down how you travel, for example, walk, bus, drive, or carpool. Please also note travel conditions, such as heavy traffic or congestion, good or bad sidewalks, shade or sun, or steep slopes. We don't need to know your actual route, although drawing it out may help you remember where you go.

Here's an example, with this person's home, school, job, park, and grocery store marked on the map. She drew a line from home to these locations and wrote down how she usually travels: walk to the grocery store and elementary school, both along decent sidewalks, and bus to work.

If you have any questions, just flag down one of us wearing names tags. [~10 mins for map work]

Discussion

Thank you for taking time to map out your routine travel. *After our discussion, we'll return to the maps, and ask for some additional comments.*

We'd like to ask a few questions about your transportation options and whether it is easy or difficult for you to get around to your important destinations. We'll write down answers and comments on this easel, and also take notes on a laptop. But you may also give comments to any of the team members who are here, and we'll make a note of it. A few ground rules: one person talking at a time, and everyone gets a turn—or turns—if they want to speak up.

- 1) Where do you travel on a routine basis? To get a sense for major destinations, would some of you briefly share what you drew on your maps?

- 1a) How about weekend travel? Are your destinations and travel different from weekdays?
 1b) What about rare but important destinations: airport or hospital? How would you get there?
- 2) [For the whole group] Do you ever use the bus? If no, why not? If yes, how often?
 Where do you typically go on the bus?
- 3) What works well with your public transportation? What would you like to see improved?
- 4) Is public transit reliable enough to use for important trips, like getting to work or school?
- 5) How often do you walk or bike somewhere? Is it safe? Are there times you can't walk or bike?
 Why? [probe shelters, crosswalks, sidewalks, lights, facilities, traffic, crime, etc.]
 Would you let your children walk or bike? Where? Under what conditions? [alone, with adult]
- 6) Can you recall a situation when you had trouble getting to work, school, or some other place
 because of a lack of adequate transportation? [If yes, ask some to tell the group about their
 particular situation] How often does this happen?
 6a) Can you describe trips that work well for you, that is, where it's easy, affordable, and
 convenient for you to get where you need to go?
- 7) For those of you with a car: Could you get around reasonably well without it? Do you spend
 more, less, or about the same amount of time driving as most people in [county or city]?
 7a) For those of you without a car: In what situations would access to a car be most helpful?
- 8) Are there places you would like to go to, but can't reach? Where?

Back-of-the-map questions

Thank you for all this useful information. This discussion has raised a lot of interesting points, and ties in to some questions on the back of your maps. We'd like to take some time now for you to return to those maps, and have you answer some questions on the back. Specifically:

- 1) Are there any trips you would take or places you would like to go to, but don't? If so, what is keeping you from making those trips? [some controlled responses, plus "other"]
- 2) Do you ever carpool? Where to? With whom do you carpool? [family, neighbors, co-workers]
- 3) Where do you get your information regarding public transit? [smart phone, website, maps, etc.]
 Do you have suggestions for improvements? [other languages, simpler, routes, busstops, etc.]
- 4) Are there any things about your regular travel that you would like to change? If so, what changes would you make?
- 5) Do you have any other comments you think would help us understand why residents of some areas may find it easier or harder to get around to important destinations?

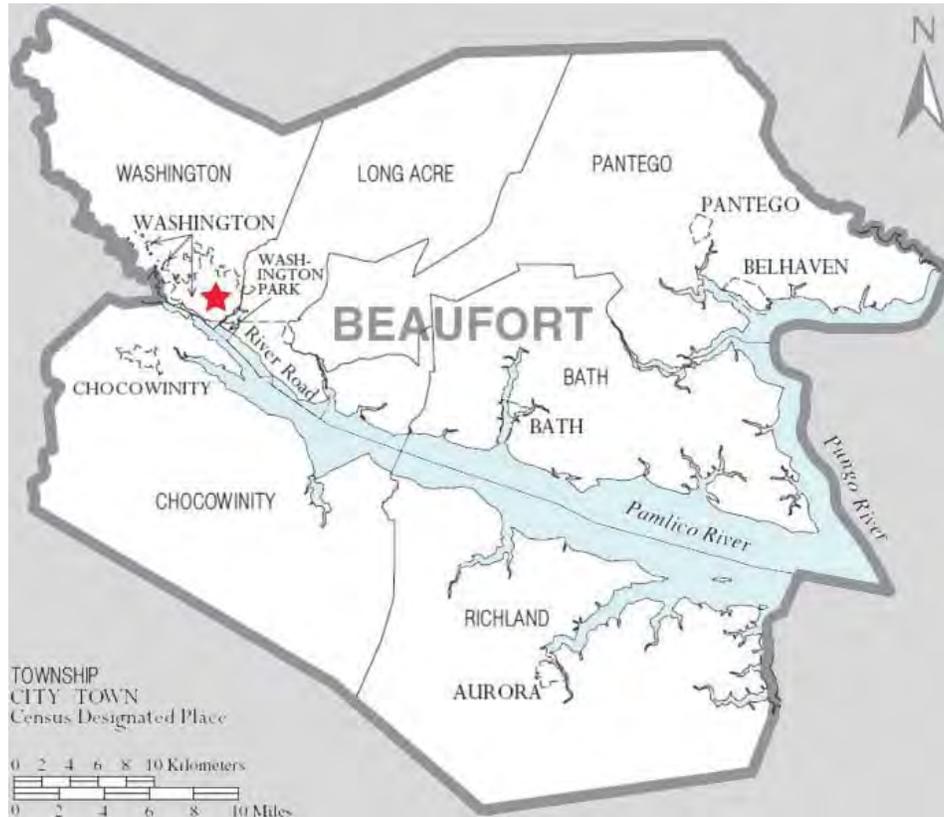
Wrap-up

Thank you for taking time to meet and talk with us. We can't make any direct changes in your community, for example, changing your bus service. But we will share what we learn with some of your community leaders, and we hope it will contribute to more and better travel options for you.

We'll leave these maps on the tables, if you want to linger and see what people drew and said.

You may reach us at [point to 1-pager with contact info]

Beaufort County



Source: www.co.beaufort.nc.us

Beaufort County in brief

Beaufort County, located in the coastal plain and along the inland coast on Pamlico Sound, had a 2010 Census population of 47,759. The share of the population self-reporting as Black is 25%, with 7% Hispanic and 66% White. The historic town of Washington is located strategically at the confluence of the Tar and Pamlico rivers, with auto and train bridges providing key river crossings between the NE and SW halves of this river-bifurcated county. The county experienced modest growth of 6.2% from 2000 to 2010. The mean travel time to work (25.4 minutes) in this expansive but largely rural county is slightly longer than the state average of 23.4. Beaufort has very limited scheduled transit to five communities, and paratransit service across the county.

Beaufort County's population is relatively old (18% over 65, compared to 13% for the state) and poor (mean household income \$38,194 compared to \$43,417 for the state; 21% living below poverty line, compared to 17% for the state), although more households (71%) own their homes than the state average (67%). Unemployment is slightly above the state average.

Key informant interviews and resident focus groups

Key informant interviews involved eight interviews with 13 people, including representatives of

- Beaufort County Area Transit
- Beaufort County Social Services
- Beaufort County Manager's office
- Economic Development Division
- MidEast Council of Governments
- Pitt County Health Department, Community Transformation Project
- Aurora elected official
- Emergency Management Coordinator's office
- Washington Community and Cultural Resources Planning

Key informants from Beaufort County provided detailed comments and thoughtful suggestions about transportation needs and patterns in the County, and about the draft maps of transportation disadvantage the team generated and shared with them. A daylong visit to Washington and several of the smaller communities, and discussions with town and county informants, confirmed that the county seat of Washington has many cultural assets and committed professional and elected staff, as well as some challenges in transportation infrastructure and services and socio-demographic pressures. The county, likewise, has deep expertise among their staff, who are actively working on increasing infrastructure quality and transportation options.

The focus group held in Beaufort County did not align with the research protocol, which called for participation by non-practitioner non-expert (transportation) residents; indeed, each of the 12 people in the Beaufort focus group had some relevant knowledge of travel patterns and needs in the county, whether from current or past professional work or through citizen involvement in local government. Nevertheless, the focus group was lively and productive, particularly with regard to ways the focus group mapping and discussion questions could be improved.

Main themes from interviews

Beaufort has distinctive traits—physical and social—that shape its transportation landscape. An inland coastal county bordering Pamlico Sound, with extensive flatlands and wetlands, the County hosts seven municipalities, numerous unincorporated settlements and a large rural area.

- Beaufort in some ways is a county divided—geographically, culturally, and politically. The County is divided nearly down the middle (on a NW to SE diagonal) by the mighty Pamlico River after it picks up the Tar River above Washington; this has implications for travel patterns, particularly for commuters working on the south side of the river. Politically, the seven current County Commissioners *all* are from the City of Washington, leaving Belhaven and Aurora without a direct voice, although in the past they had representatives on the Board.
- To some extent, Belhaven (in NE) identifies with and feels closer culturally to Hyde County.

Vulnerable populations in Beaufort County

- Elderly and others with health conditions have high demand for transportation services. Mental health patients and cognitively impaired residents are another vulnerable group.
- Community college students are an underserved—and potentially profitable—transit target

Transportation infrastructure and supply

- BATS (Beaufort Area Transit Service) runs limited scheduled service to five towns; otherwise, public transport in Beaufort is demand-responsive. The dial-in service is RGP: Rural General Public. Much of the demand is for transport to Greenville in Pitt County, to ECU's medical school and nearby clinics. The BATS director is experienced, committed and entrepreneurial; he has a growing paratransit operation he would like to expand and market. Students from Beaufort Technical Community College can get BATS service for a monthly charge.
- Medical trips usually are covered by Medicaid. Medical trips occur daily. Dialysis trips are scheduled in advance, and paid by Medicaid, an insurance provider, or the Dialysis Center. Vocational Rehab funds cover some trips. Funds generally are not moveable, so trips cannot be linked or mixed, which is a barrier for people using BATS for medical, work, and other trips.
- Taxi service is available in Washington and to some extent in Aurora, which is fairly densely populated; Pantego/Belhaven have no cab service; other areas have only limited cab service

Transportation challenges specific to Beaufort County

- The county has distinctly different types of settlement, with a rural/small-urban divide. Washington is the center of gravity; a few other towns get some traffic and attention; there are vast expanses of rural areas with limited transportation services and options.
- The Pamlico River divides the county nearly in two. A ferry (currently free, but likely to be tolled soon) provides critical access for employment on the south side.
- The county's size and diffuse employment and settlement patterns make it auto-dependent.

Solutions—formal and informal

- For communities off beaten path, neighbors or friends may provide service—often for a fee
- A ferry established for workers to the phosphate mine and to Cherry Point, which crosses the Pamlico River at Route 306, is seen by many residents as a critical part of highway system

TDI-generated county map

Key informants in Beaufort County suggested revisions to the mapping protocol to improve relevance and usefulness.

- There is significant need for services right in Washington, so darker colors around the city are not surprising; the city would benefit from better walking and cycling conditions, and more travel options for residents. At the same time, Washington has better transportation capacity than the rural areas, so controlling for population and built environment could enhance maps.
- The lightest areas may not be meaningful: Weyerhaeuser stands, agricultural lands, woodlands
- Some colored areas are easy to explain: a darker area NW of US-17/US-264 may be a trailer park; Aurora has limited grocery access; Pantego has a large minority population. Colors in the SE corner of county may relate to high industry with LEP (low English proficiency) employees, mostly Spanish-speaking, who are isolated by language and lack transportation except from their employer. More LEP workers are clustered E and SE of Belhaven, with limited grocery access. The crab house employer provides some transportation to shopping.
- Other observations on specific populations: Pamlico Beach (east-central coast) is a “dying beach community.” Mennonite population in north-central region is largely self-sufficient.
- Belhaven has a dentist and doctor [note: fall 2013 announcement that Belhaven’s clinic will close soon]; Aurora has a doctor.
- Emergency Management professionals point out that weather events have a big impact.
- Overall conclusion on mapping: the map generated by the research team’s protocol partially supports what social services know, but needs refinement to better reflect local conditions.

Focus group themes

The focus group in Beaufort County was arranged with the generous help of our professional contacts there. Although we did not recruit non-(transportation)-expert non-practitioners, the dozen participants were, in fact, all Beaufort County residents with personal travel experience, enriched with expert knowledge of transportation patterns or services in the county. As such, they provided valuable insights and useful comments.

Of the eight participants who provided (anonymous) socio-demographic information, household size ranged from single-person households to people from households with two adults and two resident children. All households had at least one automobile, and several held three cars. Three reside outside the county; several live in the rural part of the county; and all drive for all or nearly all travel needs. Several commented on the substantial distances they need to drive for all destinations: groceries, children’s school, work. Several also commented on areas of high congestion, poor road condition, and safety hazards. Reported shared travel included formally arranged carpools and informal carpooling with family, friends, neighbors and co-workers. Focus

group participants who reported using public transportation found information on the BATS website or from the Rural Planning Organization.

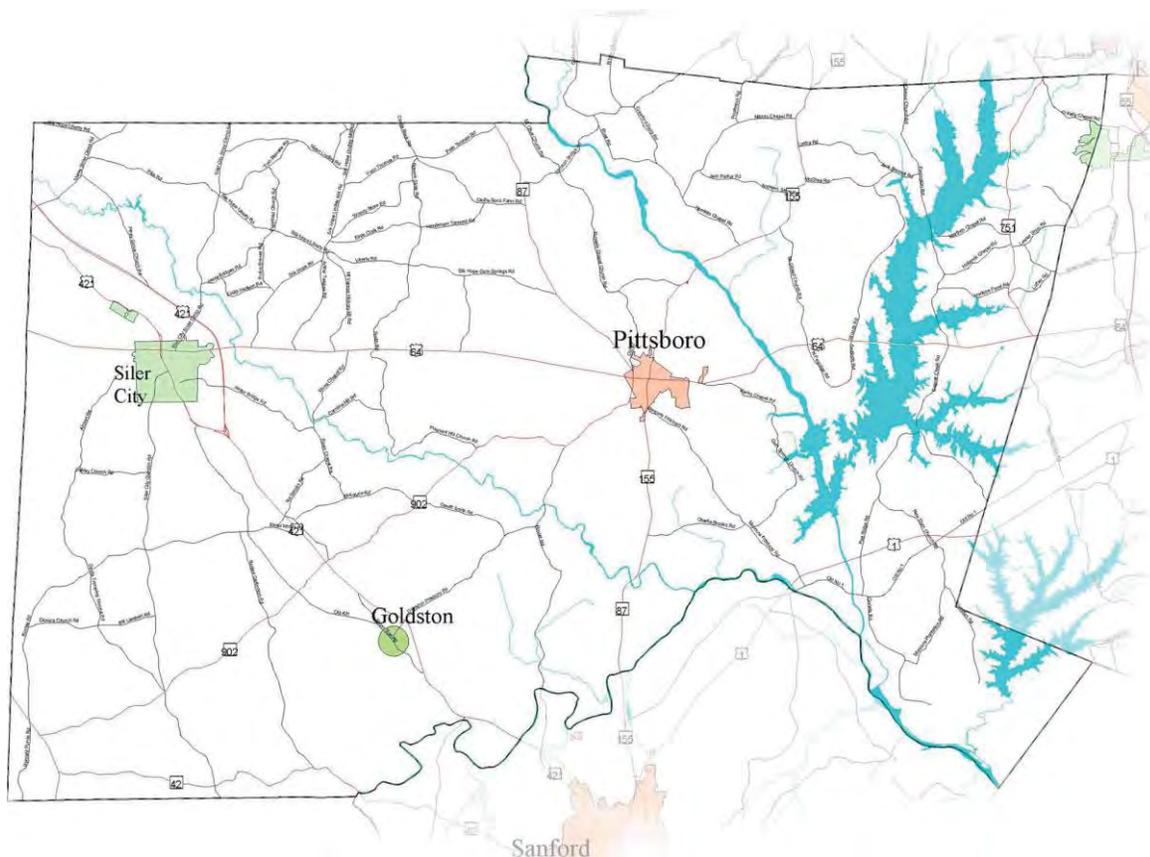
Travel options of interest to participants include shorter commutes, and a more walkable Washington. Dangerous narrow two-lane highways, lack of public transportation options, and limited access from the southern part of the county to Washington were cited as travel barriers.

Alignment of focus group responses with key informants

Several recurring themes in the focus group were consistent with information provided by expert key informants, particularly:

- The Pamlico River divides the county—not just geographic, but also an economic and cultural barrier that makes travel and social interaction among residents challenging and expensive.
- There is an urban/rural gap, with the center of power and resources located in Washington.
- Smaller settlements and rural areas have transportation challenges, but also are self-sufficient.

Chatham County



Source: www.durham-nc.com

Chatham County in brief

Chatham is a largely rural county in the Piedmont region, with a total 2010 population of 64,505, of which 71% self-identify as White, and 13% each as Black and Hispanic. The northeast corner borders on Durham and Orange counties; the county seat of Pittsboro is a 30-min drive or bus ride to the campus of the University of North Carolina at Chapel Hill—a major employer for Chatham County as well as a major destination for medical services for some Chatham residents. (Residents of other areas may travel south to Lee or west to Guilford or Randolph counties for services.) The county has been experiencing rapid population growth, adding nearly 29% in the previous decade; this growth is concentrated in the northeast corner, while much of the rest of the county has experienced heavy loss of industry and other employment opportunities. Mean travel time to work in Chatham (26.4 minutes) is slightly higher than for the state (23.4 minutes).

Median household income (\$53,958) is substantially above the state average of \$43,417, with a smaller share of the population (14%) living below the poverty line (17% for the state). Mean age (43.6 years) is higher than the state (37.4), with an aging population where 18% are older than 65 years, compared to 13% for North Carolina. Home ownership is high at 77% (compared to 67% statewide) and unemployment relatively low.

Key informant interviews and resident focus groups

Key informant interviews involved nine interviews with 10 people, including representatives of

- Economic Development
- Triangle Area Rural Planning Organization (TARPO)
- Pittsboro planning
- Chatham County planning
- Transportation Advisory Committee
- Council on Aging
- Adult Education
- Chatham Transit
- Chatham County Public Health

Key informants from Chatham County provided detailed information about the local population and their travel needs and habits. Cooperation and knowledge-sharing between county and town (Pittsboro) planners was apparent. Health, education and other social service providers were knowledgeable about the service population, and their needs and wants, including travel demand.

The research team held two focus groups with Chatham County residents:

- Southern Orange County Human Services (taking advantage of a planned TARPO outreach event, by linking up the focus group to draw in some attendees from the TARPO event), with Chatham residents with knowledge or experience relating to transportation services
- UNC campus, with Chatham County residents who commute to UNC on transit

Main themes from the interviews

Chatham has an active planning culture, with a distinctive socio-demographic challenge, given its location near Chapel Hill to the northeast and the associated growth pressure, and its more rural character and less affluent population in most of the rest of the country.

- The county has a corridor study underway for 15-501 between Pittsboro and Chapel Hill, where it anticipates more traffic and congestion, given planned and future development. Possible solutions to current and anticipated congestion include signal timing, intersection improvements and new lights. A study of route 751 is looking at the cost of 4-laning. Route 64 currently is well-controlled, with travel from Pittsboro to Apex taking only 20 minutes.

- Prospects for CMAQ (congestion mitigation and air quality) funds are more likely to flow to Chapel Hill/Carrboro/Durham MPO (Metropolitan Planning Organization) than to TARPO. TARPO has a technical committee linking all planners working in land use.

Vulnerable populations in Chatham County

Chatham County has significant populations of some traditionally vulnerable populations, with some specific features.

- The elderly in Chatham include relatively affluent retirees in the northeast and around Lake Jordan, and less affluent (often Chatham natives) elsewhere.
- Although Siler City is the largest municipality, Pittsboro is home to most county social and medical services, including the only DSS office; Sanford hosts a Social Security office.
- Siler City has a large Hispanic population, many of whom stayed on after even after several major employers left the county (such as a chicken processor that took down 2000 jobs), so Siler's population remains steady. Siler has a community college, satellite health clinics, and several non-profits: Hispanic Liaison, Chatham Together, Chatham Trades. Some residents reside in Siler but travel west to Randolph County for work, or east to Moncure.

Transportation infrastructure and supply

Chatham County's transportation network reflects its proximity to bustling Chapel Hill as well as its more rural and undeveloped reaches to the south and west.

- Chapel Hill Transit runs fee-based services to Pittsboro, serving commuting employees of UNC-Chapel Hill and UNC Hospitals, as well as patients
- Paratransit serves the county with small vans, but demand exceeds supply. There is no transit from Siler to Asheboro, and perceived poor connections from Siler City's Wal-Mart (east side) to the rest of the city (many are unaware of Chatham Transit feeder service to downtown Siler). Feeder service to Chapel Hill Transit is under-developed. Transit would benefit from more routes, shorter headways, and possible service to Sanford and airports
- Non-motorized travel frequency is low—possibly lower than transit use. Walking incidence also is very low; there is little sidewalk mileage outside of the towns. Planners want improved bicycle and pedestrian capacity, but dollars and political support are still lacking.
- Bicycling activity is largely recreational, including Jordan Lake bicycle traffic, although there are some commuters in the northeast toward Orange and Durham counties. Infrastructure currently is limited. Pittsboro has a bike plan and Siler City is working on one.

Transportation challenges specific to Chatham County

Chatham is a Piedmont county with two main small-urban centers: Pittsboro (the county seat, with 3,743 people in the 2010 Census) and Siler City (the largest municipality, with 7,887).

- Most of the growth is in Pittsboro and the northeast corner, with heavy demand putting great pressure on the transportation system. The residential and commuting corridor between Pittsboro and Chapel Hill is growing steadily and is home to relatively affluent residents, including several retirement communities. There is also a steady flow of Chatham residents traveling to Chapel Hill's medical campus for employment and care.
- The approved development pipeline includes a million square feet between Pittsboro and Orange County, and over 7000 acres in Chatham Park. Large-scale future development is being promoted NW of Siler City along Route 421, where residents commute out to work.
- The SE corner, near Moncure, is an employment hub; most drive to work in Moncure, which is rural but thriving. Some commute from Sanford; others *from* Moncure *to* Sanford
- Very rural settlements (Goldston, Bennett and Bear Creek) have limited goods, services

Solutions—formal and informal

Chatham ranges from small-urban to very rural, with the latter home to residents who are largely self-sufficient. The county is largely auto-dependent, but some cannot drive.

- With limited transit available, or people unaware or reluctant to use it, carpooling and other shared travel is sometimes the mode employed.
- There is evidence of interest in independent transportation service providers—an opportunity for fostering small independent businesses that would create jobs and fill a service gap
- The County doesn't provide transportation as part of the Health Department's mothers-and-infants program, so providers go to them. Two-thirds of the clients are located in Siler City.

TDI-generated county map

Key informants in Chatham County found the first-round maps of transportation disadvantage to be generally reasonable and in line with their view of where transportation-poor residents may be clustered. They also provided insightful comments on where—and why—the maps diverged from their professional knowledge, and made useful suggestions on revisions to the mapping protocol to bring the maps closer into alignment with conditions on the ground in the county.

- SE Siler City could be expected to be darker than it is, because of job loss and the large Hispanic population; dark colors in N and NW Siler match up with populations located there
- Some rural areas in the southwest county show up lighter than might be expected
- A colored area SW of Pittsboro is not surprising, given the elderly there; but Pittsboro proper isn't as dark as might be expected given the many elderly, including retirement communities
- Colored areas near Moncure may be industrial or utility, rather than transportation deserts
- The colored areas between Pittsboro and Chapel Hill likely reflect the large share of older residents; but some are affluent residents of Governors Club, Carolina Meadows, and others
- Transportation deserts in Goldston, Bear Creek, Silk Hope, Bonlee, and Bennett (not entirely clear on maps) may be a result of the gap in service connections for rural residents

- Mapping could be improved with some filters, such as high-income retirees, presence of numerous services/destinations, or property values. Clipping out irrelevant parcels (federal property like Corps of Engineers or game lands) would make colored areas more informative

Focus group themes

Participants in the first focus group included one person who works with substance abusers who need a variety of services, one private transport provider, and one accountant who is currently providing a lot of transportation services for parents and extended family and is considering starting a private transport service. Travel provided includes trips to Chatham, Lee, Orange or Randolph counties, for recreation, school, training programs, and shopping.

- The informal transport provider travels far and wide, using two handicapped-accessible vans: Chapel Hill for arthritis care for her mother; Moore for orthopedics and Sanford for dental for her father. She transports others as favors but may turn it into a private transport business. Some users of her informal service contribute money, but many cannot; coordination helps
- Transit difficult for those with health conditions: long waits/distances, inconvenient schedule
- For non-routine travel, transportation can be arranged, but it's expensive, e.g., \$75 to airport
- Scheduling demand-responsive seems complicated to users: signs may be inaccurate; reports of bad experiences get shared, so people make other arrangements. Transit is getting better!
- How do people with no car survive? "The best you can." Call a friend, use informal networks
- Substance abusers often need help with transport; even if they have family or friends around, they may have burned bridges, and have limited options, so they are stuck
- Residents find it hard to get to doctors' appointments, grocery store, pharmacy. Locations closer together with multiple services would be good for elderly citizens and Medicaid users.
- To understand the problem of transportation poverty, you need to be physically present in the environment and experience it

A second focus group was held on the UNC-Chapel Hill campus and targeted Chatham County residents who use Chapel Hill Transit to commute to Chapel Hill, at least some of the time.

- People with no car often simply stay home: "If car-less in Pittsboro, you're stuck"
- The PX bus is very convenient and saves money, once you figure it out; but it has a service gap in the schedule midday so that people may get stuck if they can't meet that schedule
- PX great for regular commute; other trips (weekend shopping) mean a drive to Siler or Apex
- U route helps Chatham riders get around Chapel Hill during day, but the U stops in summer
- Some convoluted routes complicate travel schedules, e.g., Ambulatory Care Center patient pickup. Some buses fill early; wheelchair users on some routes heavily; others mostly empty
- Connectivity between 15-501 at Lowe's and rest of Pittsboro and Chatham is problematic; the big bus no longer comes to the courthouse circle, which is a disappointment to some

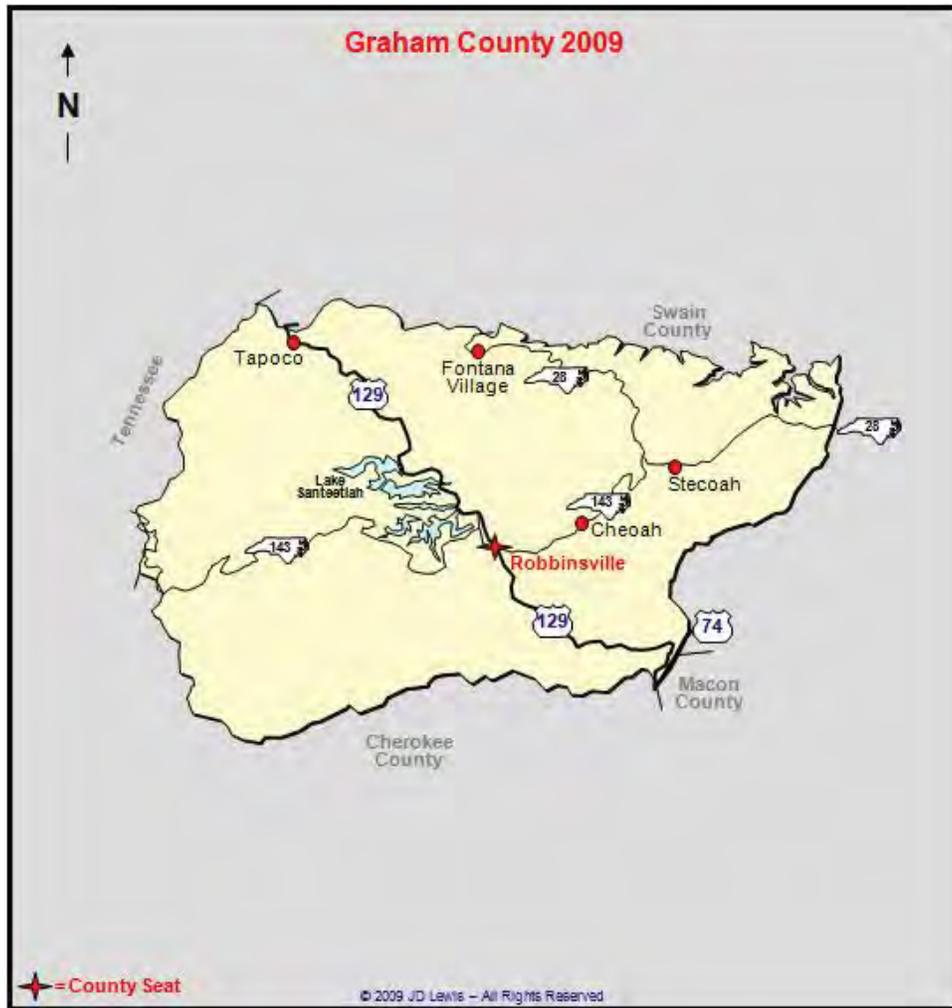
- UNC doesn't promote or alert employees to the free CCX, so people have to find it. Ridership might go up if people knew about options. UNC parking information is hard to find and user-hostile; the once/month passes are hard to figure out
- NextBus/ "all routes & services" webpage easy to use; weather, schedule changes hard to see
- Emergencies affect transit choice: the need to get to dentist or other key appointments or fetch kids or relatives is a factor; fear of getting stuck prevents people from relying on transit
- Increase transit ridership? Provide more options, more destinations (e.g., airport), reduce fare for non-UNC riders, coordinate more with Chatham Transit (some ride 20 min from Siler to PX). Don't charge Park & Ride—it will defeat purpose; some already plan to resume driving.
- Sidewalks in/around downtown Pittsboro are in good condition, and feel safe; but biking or walking from Lowe's to courthouse is not easy or safe: potholes, no bike space or sidewalk.

Alignment of focus group responses with key informants

Some themes and comments from key informants were clearly echoed by focus groups

- Most disadvantaged are in Siler City (Hispanic residents), plus isolated Bonlee and Bennett
- Bicycling and walking are not much used for utilitarian travel; it's not easy to do, and people have to travel long distances, with many leaving the county to work after loss of employers
- Chatham County has two faces: north and east (affluent, denser) and south and west (poorer, more rural), with an enormous economic disparity
- Irregular or weekend services would be useful: airport, campus, malls
- To be used more, transit must be affordable, understandable, convenient

Graham County



Source: http://www.carolana.com/NC/Counties/Images/Graham_County_NC_2009.jpg

Graham County in brief

Graham County is a small, isolated and rural county located in the rugged hills of western North Carolina. It is bordered by Swain, Macon and Cherokee counties as well as the state of Tennessee. Roughly two-thirds of the county lies within the Nantahala National Forest. In 2010, the county had a total population of 8,861. Other than Robbinsville, which has a population of 620 people, there are only two incorporated towns within the county: Lake Santeetlah (population 45), and Fontana Dam, which became a town in 2012 with a population of fewer than 40 residents. Graham County also includes portions of the Qualla Boundary and is home to Snowbird, a Cherokee community with a few hundred residents.

In 2010, Graham County was 90.3% White, 6.4% American Indian (due to the Snowbird community) and less than 1% Asian, Black or African American and Other Race.

Like most other counties in Western North Carolina, Graham County faces many difficult challenges: isolation, poverty, unemployment, and economic uncertainty, due in large part to a decline in traditional industries such as furniture mills. According to the 2010 Census, 36.6% of families in Robbinsville were living below poverty level, compared to 16% for the county as a whole. Compared to the other counties in this study, Graham County has the highest unemployment rate (17%), lowest median household income (\$31,863), lowest population density (30 people per square mile), the second highest poverty rate (23%), behind Warren County, and the highest homeownership rate (80%). Twenty percent of workers travel outside the county for employment. The mean travel time to work is 20 minutes. The county lacks a hospital, and there are only three physicians in the entire county, which means that people have to travel a long way for medical care.

With only eight vans in its paratransit system, the county struggles to meet the needs of its residents, particularly those in need of medical services, such as dialysis treatment (there is no dialysis center within the county). The county transports people to a dialysis center six days a week. Five days a week, it takes seniors to the senior center, where they receive a free meal. It does not charge a fee for its services, although it does accept donations. The limited schedule along with a demand for rides to destinations outside the county pose challenges to the county's paratransit system.

Key informant interviews and resident focus groups

Key informant interviews involved five interviews, including representatives of

- Graham County Transit
- Graham County Board of Commissioners
- Town Council of Robbinsville
- Graham County Manager
- Graham County Department of Social Services

Key informants from Graham County were eager to discuss the transportation needs and challenges in the county. They provided insightful feedback on the GIS maps we presented. All of the interviewees were longtime members of the community—most spent their entire lives in the county and thus were very knowledgeable of the kinds of transportation challenges that exist in the county.

We convened two focus groups in the county. The first focus group was held at the Community Center in Snowbird, where about 30 members of the Eastern Band of the Cherokees attended. The second focus group was held at the County Senior Center, where 12 senior citizens attended.

Main themes from interviews

The key informants identified several key themes, including access to work, services (e.g., shopping) and health care. The isolation of the county and lack of services was a concern, particularly for those with limited transportation options. Most services and medical facilities are located outside the county, necessitating long trips for even the most basic items or services. For example, there is no Wal Mart or major retailer in the county. There is only one grocery store. Many people cannot afford the gas for long trips, so they go without, rely on friends to pick up things for them, or they spend a long time waiting, as illustrated by the excerpt below from an interview with a key informant from the County paratransit system:

If you call me today and say hey I live over here in Snowbird and I want you to take me to the Walmart in Murphy so I can go shopping, I'm probably not gonna do that. I'm gonna tell you 'hey, we've got a run going to dialysis in the morning and we can drop you off and then pick you back up after the dialysis patients are done 4 hours later. Do you want to do that?' That's how we're going to handle that. A lot of people say, 'you're just going to drop me off and leave me there?' Well you know, they [the drivers] can't wait there.

Vulnerable populations in Graham County

Vulnerable populations include the elderly, poor and those with health conditions. Each of these groups relies heavily on the county paratransit system. In addition, there's a relatively small, and largely invisible Hispanic population, many of whom do not speak English.

Transportation infrastructure and supply

Graham County Transit currently operates with five mini vans, three high top handicap accessible vans and one 20-seat bus. Transportation requests are on a seat availability basis. Services include transportation to non-emergency medical appointments, shopping, Senior Center, and employment.

Regular services begin at 5:30 a.m. and end at 5:00 p.m. Daily schedules include routes to Andrews, Marble, and Cherokee. Scheduled trips are available to Asheville, Bryson City, Sylva, Waynesville, Murphy and Hayesville.

Most of the trips are for medical appointments, particularly dialysis treatments, in neighboring counties. It also contracts with a nursing home to transport one of its patients to dialysis, and with the Division of Social Services for Medicaid transportation.

Transportation challenges specific to Graham County

The rugged mountain roads, long winters, and large distance to most destinations (e.g., out-of-county travel) takes its toll on vehicles and on people's wallets. It's also dangerous to drive at night and in the winter, when the winding roads are covered with ice.

One key informant stated that there are numerous elderly widows in the county who either never learned how to drive or do not own a car.

We have a lot of elderly. Most of them raised children and they stayed at home and farmed. They grew everything they ate. And most of the time the wives didn't work. Now you're looking at widows that are left with very little Social Security to live on, and no means--no vehicles--to get to medical appointments.

Solutions—formal and informal

People in Graham County, as in other rural places, are very self-reliant and resourceful. They also help each other out in times of need. This applies to transportation. We heard many instances of people sharing or offering rides to those without vehicles, or offering to pick up something (e.g., at the store) for someone who couldn't make the trip, as the following excerpts illustrate:

I would say that, within the community, if Ms. Johnson needs to go the eye center, then you'd have four or five individuals that would stand up and say, I'll take her.
Where I live, in the Sweetwater community, you kind of have community where we say, I'm going to such and such place, and someone says, well would you mind getting anything from printing paper or cartridges for their computer, or if they need this or that. That's just the way it is.

Key informants expressed strong sentiment that people in Graham County try to take care of each other. Still, some were concerned that some people in need aren't being helped.

It's just the way it is here, you take care of your own the best you can. But there are still those that you just wonder--how do they cope?

TDI-generated county map

Key informants commented that the GIS map did not reflect accurately the conditions in Graham County, which is not surprising given the low population densities. Many of the factors or conditions that were mapped were not spatially concentrated, so it was hard to identify hot spots in the scale within which the maps were drawn, e.g., census tracts or block groups. For example, there were pockets (e.g., a trailer park) or parts of neighborhoods where Hispanic households were concentrated. Also, there is a sizable minority of Cherokees in the Snowbird Community. These pockets where people share some of the characteristics of social vulnerability were difficult to capture in the GIS maps.

Focus group themes

The focus groups in Graham County were arranged with the generous help of our contacts there. Comments from the focus group with seniors centered around public transit. All participants stated that they were very reliant on public transit. Most relied on transit to get to the Senior Center that day. One participant in particular, who is legally blind, said that public transit provides her with an essential service. They said that many more seniors—not represented in the focus group—use public transit. Participants at the focus group in the Snowbird Community seemed very appreciative of the team's interest and that they brought food and gift cards.

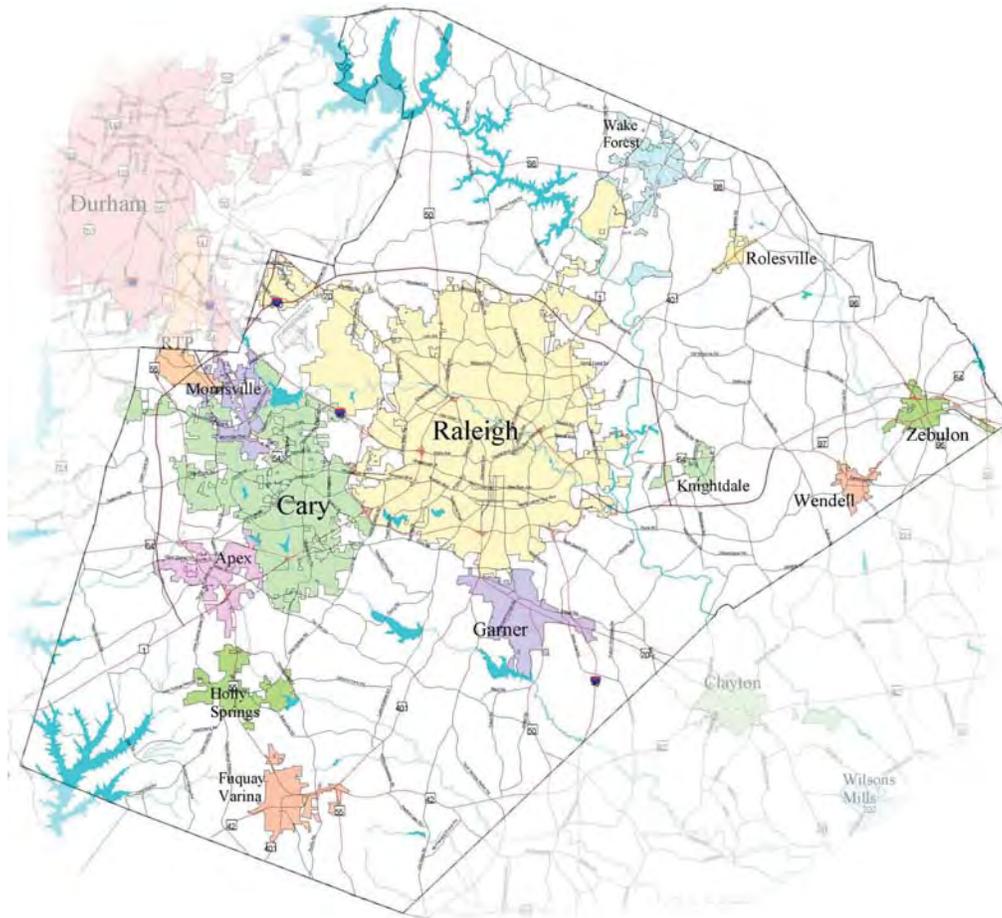
- Participants rely on transit for out-of-town travel, often organized by the Senior Center, to destinations such as Sylva, Murphy, Andrews, Franklin, Asheville, and Cherokee.
- Focus group participants relayed that if there were no public transit, they would have to rely on neighbors, family, and friends for rides, but this would be too much of a burden, since it would require friends or family to take a day off of work.
- Participants said that they travel an average of 40 to 50 miles one way to get to work, usually by personal vehicle or ridesharing. One of the participants said that he walks everywhere – the rest of the group agreed that it was not unusual to see people walking to get where they needed to go.
- The Snowbird participants relayed that they do use public transit, but that it is not very convenient, because the public transit vans often go a long way, out of the way, to pick up other riders. Thus, most trips take a lot of time because the vans stop at several destinations. As a result, using public transit often requires riders to take a day off of work, which is not always possible and/or affordable.
- As an alternative to public transit, they rely on friends for rides or walk. A few of the participants (three to four) said that they either do not have a personal vehicle or that their personal vehicle is insufficient for long distance travel (due to road conditions, or simply the age/condition of the vehicle). A few participants said that vehicle maintenance is a significant issue. The secondary roads that Snowbird residents rely on are in poor condition and contribute to significant wear and tear on vehicles. These challenges are exacerbated during the winter months.

Alignment of focus group responses with key informants

In general, the issues identified in the focus groups echoed those of the key informants, namely:

- The isolation and limited services offered in the county necessitate long trips for medical visits or shopping.
- Many disadvantaged groups, particularly the elderly and those with special medical needs, rely on public transit. This requires them to spend long hours on each trip.
- People in the county work to help each other out. Those who cannot drive, do not own a car, or simply cannot afford the cost of gas or vehicle maintenance rely on the kindness of family, friends or neighbors to help meet their travel needs.

Wake County



Source: http://www.durham-nc.com/resources/images/maps/wake_county.gif

Raleigh/Wake County in brief

Wake County, a central Piedmont county of 900,993 people (2010 Census), is home to the state capital of Raleigh. The self-reported ethnic composition in the County is 62% White, 20% black, and 10% Hispanic. Wake is among the most developed and wealthiest counties in the state (median household income \$61,594, compared to \$43,417 for the state), with relatively high levels of education (47% of residents hold a bachelor's degree, compared to 26% for the state). Home ownership of 65% is slightly lower than the state 67%.

Key informant interviews and resident focus groups

Key informant interviews involved five interviews with six people, including representatives of:

- City of Raleigh Transportation Planning
- City of Raleigh Emergency Management

- City of Raleigh Planning Department
- Center for Volunteer Caregiving

We did not convene focus groups in Raleigh or in Wake County as part of the research plan; rather, Raleigh served as a one-off urban comparison for our key informant data set.

Main themes from the interviews

The City of Raleigh is the state capital and part of the rapidly growing Triangle metropolitan area. Raleigh is only one municipality in a large county that includes urban, suburban, and rural areas. The outreach in Raleigh was intended to add a large, urban center to the analysis.

As one key informant summarized, “It’s tough to look at Wake County, one of the largest in North Carolina” because it is so dynamic and diverse. The interviews revealed some unique characteristics, including the regional perspective that is necessary for planning transportation in Raleigh. With RTP, Durham and multiple other Wake County municipalities, Raleigh exists only as part of a larger network. The related theme of urban sprawl is also evident in our interviews.

One of my volunteers sent me an email today saying, you know, it’s interesting that the people who live in Cary have doctors in Raleigh, and the people who live in Raleigh have doctors in Cary, so. And I marvel over that.

Vulnerable populations in Wake County

The vulnerable populations discussed in interviews with Raleigh key informants included:

- Elderly residents in an aging population. Suburban and rural Wake County is especially disconnected. Within Raleigh, there are challenges like: How much time do you allow at pedestrian crossings, taking into consideration elderly people who may travel in the area?
- Disabled residents may need consideration in planning and special services
- Low-income residents, which in Raleigh took a different shape. Poorer and wealthier live much closer together in the city, compared to the rural counties. There are patterns of wealth and poverty; the divide may still be there but it geographically nuanced.
- Southeast Raleigh is home to relatively lower-income populations.

Transportation infrastructure and supply

There are many resources available through the City of Raleigh and Wake County. Key informant interviews touched on many, but may not capture all that the county and city offer.

Scheduled service

CAT (Capital Area Transit)

- Ridership around 6.4 million on CAT

- 20 fixed routes operate 7 days a week with 70 peak buses
- 15-minute service in some corridors

Wolf Line (NC State's free service)

- Ridership around 3 million
- Seasonal—does not run when classes are not in session

Triangle Transit (TTA)

- Ridership around 1.5 million
- Regional transportation for Triangle: Apex, Cary, Chapel Hill, Durham, Garner, Hillsborough, Knightdale, RDU Airport, Raleigh, RTP, Wendell, Wake Forest, Zebulon
- Go Pass program
- TTA batches rideshare for the region: parking discounts serve as incentives for participation

C-Tran

- Town of Cary's fixed-route and door-to-door transit service
- Every day except Sunday

Paratransit

ART (Accessible Raleigh Transit)

- Provides 1,500 trips per day
- Raleigh's paratransit system for people with disabilities that preclude use of fixed-route
 - Eligibility requirements are customized
 - Application process involves doctor / health assessment, additional 3rd-party assessment
- ADA requirements limit charge to double the fixed-route fare, so it costs \$2/ride
- Call center receives requests 24 hours in advance or up to 30 days in advance
 - Automated, database generated to batch trips
 - Multiple requests usually are for work trips
- If ART cannot provide service, they contract out to about 40 taxi companies with established record, so individuals typically have the same driver and build relationships—good and bad.
- Growing bicycle/pedestrian infrastructure in Raleigh, primarily in the downtown area, also connects with Cary's greenways. Culture of bike community increasingly evident in the city.

Transportation challenges specific to Wake County

Wake and Raleigh transportation capacity is auto-centric, but offers many transit options

- Reliance on autos for most commuting means congestion and long commutes, including RTP
- Unsafe biking and walking conditions limit non-motorized travel
- Difficulties with public transit—reliability and frequency
 - Weighted towards commuters
 - Sunday service is available but much more limited (only three or four routes running)
 - Good geographic coverage but frequency is somewhat limited
 - Transit: per-ride fares add up (people forget gas taxes and roads tolls as part of auto cost)

- Poorer people may need transit for medical appointments or non-traditional shifts for service jobs, but the transit does not always support them
- Crossing busy thoroughfares to get to bus stops going the in right direction is tricky.
- Grocery trips can be difficult, especially for those in southeast Raleigh (Kroger just closed).
- Getting to medical appointments might be less difficult in Raleigh because you Wake Med (largest provider in the region) is bus-accessible. Center for Volunteer Caregiving disagrees.
- Gap between long-time residents and transient populations, who work for a couple of years and move on, may lead to community disengagement.
- Cost of living in Raleigh feeds into urban sprawl and suburban/exurban developments—“just cheaper to live outside of Wake County,” but gas costs are starting to make up that difference.
- Planning professionals are starting to think about transit-disadvantaged populations more broadly beyond the traditional focus on low-income and carless households. In the last few years, as the cost of fuel has increased and labor has increased because of medical and other costs, you find out that people just figure out a way to make it work.
- Bicycle and pedestrian themes
 - Safety
 - Feasibility in a sprawling city
 - Aging in place: new operational considerations
- Paratransit challenges: logistics, “making a lot of calls,” 24-hour window can strand riders.
- RDU is an international airport but has no access for non-drivers.

Solutions—formal and informal

While Raleigh has more infrastructure and services than the other counties in our study, there are also more people, and thus more demand and pressure on the systems in place.

- Public transit and paratransit: Raleigh prides itself on its paratransit services (ART), which one official called a “Cadillac type of service.” He elaborated, “We’ve actually had people tell us they moved to Raleigh because of the type of service we have.” ART reaches 1,500 people daily, and uses technology to sort and streamline the requests. Eligible individuals can access work, health care, and amenities for \$2/trip, even though it costs the county much more to provide that service. Reliability and regularity are great benefits, but such optimal service may have unintended consequences. One official described the process and outcome:

It can be a bad thing in that we have found that Mr. Smith not only picks them up at the curb but Mr. Smith takes them into the house, puts the groceries away, does all kinds of things that could be liability issues for us. There could be side deals going on that we really can't administer. So we have to be careful. We want to provide a good service but as we have integrated a shared van service over the last 18 months the community has realized we're doing this to save costs, and we're doing this to try to offer a service that's more similar to what's offered nationwide. It's not the, I'm going to be guaranteed a taxi ride with my personal driver. That's been very difficult for some of our clients to get

used to. "I don't wanna ride in the van with someone else. There's a delay; I don't know them." They've really, for lack of a better term, gotten spoiled of having—and that trip costs them \$2. ADA requirements say that we can only charge double the fixed route fare. And we have a dollar fare. So Ms. Smith can go to the beauty shop for 2 dollars. The average trip costs us about 20 dollars.

- Non-profit: Center for Volunteer Caregiving averages 40-65 rides/month for people just above the Medicaid income eligibility threshold, but still poor. CVC:
 - offers non-medical rides for Medicare/Medicaid recipients.
 - also has funds for taxi services in areas with no volunteers.
 - matches volunteers with individuals.
 - encourages socialization, while the City and County programs may have to discourage relationship-building between drivers and recipients due to liability and insurance.

Often, when our volunteers take someone to a doctor's appointment, they'll tack on to that a trip to the pharmacy to get their prescriptions filled. And sometimes shop-ping, sometimes also just to go out and get some food. Because the people we are serving, along with being elderly and disabled, the result of that is that they are also socially isolated. And so our volunteers are providing transportation but also pro-viding contact and companionship that people without access to transportation don't.

TDI-generated county map

Key informants generally supported the map framework, but City officials found the level of detail was weak. It would be great to have more detail than Census tracts, especially in Raleigh:

- “micro-level” and “little pockets rather than broad areas”
- connecting sidewalks
- positives of the built environment and bus routes
- normalization for “exposure”—high pedestrian activity or transit

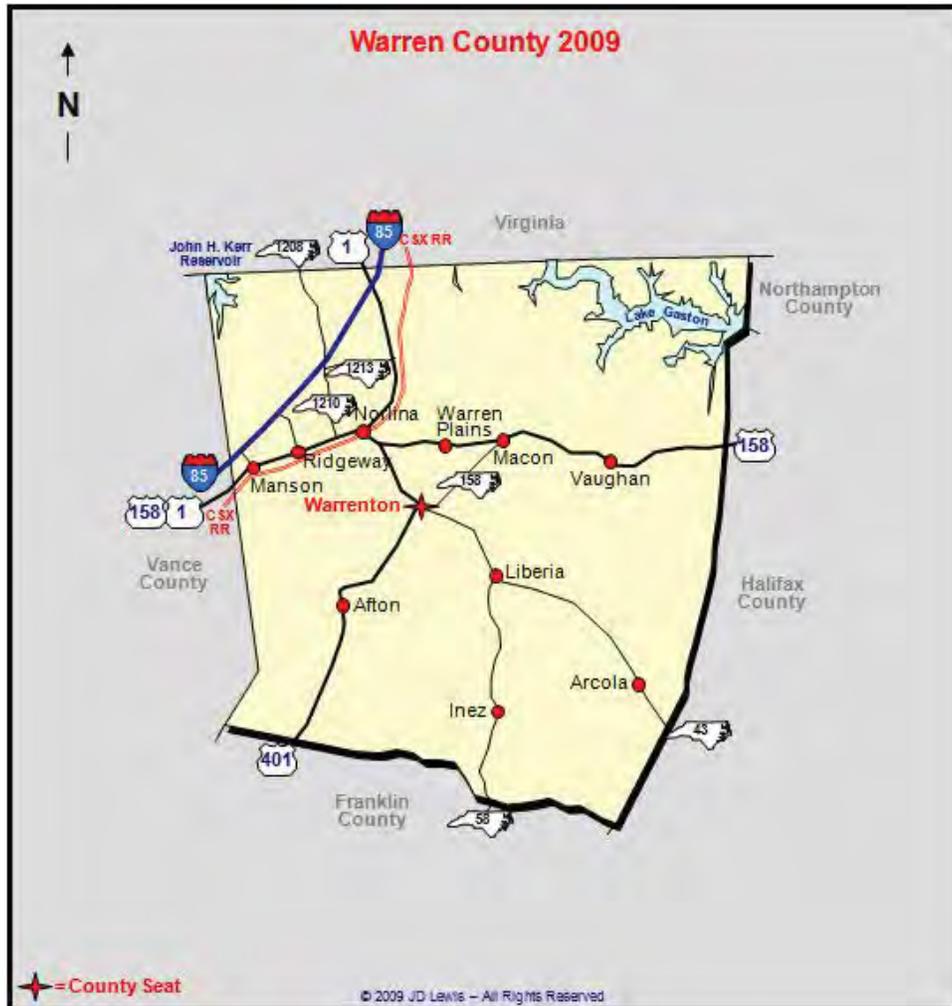
One official said the transportation desert map “looks a lot like our bus route map.” The heaviest bus service areas (number of routes and frequency) are also the most disadvantaged areas.

According to city officials, there is a strong alignment between need and provision of services.

Another key informant echoed this sentiment,

Southeast Raleigh is probably considered to be disadvantaged, where the northern part of Raleigh is not economically disadvantaged. We provide less transit service here (north) and more transit service here (southeast). Is there a desert? No. We just allocate our resources where they're needed. That's where I get kind of tripped up because this desert concept, desert paints a picture of just nothing. And that's not the case in Raleigh. As you zoom out, in the rural areas, I'm sure there are areas that have difficulty. But as far as the city limits of Raleigh, I have a hard time saying there's a desert anywhere.

Warren County



Source: http://www.carolana.com/NC/Counties/Images/Warren_County_NC_2009.jpg

Warren County in brief

Warren County, a relatively sparsely populated Piedmont county in the north-central region of the state, had a 2010 Census count of 20,972 residents, a 5% increase over the 2000 Census. Warren is a majority-minority county, with 52% of the population self-identifying as Black, 5% as American Indian and 3% Hispanic; Whites account for 38% of the population. Although largely rural, with only three small incorporated municipalities, Warren County is close to Wake and Durham counties, and identifies itself as the northern reach of the Triangle, with good highway and rail connections. The county also boasts good access to multiple recreation areas and water bodies, and is developing its tourism and biotechnology sectors. Median household income in Warren, at \$32,574, is much lower than the state average (\$43,417); 27% of Warren residents are below the poverty line, compared to 17% statewide. The mean age is 44.9 (37.4 for the state), with 19% of residents older than 65 (13% for the state).

Key informant interviews and resident focus groups

Key informant interviews involved six interviews with six people, including representatives of:

- Warren County Senior Center
- Warren County Health Department
- Warren County Planning and Zoning
- Warren Family Institute
- Warren County Social Services
- Warren County Manager

The research team also held a focus group with Warren County residents at the Green Duke house, a job-link center, in Soul City, which yielded a lively and informative discussion.

Main themes from the interviews

Warren County is a poor rural county with no major cities. As such, Warren County residents are scattered throughout the rural areas of the county, which presents many transportation challenges, especially considering the presence of socially vulnerable populations. Warrenton, the county seat, and nearby Norlina constitute the major town centers of the county.

Route 158 serves as a dividing line between wealthier (north) and poorer, more disadvantaged (south) communities. One official said, “We have two counties. And in one county there are the haves and [in the other] the have-nots. It sounds very generic.” Lake Gaston, in the northeast, is an affluent area that one official identified as site of most of the development and source of most of the tax base. Well-off families and retirees near the lake, where many of the structures are second or vacation homes. This is an important consideration, as elderly here may not be as disadvantaged as other aging populations. The county’s wealth gap is manifest in the built environment: Key informants identified three main supermarkets in the county: one in the lake area, which disproportionately serves the wealthier, and the other two in Warrenton and Norlina.

Other key amenities and services are also unevenly distributed in the county. There are several health providers in the county, including the Health Department, a free clinic, and a rural health group. However, there is no hospital, which means people with more serious conditions or with radiology or other needs must travel long distances, or use an ambulance, which is very costly.

More of the vulnerable populations are scattered south of Route 158 in the very rural areas. Thus, the sickest, poorest residents are farthest from grocery stores and services like the Health Department, which are located in Warrenton and Norlina. The most disadvantaged often must rely on others to get around, which can be frustrating and difficult. There is increasing demand for paratransit services, which still does not meet the needs of the most vulnerable. Reliance on paratransit by Medicare and Medicaid recipients means that frail, elderly or disabled individuals

often end up taking day-long trips with no bathroom breaks. One key informant said, “You’re dealing with a population that needs to use the bathroom more frequently than others! And unfortunately the current KARTS system does not allow bathroom breaks.”

Walking and cycling are not currently feasible options for getting around Warren County. Even in towns like Warrenton, it typically takes 10-15 minutes driving to get to town for work or for recreation. Warrenton has recently built new sidewalks and improved the safety and accessibility within town, but in such a rural county, walking and cycling are not realistic primary modes.

Vulnerable populations in Warren County

Warren County has several different—and overlapping—socially vulnerable populations:

- Minorities are the majority: 52% African-American, with a substantial Latino population. The Haliwa-Saponi community of Hollister straddles Warren and Halifax counties.
- Transient or short-term laborers often have low English proficiency and usually are carless
- Warren has many low-income residents; median income is \$32,574 and poverty is 27%, with unemployment at 14%, well above the level in the Triangle (to the south) and state.
- Elderly and disabled, as well as other residents such as pregnant women, need services.

Transportation infrastructure and supply

Warren County does not have scheduled transit service. Warren County works with other counties in the region to offer paratransit. As a Tier-1 county with limited resources, Warren has a comprehensive plan for transportation (CTP), but lacks a bicycle-pedestrian plan (“a pipe dream”); although some people are talking about it, “there’s no coordination or concerted effort, it’s all very piecemeal” but “at least we’ve identified needs in our CTP.”

The Kerr-Tarr Council of Governments is very active and interested in improvements for the area. They are also part of an attempt by their Rural Planning Organization to create regional service with other rural counties and Wake County—an idea with strong support, but no funding.

- KARTS (Kerr Area Rural Transport Service)
 - Services are contracted out, to a private company based in Henderson, NC.
 - Lack of coordination between KARTS and planning/zoning division leaves service gaps.
 - Paratransit is geared toward medical transportation for elderly and disabled/.
 - Services are limited to weekdays.
- Warren County Social Services Agency has 2 vans and drivers
- CPTA (Choanoke Public Transportation Authority) serves Bertie, Halifax, Hertford, and Northampton Counties. This agency does not actually serve Warren County, but there is some coordination for out-of-county or cross-county trips

Transportation challenges specific to Warren County

Warren County's transportation challenges relate to its geography, low population density, and socio-demographic profile, with small towns and large rural expanses, and low-income residents.

- Lack of jobs in the county mean that many workers commute *out* of the county; lack of transportation also means some willing workers may not have the means to access jobs.
- Basic amenities are available in the county, but specialized aren't, e.g., no clothing outlets.
- Paratransit challenges include scheduling, logistics, less-than-full service, and affordability (for those who do not qualify for reimbursement through Medicaid or Medicare).
 - KARTS operates on a specific timetable, e.g. to Wake Med on Tuesday and Thursday, Duke Hospital on Wednesdays, etc. Vans usually leave around 10 am and return by 5:30.
 - Individuals need to know about KARTS options when scheduling appointments.

Solutions—formal and informal

The travel landscape in Warren County is a mix of public and private, formal and informal.

- Paratransit is critical, but currently doesn't meet the demand, and imposes limitations
- Family support networks cover many travel needs. Public Health official estimated that more people (50%) rely on family and friends than on KARTS (10-15%).
- Non-transportation oriented government services, like the Senior Center, provides rides to seniors. Similarly, social workers from the Social Services Agency will go out "to fetch" patients who don't have any of the other formal or informal solutions available to them.
- The Warren Family Institute has a van and provides some rides.
- At least two churches operate vans, and as one official described, "We crisscross each other on Sunday mornings."
- Migrant farmworkers are transported by employer-provided "refurbished school buses."
- A formerly thriving taxi service folded for economic reasons, illustrating the financial challenges of balancing transportation supply and demand in a poor, rural county.

TDI-generated county map

Key informants indicated that the research team's map of transportation disadvantage risk is fairly accurate: "dead on the money," according to one key informant. However, it doesn't capture all of the nuances, and the local experts had feedback and suggested enhancements.

- South and southeast of 158 are the most disadvantaged areas.
- A lot of farmland and natural forest where few, if any, people live. If possible, it would be helpful to exclude those sections from the mapping treatment. But in reality, there may be a small handful of households in each census tract, weighting the "color" of the tract heavily toward those individual households.
- Map could be divided into "quadrants"; one of those quadrants (southwestern) has the largest senior population and is the furthest from "anything."

- Warrenton was shaded darker than might be expected, because that is where the resources are. But in such a small population, the presence of low-income housing and nursing homes could push those Census tracts over the thresholds included for the maps. Consider a filter.
- Hollister, the area where the Haliwa-Saponi tribe lives, is actually divided between Warren and Halifax counties.

Focus group themes

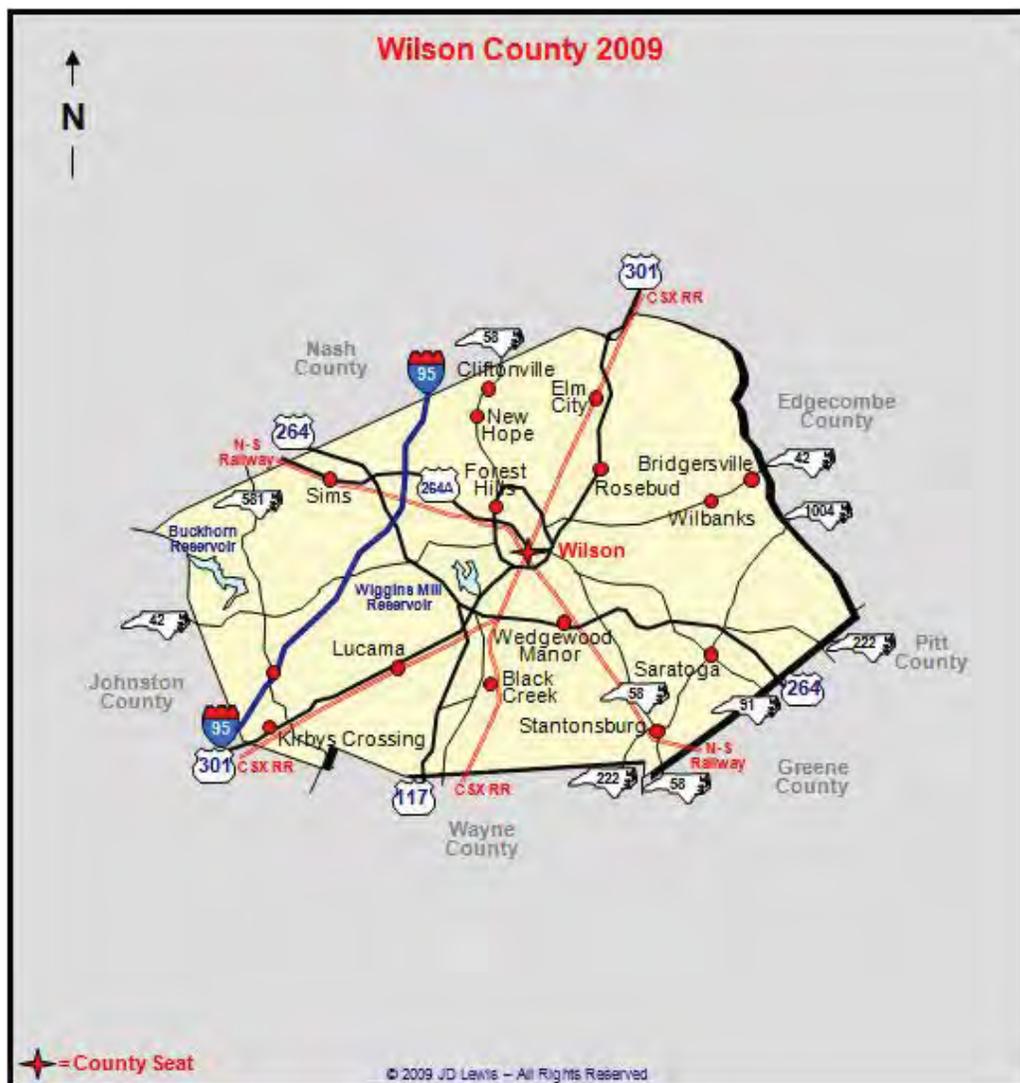
A focus group in Soul City on June 12, 2013 drew 13 participants, including one white and 12 African-American adults, who shared challenges and experiences from their daily lives. All owned cars. However, the cost of car ownership was noted as potentially burdensome; one participant said, “The least little glitch and you’re in trouble.” For those who don’t own cars, there is a “ripple effect” because a person can’t get to interviews or appointments, and then may get demoralized and stop looking for work.

- Several participants had children, including one woman with eight children; one participant was a community college student.
- Many people seemed excited about the possibilities of public transportation and its effect in their lives, but also recognized that scheduled service would be infeasible in such a rural county. They mentioned MegaBus, park-and-ride hubs, and shuttles.
- While the general sentiment was that quality of life is high in rural Warren County (more than one participant had moved there from places like Detroit and New Jersey), feelings of isolation and missed cultural opportunities manifest when discussing mobility and accessibility. One participant even wrote, “Warren County is simply devoid of transportation options” on the mapping exercise.
- There was some nostalgia for a sense of community that would bring people together to support each other. A participant asked rhetorically, “One of the key questions is, How do we develop a sense of community again so that people will be more willing to help each other...to take care of one another?” This insight provides a perspective on institutionalizing some of the informal solutions that may already be present.

Alignment of focus group responses with key informants

The focus group echoed sentiments expressed in key informant interviews, including the difficulties of getting around in the rural community without a car. Even with a car, the cost of travel (gas, wear and tear) and the long distances are common barriers, and can determine what activities or trips Warren County residents take part in. While focus group participants were not the most disadvantaged members of the community, all had experiences and shared knowledge of the types of challenges enumerated by key informants. One take-away from a poor, rural county like Warren is that there co-exist, paradoxically, an atmosphere of isolation along with shared, supportive communities.

Wilson County



: http://www.carolana.com/NC/Counties/Images/Wilson_County_NC_2009.jpg

Wilson County in brief

Straddling the rough border between Piedmont and coastal Plain, Wilson County is located in the east-central region of North Carolina; rolling hills in the west give way to flatter plains toward the east. The county's Census-reported population in 2010 was 81,234; Wilson is a minority-majority county where 39% self-report as Black and 10% as Hispanic, with 49% identifying as White. The county seat is Wilson—a small city with a distinctive and appealing downtown and urban core that has worked hard to keep its economy humming, aided by a major bank headquarters (BB&T), small college (Barton), strong health care sector, and other industry. The

county experienced moderate growth of 10.1% from 2000 to 2010. The 19.2-minute mean travel time to work is lower than the state average (23.4 minutes). Wilson has scheduled transit in the City of Wilson, with paratransit available for residents across the entire county who need special services. Wilson's age profile is very similar to the state average, with the mean age and percentage of residents older than 65 both just slightly above the statewide number. The median household income (\$36,645) is lower than the state (\$43,417), and home ownership (60% of households) is lower than the 67% of households statewide who own their homes.

Key informant interviews and resident focus groups

Wilson County key informant interviews involved six interviews with 12 people, representing:

- Public Relations Office
- Citizen Transportation Advisory Board
- Chamber of Commerce Transportation Committee
- Planning and Development Services
- Bike-Pedestrian citizen board representatives
- Wilson Police Department
- Wilson County Emergency Management

Key informants from Wilson County provided detailed comments and thoughtful analysis on how the infrastructure in the city and across the county meets the needs of various residents, and commented extensively on the color-coded maps of transportation-disadvantage risk areas.

The first focus group in Wilson County was very small, and did not align with the protocol, which calls for non-practitioner non-(transportation)-expert residents; each of the three people in the first focus group had direct knowledge of travel patterns and services in the county, primarily in their roles as emergency dispatchers or responders. Nevertheless, the group provided useful feedback and comments on the map activity and on Wilson County transportation patterns.

A second focus group specifically sought out farm workers on H-2A temporary agricultural worker visas who are based at a camp in Wilson County. These 30 farmworkers, whom large agricultural operations hire, mostly from Mexico for seasonal work, typically have low English proficiency. Since they do not have cars, they rely on employer-sponsored transportation to get to work and to access goods and services.

Main themes from interviews

Wilson is a growing and relatively stable county, where economic development has been steady if not explosive, the city remains a strong center of social and cultural interaction, and rural lively-hoods are fairly stable. The county has a strong professional planning corps—active in

state and regional planning organizations, and interested in exchanging knowledge with academic partners.

- With a diverse economy and diverse population, Wilson is experiencing some growth pressures
- Strong management and infrastructure offer chance for creative and affordable improvements

Vulnerable populations in Wilson County

- A large Hispanic population provides farm and other labor; many of these residents are carless.
- Low-income and older residents need assistance in accessing medical and other services.
- College students in the City of Wilson, while not necessarily vulnerable residents, add to the transportation puzzle, with about 1000 trips/day, many of them on foot.
- Wilson is home to a sizeable population of deaf and hard-of-hearing; the School for the Deaf and Hard of Hearing is located northeast of downtown Wilson along Route 301.

Transportation infrastructure and supply

The city sits at the general juncture of several routes: 117, 301, 264, plus smaller state roads; Interstate 95 runs just west of town. An active train line parallels Rt. 264 from the northwest into near-downtown; development along this rail line is anticipated to intensify in coming years.

- Wilson's urban bus system is good but under-utilized; the system would benefit from more marketing, as many residents are unaware of the extent and convenience of the transit system.
- The Public Relations office within the City of Wilson gets calls from within *and* outside the city (from Wilson and other counties), and attempts to find out callers' needs and refer them on to other places. Many callers are looking for transport to medical care in Wilson County, or need to go to Pitt County to access East Carolina University medical campus and nearby clinics
- Regional auto access is good from anywhere in Wilson County—Raleigh, Kinston, Goldsboro.

Transportation challenges specific to Wilson County

Heavy traffic and safety concerns are by-products of Wilson's generally positive current economic climate, with many areas around the city described as dangerous and congested. Major thorough-fares are in place for autos, but bicycles and pedestrians are not well-served, and connectivity is insufficient. Lack of money is holding back pedestrian and cycling-supportive projects that the city and county are eager to launch. Some places have sidewalks, but are still dangerous for walkers.

- Much of the employment is outside the city, e.g., factories, tobacco. Firestone/Bridgewater is just north of the city. Most who can drive to work do so; most utilitarian cycling that happens is by necessity, not choice. The latter group includes some non-driving seasonal laborers.
- Wilson is flat, so cycling and walking could flourish, in theory, and there is an active bicycling advocacy group that meets regularly; recreational cyclists are more common than utilitarian. But even if traffic were slowed, it is still too dangerous for biking without dedicated paths or lanes. North and east of downtown, near Ward Blvd, Corbett is to be repaved with bike lanes. Northwest of town beyond Ward Blvd, Pack House Road has shoulders that bikes can use.
- Safe passage is hard to come by on busy wide roads; Ward Blvd is marked 45mph, but people drive 60. Engineers do a good job moving traffic without so much speed. Airport Blvd goes from two to five lanes. Route 301 heading northeast out of town sees very busy traffic and high speeds; they are working on sidewalks on old 95, with stoplights, where kids walk to school.
- Many schools do not have good bike/pedestrian access, including an elementary school in the congested district near the hospital. Children walk to Winstead School even with no sidewalks.
- Airport Blvd between US-264 and Rt. 58 hosts a senior village with few bus stops, and Section 8 apartments at Joyne Lane off Airport Blvd, as well as Starship Lane off Nash St. NW (Rt. 58), where there are no sidewalks but lots of foot traffic on a five-lane road. Farther up Airport Blvd is an upscale retirement community, across Lake Wilson Rd from the Food Lion.
- Other development patterns: suburban large-lot development west of town, between US-264 and route 42 and west of I-85: pharmaceutical plants, low-density development, and upscale residential housing northwest of town along Rt. 58. Southeast of downtown is settled by lower-income residents. In Hispanic neighborhoods, there are a lot of cyclists mixed in with traffic: high speed, narrow roads, and weak enforcement of speeding laws are a dangerous mix.

Solutions—formal and informal

Transportation challenges in the seasonal farm-worker camp take several forms:

- The employer provides bus service from camp to work sites, along with emergency transport.
- A routine Sunday bus run stops first at a flea market, second at a place where workers can cash checks and wire money, and third at Wal-Mart. They usually leave at 7am and return by 1 p.m.
- Food access is addressed at the camp, in part, by a woman who comes daily to sell traditional Mexican food. About half buy food from her; the others cook in the communal kitchen.

TDI-generated county map

The Wilson County key informants found the results of the mapping to be interesting and in many cases readily interpretable given their knowledge of Wilson residents, travel behavior and needs, and existing transportation infrastructure and services. Comments on color-coding and mapping:

- Downtown Wilson might reasonably be expected to be lighter, given its transit access. Directly south of the city is commercial development; west is mostly middle-class residential. A moderately dark area directly south of downtown is an isolated neighborhood in rural farmland.
- Areas in western near-downtown may be more disadvantaged than show up on the map. South-east of downtown, which is a bit darker, perhaps shouldn't be, as it doesn't have much housing.
- East of downtown, with darker areas, are scattered neighborhoods and solid waste facilities. Northeast of Wilson, along Rt. 301 to Elm City, perhaps should be lighter, as it's mostly rural. Dark areas east and northeast (east of railroad tracks from Norfolk Southern) of downtown Wilson may be trailer parks; possibly also located there are some elderly but self-sufficient populations. Trailer parks just west of downtown (past Ward) folded; FEMA bought them out and didn't rebuild. Dark areas around Elm City are in an area far from city services.
- Migrant camps and other Hispanic concentrations are located west of Wilson and I-95, between US-264 and Rt. 42, as well as in and around Elm City to the northeast.
- Rail corridor to the Triangle is valuable, so it's worth preserving development along this route.
- North of downtown, along Rt. 58, is the country club. There is some county/city political tension, but appreciation for the "great city manager—thinks outside the box." The city has been becoming more progressive recently, while the county generally is going the other way.
- Planning for land use and transportation: Services are located mostly downtown and east of Wilson; handicapped and elderly need help getting to those locations. Much of the shopping and services are moving north and west. There is interest in revitalizing downtown, but that will need a push from citizens to support the planning process, and dollars to make it happen.

Focus group themes

Focus groups in Wilson County included a small group of people with transportation or public-service experience, and a large group of seasonal farm laborers hired from Mexico and provided with group housing and limited transportation (work sites, weekend transportation to shopping). The farm-workers shared personal experiences that illustrate transportation challenges that directly shape their daily lives. Focus group participants were very limited in their ability to independently access health care, retail, other services and social opportunities outside of the camp. Because of their geographic isolation and the lack of access to public transportation

(which doesn't reach them) and private transportation (no one can afford a car), they were wholly dependent on their employer and a nearby clinic for transportation. They sometimes walk into town to go to the tienda, or to the lake to go fishing, but make limited other trips, usually to a tienda' or 'dispensa' (small stores). Their constrained travel reflects their options: There was a lot of expressed interest in going to nearby cities such as Raleigh and Durham to sight-see and access a greater variety of goods at lower prices. Having access to the beach and other public destinations would provide opportunities for affordable entertainment and recreation—saving money to send home being their paramount concern. The overall impression is one of forced dependency on the employer to provide a gateway to the world outside of the camp.

People come from all over Mexico to work at this camp—out of the 31 states in Mexico, there are 20 states represented among the 30 workers at the camp. They are on 6-7 month contracts, after which they go back home; most of them return for the next harvesting period, so many know each other from previous years. Most of the seasonal workers are bussed between the camp and work site each day; the whole group travels together to each location. Work locations change day by day, but usually are within a half-hour of where they live.

To go anywhere else besides work and the weekly bus run to Wal-Mart “is another story,” and very difficult without someone offering transportation. There are some destinations outside the camp they can access on foot (within 2.5 miles)—a few friends living nearby, as well as a lake where they can fish. There is no restriction on walking around the property or beyond, so they are free to go walking, and sometimes they can find a ride back to camp from their friends. But leaving camp is risky since there is no rail, lights, or other protection from traffic:

We have not been outside the camp today... We only go out on Sundays

During the week, they don't really leave the camp; limited disposable income and the need to send money home to their families constrains their travel and non-work activities. In addition, many want to be available for unexpected work opportunities.

Recreational activities are limited by transportation and liability. The farm-workers appear to take their limited mobility in stride, aware that the terms of their contracts make the employer responsible for everything that happens in the camp—but not outside. As soon as they step out of the camp for anything other than work, they assume the risk for any injury. Given their limited contracts and the goal is to earn and send money back to their families, they tend to stay at camp and forego recreational activities. If they decide to leave the camp outside of work, they need to either call a friend or pay someone to take them. During the rest of the week they work in the field and only leave the site if it is an emergency or completely necessary, for example: assigned work in another place, equipment pickup run, errands for the employer, or if someone is sick or hurt.

The workers reported that emergencies are well-covered: Harvest clinic will arrange transport on certain days of the week, and the employer will lend a vehicle or provide a ride for urgent needs.

If we ask to go somewhere, they take us. That has never been a problem. [...] In case of an emergency the patron helps us get wherever we need fast, and without a problem

The focus group was unanimous on what would make it easier for them to get around: a bus that makes daily or other routine trips for workers. Destinations of interest include cities like Raleigh and Durham (beyond Wilson, which they already know), stores, and the beach. Other desirable destinations: church, bars, sports events, other retail outlets (beyond the routine Wal-Mart runs). Although several people in the camp (8-10) have licenses and can drive the trucks (for work purposes or emergencies), no-one owns a car. Without car or license, it is very difficult to get around. A bus that could be used for grocery store trips and other needs would make them feel less isolated and less dependent on their employer or service providers. Their transportation situation, with regular access to Wal-Mart and other services, is better than other camps they have worked at or heard of; they consider their situation atypical of migrant camps. The consensus: The primary reason for their residence in the camp was employment and family support; their desire for travel to destinations other than work and weekly shopping are modest and secondary to their motivation to maintain employment and earnings, but still factor into attitudes about the camp and their lives.

Some of the focus group participants seemed reluctant to speak up or skeptical of the value of this inquiry; they gave the impression they do not expect anything to change in the long run. But in the background, one of youngest workers was heard repeating... "Never say never" with a hopeful and grateful tone.

How to Use Indicators to Map Transportation-Disadvantaged Populations

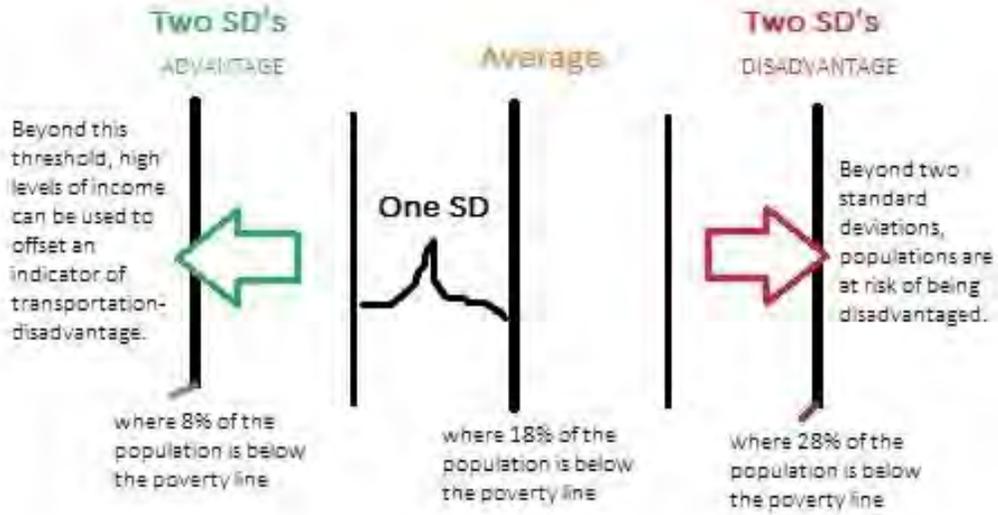
1. Choose indicators that are likely to demonstrate transportation-disadvantage in a region.
 - a. For this study the following indicators were chosen: household income, households with mobility-impaired individuals, households with youth of non-driving age, households with seniors, ethnic minority households, and Limited English Proficiency households (carless households may also be a desired indicator).
2. Determine indicator thresholds for what constitutes transportation-disadvantage.
 - a. For this study statewide county averages were calculated for each indicator based on Census data.
 - b. Standard deviations from these averages were also calculated. Indicator values that were beyond two standard deviations of the indicator averages were given a value of 1 and mapped. For guidance on how to calculate standard deviations see page 78
3. Follow guidance in 2a and 2b. Assign all indicators that are greater than two standard deviations of the county averages a value of 1. Map the areas that have a value of 1. Practitioners will need to develop a color coding system so that it becomes apparent how many indicators are mapped, in areas where there are overlap.
4. Revise maps based on outreach.
 - a. For this study it was determined that low-income could indicate transportation-disadvantage, while high-income could indicate “transportation-advantage.” After discussions with a key informant, a correction factor of -1 was applied households experienced a high income-level. For this study, a correction factor of -1 was used for populations beyond two standard deviations of the statewide county average for houses below the poverty level (see image on the following page.)

	S1701: % Below Poverty Level (Household income)	S1801: % Without any disability	P12: 14 and Under (Youth of Non-Driving Age)	P12: 62 and greater (Households with seniors)	B02001: 100-White Alone% (Ethnic minority households)	B16001: % Pop Speak English Less Than "Very Well" (All Subgroups)	B08201: % No Cars
NC Statewide Average	18%	81%	19%	19%	28%	4%	7%
Standard Dev	5%	4%	2%	5%	18%	2%	3%
Mapping Threshold (1)	≥28%	≤73%	≥23	≥29%	≥64%	≥8%	≥13%
Correction Factor (-1)	<8%						

Income Example

Statewide County Average = 18%

Standard Deviation (SD) = 5%





Calculating the Mean and Standard Deviation

Many of the questions from the patient satisfaction surveys include rating scales. This will require calculating means and standard deviations for data analysis. This can be done using popular spreadsheet software, such as Microsoft Excel®, or even online calculators. If neither of these is readily available, both the mean and standard deviation of a data set can be calculated using arithmetic formulas. Following are brief descriptions of the mean and standard deviation with examples of how to calculate each.

The Mean

For a data set, the mean is the sum of the observations divided by the number of observations. It identifies the central location of the data, sometimes referred to in English as the average. The mean is calculated using the following formula.

$$M = \frac{\Sigma(X)}{N}$$

Where Σ = Sum of
 X = Individual data points
 N = Sample size (number of data points)

Example: To find the mean of the following data set: 3,2,4,1,4,4.

$$M = \frac{3+2+4+1+4+4}{6} = \frac{18}{6} = 3$$

The Standard Deviation

The standard deviation is the most common measure of variability, measuring the spread of the data set and the relationship of the mean to the rest of the data. If the data points are close to the mean, indicating that the responses are fairly uniform, then the standard deviation will be small. Conversely, if many data points are far from the mean, indicating that there is a wide variance in the responses, then the standard deviation will be large. If all the data values are equal, then the standard deviation will be zero. The standard deviation is calculated using the following formula.

$$S^2 = \frac{\Sigma(X-M)^2}{n - 1}$$

Where Σ = Sum of
 X = Individual score
 M = Mean of all scores
 N = Sample size (number of scores)

Example: To find the Standard deviation of the data set: 3,2,4,1,4,4.

Step 1: Calculate the mean and deviation.

X	M	(X-M)	(X-M) ²
3	3	0	0
2	3	-1	1
4	3	1	1
1	3	-2	4
4	3	1	1
4	3	1	1

Step 2: Using the deviation, calculate the standard deviation

$$S^2 = \frac{(0+1+1+4+1+1)}{(6-1)} = \frac{8}{5} = 1.6$$

$$S = 1.265$$

What to Infer from the Mean and Standard Deviation

As explained previously, if the data points are close to the mean, indicating that the responses are fairly uniform, then the standard deviation will be small. Conversely, if many data points are far from the mean, indicating that there is a wide variance in the responses, then the standard deviation will be large. However, the standard deviation alone is not particularly useful without a context within which one can determine meaning.

A standard deviation of 1.265 with a mean of 3, as calculated in our example, is much different than a standard deviation of 1.265 with a mean of 12. By calculating how the standard deviation relates to the mean, otherwise known as the coefficient of variation (CV), you will have a more uniform method of determining the relevance of the standard deviation and what it indicates about the responses of your sample. The closer the CV is to 0, the greater the uniformity of data. The closer the CV is to 1, the greater the variability of the data.

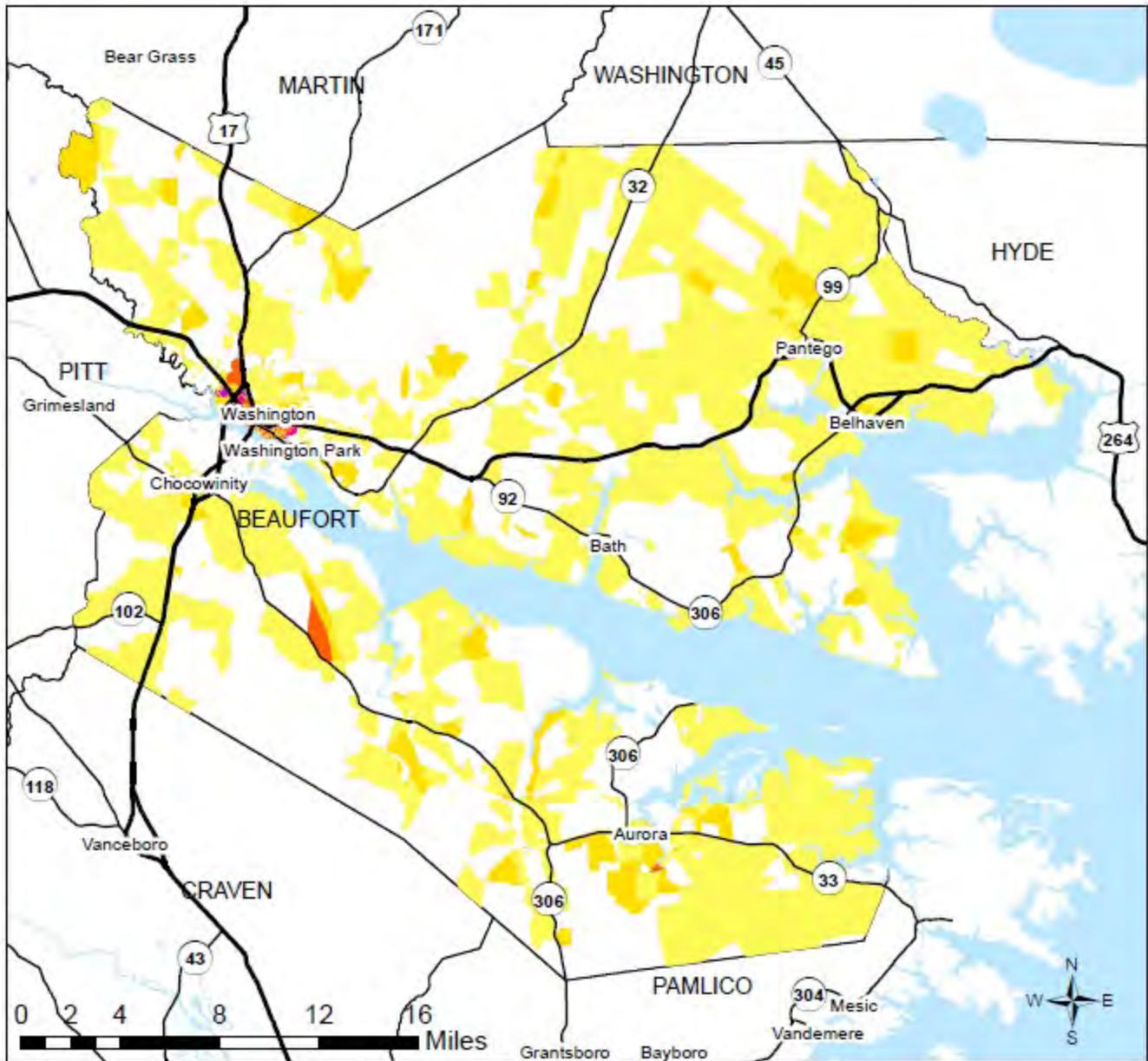
$$CV = \frac{S}{M}$$

Using our example of a standard deviation of 1.265 and a mean of 3, you will see that the coefficient of variation is rather large, indicating that the data has a great deal of variability with respect to the mean and there is not general consensus among the sample.

$$CV = \frac{S}{M} = \frac{1.265}{3} = .42$$

Using the example of a standard deviation of 1.265 and a mean of 12, you will see that the coefficient of variation is rather small, indicating that the data has a greater deal of uniformity with respect to the mean and there is a general consensus among the sample.

$$CV = \frac{S}{M} = \frac{1.265}{12} = .11$$



Compilation of Disadvantaged Population Factors – Beaufort County

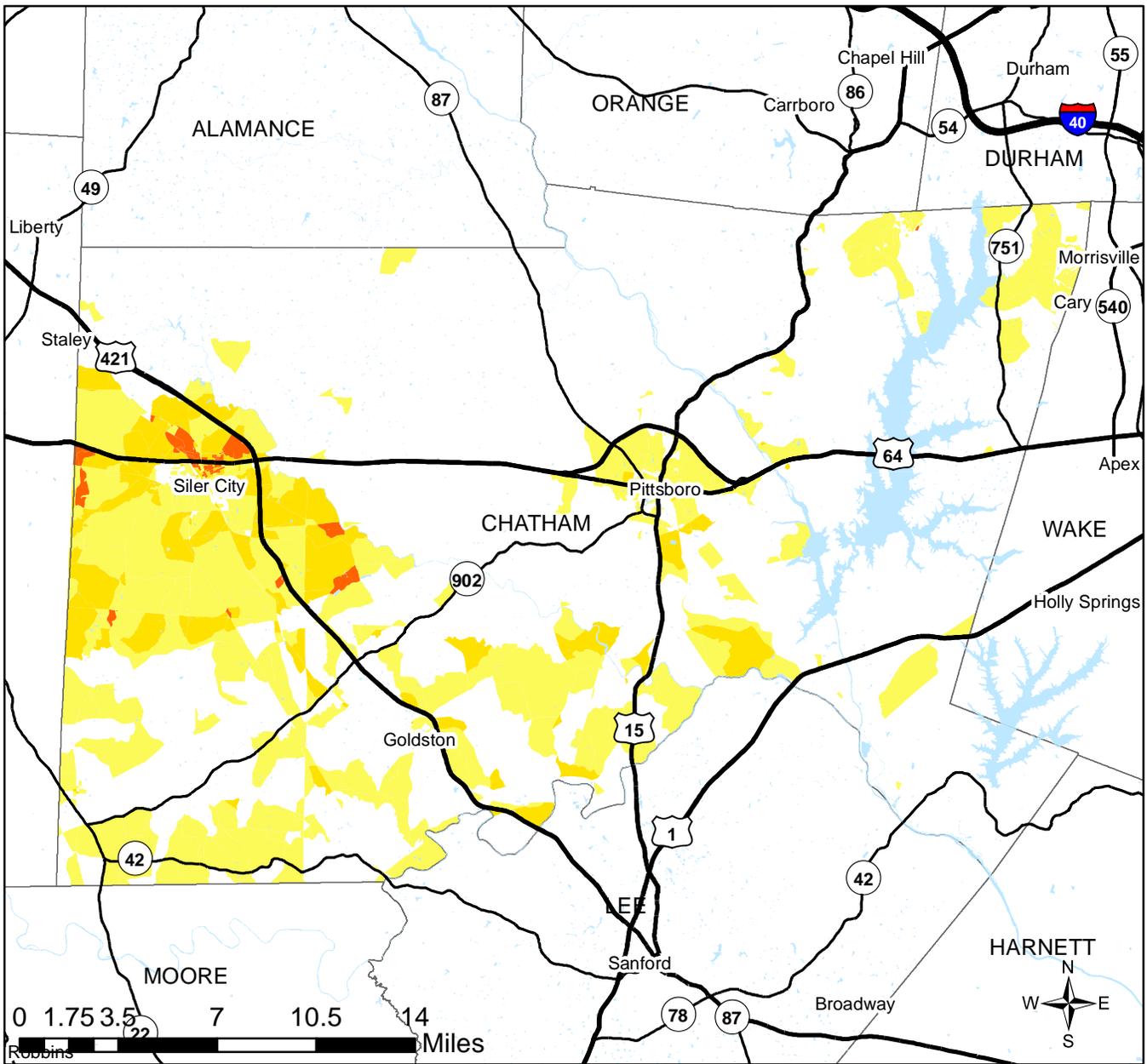
Number of Factors Exceeding Thresholds (6 Total)

Number of Factors	Indicators	Threshold Values
0		
1	Household Income	Low Income: \geq 28% of Population Below Poverty Level High Income: $<$ 8% of Population Below Poverty Level (Negative Factor)*
2	Households with mobility-impaired individuals	$<$ 73% of Population 5 Years and Over Without Any Disability
	Households with youth of non-driving age	\geq 23 % of Population \leq 14 years old
	Households with seniors	\geq 29% of Population \geq 62 years old
3	Ethnic minority households	\geq 64% Minority Population
4	LEP households	\geq 5% of Population or $>$ 1000 persons per tract speaking English less than "Very Well"

*Applied in response to key informant interviews



Beaufort County Average: 0.59 indicators



Compilation of Disadvantaged Population Factors - Chatham County

Number of Indicators Exceeding Threshold (6 Total)



Indicators	Threshold Values
Household Income	Low Income: $\geq 28\%$ of Population Below Poverty Level High Income: $< 8\%$ of Population Below Poverty Level (Negative Factor)*
Households with mobility-impaired individuals	$< 73\%$ of Population 5 Years and Over Without Any Disability
Households with youth of non-driving age	$\geq 23\%$ of Population ≤ 14 years old
Households with seniors	$\geq 29\%$ of Population ≥ 62 years old
Ethnic minority households	$\geq 64\%$ Minority Population
LEP households	$\geq 5\%$ of Population or >1000 persons per tract speaking English less than "Very Well"

*Applied in response to key informant interviews



Chatham County Average: **0.40 indicators**

Data Source: 2011 Census Data Table S1701, S1801, P12, B02001, B16001, B08201



Defining North Carolina's Transportation Disadvantaged Populations

NCDOT RESEARCH PROJECT 2013-12

Summary of Data for GIS-Derived Maps

The following table presents a series of indicators for identifying transportation disadvantaged populations. For each indicator, one or more Census data sources have been detailed that provide useful data related to each indicator. The analysis threshold provides details about the census data used for mapping, including the North Carolina county average (and standard deviation) for each attribute. The subsequent mapping is based on the North Carolina county average plus intervals of standard deviation (i.e., county average, average plus one standard deviation, average plus two standard deviations, and greater than average plus two standard deviations). This information provides practitioners with the information needed to replicate this analysis or extend this analysis to other areas.

A summary map was developed for each county presenting the various indicators in a composite map based on thresholds of the North Carolina county average plus two standard deviations for each indicator. The purpose of these maps are to display areas where a confluence of factors exist that are indicative of transportation disadvantaged populations. The maps show a count (from a minimum of 0 factors to a maximum of 6) of the indicator thresholds that are exceeded in each area. The indicators and their respective thresholds are:

- Low-income households: $\geq 28\%$ of Population Below Poverty Level
- Households with mobility-impaired individuals: $< 73\%$ of Population 5 Years and Over Without Any Disability
- Households with youth of non-driving age: $\geq 23\%$ of Population ≤ 14 years old
- Households with seniors: $\geq 29\%$ of Population ≥ 62 years old
- Ethnic minority households: $\geq 64\%$ Minority Population
- LEP households: $\geq 8\%$ of Population speaking English less than "Very Well"

The data used for NCDOT CIAs from the US Census include:

- Population Change – US Census Bureau, Census 2010 and Census 2000, Summary File 1 100% Data, Table P1 and P001 "Total Population"
- Race – US Census Bureau, American Community Survey 5-Year Estimates (2006-2010), Table B020001, "Race"
- Hispanic – US Census Bureau, American Community Survey 5-Year Estimates (2006-2010), Table B03002, "Hispanic or Latino Origin by Race"

- Poverty – US Census Bureau, American Community Survey 5-Year Estimates (2006-2010), Table S1701, “Poverty Status in the Past 12 Months,” and Table C17002, “Ratio of Income to Poverty Level in the Past 12 months”
- LEP – US Census Bureau, American Community Survey 5-Year Estimates (2006-2010), Table B16001, “Language Spoken at Home by Ability to Speak English for the Population 5 Years and Over”
- Percentage of Households Without Cars - US Census Bureau, American Community Survey 2011 5-Year Estimates, Table B08021. *Note: Percentage of Households Without Cars was not used for the mapping process.*

Notes/Thoughts for Further Analysis:

- S1701: Poverty could be stratified by age, sex, race, employment status, work status
- C17002: Using a different level of poverty (i.e. under .5, .5 to .99, 1 to 1.24, 1.25 to 1.49, 1.50 to 1.84, 1.85 to 1.99, or 2.0 and greater)

Disadvantaged Population Indicator	Census Data Source(s)	Analysis Threshold
Low-income households	S1701: Poverty Status in the Past 12 Months – Tract (US Census Bureau, American Community Survey 2011 5-Year Estimates)* C17002: Ratio of Income to Poverty Level in the Past 12 months – Tract (US Census Bureau, American Community Survey 2011 5-Year Estimates)*	S1701: Percentage of Population Below Poverty Level NC County Average = 18% (SD 5%) Maps of <18%, 18%-22.99%, 23%-27.99%, and ≥ 28%
Households with mobility-impaired individuals	S1801: Disability Characteristics – Cities/Towns, County (2007 American Community Survey 3-Year Estimates) S1810: Disability Characteristics – Cities/Towns, County (2011 American Community Survey 3-Year Estimates) S1811: Selected Economic Characteristics for the Civilian Non institutionalized Population by Disability Status – Cities/Towns, County (2011 American Community Survey 3-Year Estimates)	S1801: Population 5 Years and Over Without Any Disability (sensory, physical, mental, self-care, go-outside-home, employment) NC County Average = 81% (SD 4%) Maps of <73%, 73%-76.99%, 77%-80.99%, ≥81% (Higher is more desirable)
Households with youth of non-driving age	P12: Sex by Age – Block (2010 Census Summary File 1)	P12: Male and Female Population ≤ 14 years old NC County Average = 19% (SD 2%) Maps of <19%, 19%-20.99%, 21%-22.99%, and ≥ 23%
Households with seniors	P12: Sex by Age – Block (2010 Census Summary File 1)	P12: Male and Female Population ≥ 62 years old NC County Average = 19% (SD 5%) Maps of <19%, 19%-23.99%, 24%-28.99%, and ≥ 29%
Ethnic minority households	B02001: Race – Tract (US Census Bureau, American Community Survey 2011 5-Year Estimates)* B03002: Hispanic or Latino Origin by Race – Tract (US Census Bureau, American Community Survey 5-Year Estimates (2006-2010))*	B02001: 100% - Percentage of White Alone NC County Average = 28% (SD 18%) Maps of <28%, 28%-45.99%, 46%-63.99%, and ≥ 64%
LEP households	B16001: Language Spoken at Home by Ability to Speak English for the Population 5 Years and Over – Tract (US Census Bureau, American Community Survey 2011 5-Year Estimates)*	B16001: Percentage of all Languages comprised of speaking English less than “Very Well” ≥ 8% of Population or >1000 persons per tract speaking English less than “Very Well”
Carless households**	B08021: Tract (US Census Bureau, American Community Survey 2011 5-Year Estimates)*	B08021: Percentage of Households Without Cars NC County Average = 7% (SD 3%) Maps of <7%, 7%-9.99%, 10%-12.99%, and ≥ 13%

* Represents US Census data used for NCDOT CIA

**While the statewide county average is 8% for LEP households, NCDOT requested using a threshold of 5% (LEP requirement) for the case study applications.

TD Population Indicator Mapping Process

LRS Arcs Shapefile: <https://connect.ncdot.gov/resources/gis/Pages/GIS-Data-Layers.aspx>

In ArcMap 10.1:

- Import shapefile
- Right click shapefile in Table of Contents and select “Properties”:
 - “Definition Query” tab:
 - Enter `"RTE_1_CLSS"='I' OR "RTE_1_CLSS"='US' OR "RTE_1_CLSS"='NC'`
 - “Symbology” tab:
 - Click Categories in the “Show:” box
 - Select `RTE_1_CLSS` as “Value Field”
 - Select “Add All Values”
 - Double Click each value and define as:
 - I: Color: Blue Width: 2.75
 - US: Color: Black Width: 2.00
 - NC: Color: Red Width: 1.25
 - Uncheck “<all other values>” box
 - “Labels” tab:
 - Check “Label features in this layer” box
 - Set “Method:” to “Define classes of features and label each class differently”
 - Select “Add...” and create three new classes: I, US, and NC
 - Set the “Label Field:” to `RTE_1_NBR` for all three classes
 - Select “SQL Query...” and enter `"RTE_1_CLSS"='the name of the class'`
 - Select “Symbol...” and choose the appropriate shield symbol for the class of road
 - Select “Placement Properties...” and choose “Horizontal” Orientation and “Remove duplicate labels”
 - Select *Default* class and delete

Municipal Boundaries: <https://connect.ncdot.gov/resources/gis/Pages/GIS-Data-Layers.aspx>

In ArcMap 10.1:

- Import shapefile
- Double Click the box under the shapefile in the Table of Contents:
 - Select “Hollow”
 - Set “Outline Width:” to 0
- Right click shapefile in Table of Contents and select Properties:
 - “Labels” tab:
 - Check “Label features in this layer” box
 - Set “Method:” to “Label all the features the same way”
 - Set “Label Field:” to *MB_NAME*
 - Select “Placement Properties...” and choose “Horizontal” Orientation and “Remove duplicate labels”
 - Select “Symbol” → “Edit Symbol...” → “Mask” tab: Set “Style” to “Halo” and “Size:” to 1.5000

County Boundaries: <https://connect.ncdot.gov/resources/gis/Pages/GIS-Data-Layers.aspx>

In ArcMap 10.1:

- Import shapefile
- Double Click the box under the shapefile in the Table of Contents and select “Hollow”
- Right click shapefile in Table of Contents and select Properties:
 - “Labels” tab:
 - Check “Label features in this layer” box
 - Set “Method:” to “Label all the features the same way”
 - Set “Label Field:” to *NAME*
 - Select “Placement Properties...” and choose:
 - “Horizontal” Orientation
 - “Remove duplicate labels”
 - Check “Only place label inside polygon” box
 - Set the font to 10

Road Density Maps:

- Block group shapefile: ftp://ftp2.census.gov/geo/pvs/tiger2010st/37_North_Carolina/
 - EX. tl_37001_bg10.zip
- All Roads shapefile: <http://www.census.gov/cgi-bin/geo/shapefiles2012/main>
 - Layer Type: Roads
 - All Roads: North Carolina
 - Select County

In ArcMap10.1

- Under the “Geoprocessing” tab select “Buffer”
 - Set “Distance” to a “Linear Unit” of 10 ft
 - Set “Side Type” to “FULL”
 - Set “Dissolve Type” to “NONE”
 - Name the output “BUFFER”
- Under the “Geoprocessing” tab select “Intersect”
 - Under “Input Features” select “BUFFER” and the roads shapefile
 - Set “Output Type” to “LINE”
 - Name the output “SEGMENTED_ROADS”
- Right click the “SEGMENTED_ROADS” and select “Open Attribute Table”
 - Click “Table Options” (white rectangle) in the top left of the opened window and select “Add Field”
 - Set “Name:” as *Length* and “Type:” as “Double”
 - Right click the new Length column and select “Calculate Geometry”
 - Set “Property” to “Length” and “Units” to “Miles US”
 - Copy the entire “SEGMENTED_ROADS” table to Excel

In Excel:

- Under the “Data” tab select “Remove Duplicates”
 - Under “Columns” select only “FULLNAME” and “Length”
- Save table as “Cleaned_Roads”

In ArcMap10.1

- Import “Cleaned_Roads”
- Right click “SEGMENTED_ROADS” in the Table of Contents and select “Joins and Relates” → “Join...”
 - Select “Join attributes from a table”
 - Choose “FID” as the “field in this layer that the join will be based on”
 - Choose the “Cleaned_Roads” table as the table to join.
 - Choose “FID” as the “field in the table to base the join on”
 - Under “Join Options”, select “Keep only matching records”

- Right click the block group shape file in the Table of Contents and select “Joins and Relates” → “Join...”
 - Select “Join data from another layer based on spatial location”
 - Choose the “SEGMENTED_ROADS” as the layer to join.
 - Select “Each polygon will be given a summary of the numeric attributes...”
 - Select “Sum” for how the attributes are to be summarized
 - Save output as “Join_Ouput” and set “Type:” as “Shapefile”
- Right click “Join_Output” in the Table of Contents and select “Open Attribute Table”
 - Click “Table Options” (white rectangle) in the top left of the opened window and select “Add Field”
 - Set “Name:” as *Density* and “Type:” as “Double”
 - Right click the Density column as select “Field Calculator”
 - Enter $[Sum_Leng_1]/(([ALAND10]+ [AWATER10])*3.861*10^{-7})$
- Right click “Join_Output” in the Table of Contents and select “Properties”
 - “Symbology” tab:
 - Click “Quantities” in the “Show:” box
 - Set “Value: as *Density*”
 - Set the “Color Ramp:” as yellow to brown
 - Double Click the boxes and set “Outline Width:” to 0
 - Click the “Range” variables and set as desired
- Right click “Join_Output” in the Table of Contents and select “Open Attribute Table”
 - Right click the Density column and select “Statistics” to find average density

State Abbreviation	FIPS Code
NC	37

County	FIPS	County	FIPS	County	FIPS	County	FIPS
Alamance	001	Cumberland	051	Johnston	101	Randolph	151
Alexander	003	Currituck	053	Jones	103	Richmond	153
Alleghany	005	Dare	055	Lee	105	Robeson	155
Anson	007	Davidson	057	Lenoir	107	Rockingham	157
Ashe	009	Davie	059	Lincoln	109	Rowan	159
Avery	011	Duplin	061	Macon	111	Rutherford	161
Beaufort	013	Durham	063	Madison	113	Sampson	163
Bertie	015	Edgecombe	065	Martin	115	Scotland	165
Bladen	017	Forsyth	067	McDowell	117	Stanly	167
Brunswick	019	Franklin	069	Mecklenburg	119	Stokes	169
Buncombe	021	Gaston	071	Mitchell	121	Surry	171
Burke	023	Gates	073	Montgomery	123	Swain	173
Cabarrus	025	Graham	075	Moore	125	Transylvania	175
Caldwell	027	Granville	077	Nash	127	Tyrrell	177
Camden	029	Greene	079	New Hanover	129	Union	179
Carteret	031	Guilford	081	Northampton	131	Vance	181
Caswell	033	Halifax	083	Onslow	133	Wake	183
Catawba	035	Harnett	085	Orange	135	Warren	185
Chatham	037	Haywood	087	Pamlico	137	Washington	187
Cherokee	039	Henderson	089	Pasquotank	139	Watauga	189
Chowan	041	Hertford	091	Pender	141	Wayne	191
Clay	043	Hoke	093	Perquimans	143	Wilkes	193
Cleveland	045	Hyde	095	Person	145	Wilson	195
Columbus	047	Iredell	097	Pitt	147	Yadkin	197
Craven	049	Jackson	099	Polk	149	Yancey	199

Downloading Data from the New American FactFinder to use with TIGER/Line Shapefiles

NEW American FactFinder (AFF)

- Access data from:
 - 2010 Decennial Census
 - All data from the Legacy AFF (beginning Fall 2011)
- <http://factfinder2.census.gov>

American FactFinder Homepage

The screenshot displays the American FactFinder homepage with the following elements:

- Header:** U.S. Census Bureau logo and 'AMERICAN FactFinder' branding with a magnifying glass icon. Navigation links for 'Feedback', 'FAQs', 'Glossary', and 'Help' are on the right.
- Navigation Bar:** 'MAIN' (highlighted), 'SEARCH', 'WHAT WE PROVIDE', and 'USING FACTFINDER'. Language options 'English' (highlighted) and 'Español' are on the right.
- Left Sidebar:**
 - Your Selections:** 'Your Selections' is empty.
 - Topics:** ?
 - Geographies:** (states, counties, places, ...)
 - Population Groups:** (race, ancestry, ...)
 - Industry Codes:** (NAICS, ...)
 - Legacy American FactFinder:** The following data are available on the legacy American FactFinder System:
 - [2007 Economic Census](#)
- Main Content Area:**
 - Header:** 'Your source for population, housing, economic, and geographic data' with four circular icons representing people, houses, money, and a map.
 - Video Tutorial:** 'View video tutorials to help you get started using the NEW American FactFinder.'
 - Quick Start:**
 - Enter search term(s) and click 'GO' ?
 - Form fields: 'topic or table name' and 'geography (optional) for'.
 - Buttons: 'GO' and radio buttons for 'topics' (selected), 'population groups', and 'industries'.
 - Text: 'Or use the options on the left to begin your search'
 - News and Notes:**
 - Feb 04, 2011
- Right Sidebar:**
 - U.S. Population Clock:** 18:01 UTC (EST+5) Mar 15, 2011. **310,990,167** (more population clocks)
 - Reference Maps:** Reference Maps show selected geographic boundaries for an area along with orienting features, such as roads. Includes a dropdown for 'United States' and a 'GO' button.
 - Address Search:** (Section header)

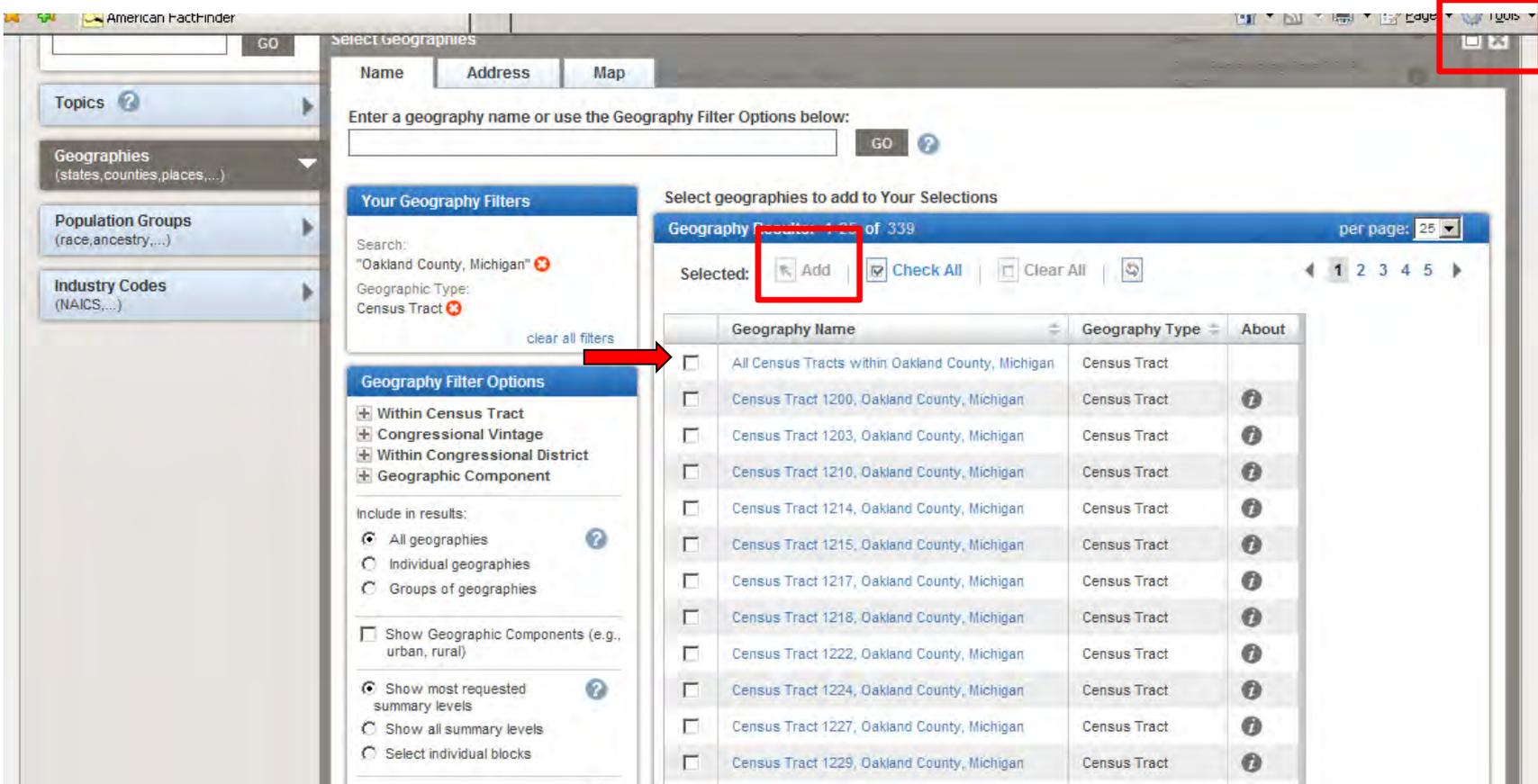
The screenshot shows the U.S. Census Bureau data selection interface. On the left, a sidebar menu under 'Topics' includes options like People, Housing, Year, Product Type, Document Type, Data Type, Compare Geography, Program, Survey, and Dataset. The 'Dataset' option is selected, and a list of datasets is displayed in the main area. The dataset '2010 Redistricting Data SF (PL 94-171)' is highlighted. A red arrow points from this dataset to the 'Your Selections' box on the right, which now contains the selected dataset name. Below this is a 'Search within Results for...' field and a 'GO' button. At the bottom, another 'Topics' menu is visible with 'People' and 'Housing' options.

<input type="checkbox"/>	QT-PL	Race, Hispanic or Latino, Age, and Housing Occupancy: 2010	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	GCT-PL1	Race and Hispanic or Latino: 2010 - State -- Place	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	GCT-PL1	Race and Hispanic or Latino: 2010 - State -- County Subdivision	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	GCT-PL1	Race and Hispanic or Latino: 2010 - State -- School District	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	GCT-PL1	Race and Hispanic or Latino: 2010 - State -- American Indian Area/Alaska Native Area/Hawaiian Home Land	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	GCT-PL1	Race and Hispanic or Latino: 2010 - State -- Congressional District	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	GCT-PL1	Race and Hispanic or Latino: 2010 - State -- Place and (in selected) County Subdivision	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	GCT-PL1	Race and Hispanic or Latino: 2010 - County -- County Subdivision	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	GCT-PL1	Race and Hispanic or Latino: 2010 - State -- State Legislative District	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	GCT-PL1	Race and Hispanic or Latino: 2010 - County -- Census Tract	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	GCT-PL1	Race and Hispanic or Latino: 2010 - State -- County / County Subdivision	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	GCT-PL2	Population and Housing Occupancy Status: 2010 - State -- State	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	GCT-PL2	Population and Housing Occupancy Status: 2010 - County -- County	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	GCT-PL2	Population and Housing Occupancy Status: 2010 - State -- State	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	GCT-PL2	Population and Housing Occupancy Status: 2010 - State -- American Indian Area/Alaska Native Area/Hawaiian Home Land	2010 Redistricting Data SF (PL 94-171)	i

- First, select the dataset
 - Click **Topics**
 - Click **Dataset**
 - Click on the **2010 Redistricting Data SF (PL 94-171)** and this sends the dataset to the **Your Selections** box.

The screenshot shows a web application interface for selecting geographies. The main content area is titled "Select Geographies" and contains a search bar with the text "Enter a geography name or use the Geography Filter Options below:". Below the search bar is a "GO" button. To the left of the search bar is a sidebar with navigation options: "Geographies (states, counties, places,...)", "Population Groups (race, ancestry,...)", and "Industry Codes (NAICS,...)". A red arrow points to the "Geographies" sidebar item. Below the search bar is a "Your Geography Filters" section, which is currently empty. Below that is a "Geography Filter Options" section with a list of options: "Geographic Type" (State (53), County (4,823), City or Town (89,387), Congressional District (2,294), Census Tract (78,824), Other (111,664)), "Summary Level" (Within State, Within Region, Within Division, Within County), and "Type of County". A red arrow points to the "Census Tract" option. To the right of the search bar is a "Select geographies to add to Your Selections" section. It shows "Geography Results: 1-25 of 287,045" and a "per page: 25" dropdown. Below this is a table with columns "Geography Name", "Geography Type", and "About". The table lists various states: All States within United States, Alabama, Alaska, Arizona, Arkansas, California, and Colorado. A "Selected:" section above the table includes "Add", "Check All", and "Clear All" buttons. At the top of the page, there is a "Dataset:" section with "2010 Redistricting Data SF (PL 94-171)" and a "clear all selections" link. Below this is a "Search within Results for..." section with a search bar and a "GO" button. At the top right, there is a "Selected:" section with "View", "Download", "Compare", and "Clear All" buttons. Below this is a table with columns "ID", "Title", "Dataset", and "About".

- Now select the geography. We will retrieve data for all census tracts in Oakland County, Michigan as an example.
 - Click **Geographies**
 - Type *Oakland County, Michigan* into the **Enter a geography name or use the Geography Filter Options below** box.
 - Click on **Census Tract** under **Geographic Type**



- Once your results page refreshes, Check the box next to **All Census Tracts within Oakland County, Michigan**.
- Click **Add** and this will add the geography to the **Your Selections** box.
- Close out of the geography window by hitting the **x** in the top, right corner.

U.S. Census Bureau AMERICAN FactFinder

MAIN **SEARCH** WHAT WE PROVIDE USING FACTFINDER Feedback FAQs Glossary Help

Search Use the options on the left (search, topics, geographies, ...) to find the data you're looking for

Your Selections

Dataset:
2010 Redistricting Data SF (PL 94-171) ✕

Census Tract:
All Census Tracts within Oakland
County, Michigan ✕

[clear all selections](#)

Search within Results for... →

Topics ?

- [-] People
 - [+] Basic Count/Estimate
 - [+] Age & Sex
 - [+] Origins
 - [+] Race & Ethnicity
- [+] Housing
- [+] Product Type
- [+] Dataset

Include archived products ?

Search Results: 1-7 of 7 per page: 25

Selected: ?

	ID	Title	Dataset	About
<input type="checkbox"/>	QT-PL	Race, Hispanic or Latino, Age, and Housing Occupancy: 2010	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	H1	OCCUPANCY STATUS	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	P1	RACE	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	P2	HISPANIC OR LATINO, AND NOT HISPANIC OR LATINO BY RACE	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	P3	RACE FOR THE POPULATION 18 YEARS AND OVER	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	P4	HISPANIC OR LATINO, AND NOT HISPANIC OR LATINO BY RACE FOR THE POPULATION 18 YEARS AND OVER	2010 Redistricting Data SF (PL 94-171)	i
<input type="checkbox"/>	G001	GEOGRAPHIC IDENTIFIERS	2010 Redistricting Data SF (PL 94-171)	i

Selected: ?

- All available data tables will show up in the **Search Results** section.
- In this example, we will view the **Race (P1)** table to download the total population for each census tract.
 - Check the box next to **Race** and click **View**

Results - Click [Back to Search](#) to select other tables or geographies

← BACK TO SEARCH

Result 1 of 1

VIEW ALL

P1

RACE
 Universe: Total population ⓘ
 2010 Census Redistricting Data (Public Law 94-171) Summary File

Table View

Map View

Actions: [Modify Table](#) | [Bookmark](#) | [Download](#) | [Create a Map](#)

[View Table Notes](#)

NOTE: For information on confidentiality protection, nonsampling error, and definitions, see <http://www.census.gov/prod/cen2010/pl94-171.pdf>

← 1 - 18 of 338 >>

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	Census Tract 1200, Oakland County, Michigan	Census Tract 1203, Oakland County, Michigan	Census Tract 1210, Oakland County, Michigan	Census Tract 1214, Oakland County, Michigan	Census Tract 1215, Oakland County, Michigan	Census Tract 1217, Oakland County, Michigan	Census Tract 1218, Oakland County, Michigan	Census Tract 1222, Oakland County, Michigan	Census Tract 1224, Oakland County, Michigan	Census Tract 1227, Oakland County, Michigan	Census Tract 1229, Oakland County, Michigan	Census Tract 1230, Oakland County, Michigan	Census Tract 1231, Oakland County, Michigan	Census Tract 1240, Oakland County, Michigan	Census Tract 1245, Oakland County, Michigan	Census Tract 1250, Oakland County, Michigan	Census Tract 1256, Oakland County, Michigan	Census Tract 1262, Oakland County, Michigan
Total:	3,115	3,230	3,408	3,991	3,436	5,198	4,499	3,517	6,755	3,022	1,881	2,396	3,080	5,283	6,079	3,457	2,793	2,657
Population of one race:	3,062	3,215	3,337	3,913	3,390	5,131	4,435	3,493	6,642	2,987	1,849	2,361	3,048	5,183	5,963	3,401	2,774	2,631
White alone	2,979	3,156	3,172	3,714	3,267	5,019	4,303	3,419	6,430	2,926	1,790	2,277	2,982	4,854	5,776	3,277	2,717	2,547
Black or African American	19	22	70	69	65	31	43	27	67	20	13	35	23	168	70	56	24	28

- AFF displays the population, and population by race, for each census tract within Oakland County, Michigan. However, it only shows a few tracts on each page. You can click on the arrows (> >>) to scroll through all of the data.

Results - Click [Back to Search](#) to select other tables or geographies

← BACK TO SEARCH

Result 1 of 1

VIEW ALL

P1

RACE
 Universe: Total population ⓘ
 2010 Census Redistricting Data (Public Law 94-171) Summary File

Table View

Map View

Actions: [Modify Table](#) | [Bookmark](#) | [Download](#) | [Create a Map](#)

[View Table Notes](#)

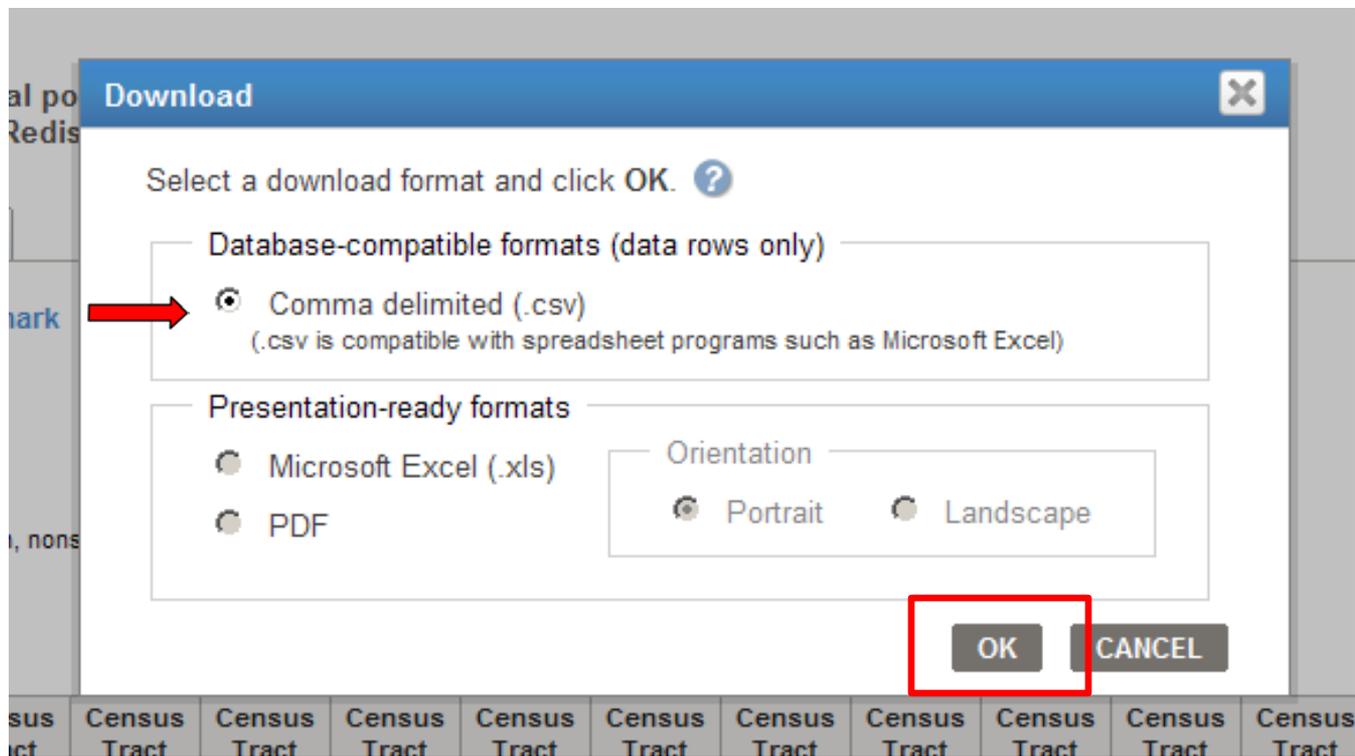
NOTE: For information on confidentiality protection, nonsampling error, and definitions, see <http://www.census.gov/prod/cen2010/pl94-171.pdf>

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<< 1 - 18 of 338 >>

	Census Tract 1200, Oakland County, Michigan	Census Tract 1203, Oakland County, Michigan	Census Tract 1210, Oakland County, Michigan	Census Tract 1214, Oakland County, Michigan	Census Tract 1215, Oakland County, Michigan	Census Tract 1217, Oakland County, Michigan	Census Tract 1218, Oakland County, Michigan	Census Tract 1222, Oakland County, Michigan	Census Tract 1224, Oakland County, Michigan	Census Tract 1227, Oakland County, Michigan	Census Tract 1229, Oakland County, Michigan	Census Tract 1230, Oakland County, Michigan	Census Tract 1231, Oakland County, Michigan	Census Tract 1240, Oakland County, Michigan	Census Tract 1245, Oakland County, Michigan	Census Tract 1250, Oakland County, Michigan	Census Tract 1256, Oakland County, Michigan	Census Tract 1262, Oakland County, Michigan
Total:	3,115	3,230	3,408	3,991	3,436	5,198	4,499	3,517	6,755	3,022	1,881	2,396	3,080	5,283	6,079	3,457	2,793	2,657
Population of one race:	3,062	3,215	3,337	3,913	3,390	5,131	4,435	3,493	6,642	2,987	1,849	2,361	3,048	5,183	5,963	3,401	2,774	2,631
White alone	2,979	3,156	3,172	3,714	3,267	5,019	4,303	3,419	6,430	2,926	1,790	2,277	2,982	4,854	5,776	3,277	2,717	2,547
Black or African American	19	22	70	69	65	31	43	27	67	20	13	35	23	168	70	56	24	28

- You can also modify the table, bookmark the page, or download the data. In order to use the data in ArcGIS, you will need to download the data.
 - Click [Download](#)



- Click the radio button next to **Comma delimited (.csv)** since this is the database-compatible format.
- Click **OK**
- Save the zipped file to your computer and unzip it.

	A	B	C	D	E	F	G
1				D001	D002	D003	D004
2				Total:	Total:	Total:	Total:
3				Population of one race:		Population of one race:	
4	GEO.id	GEO.id2	GEO.display-label			White alone	Black or African American alone
5	Id	Id2	Geography				Ameri
6	1400000US26125120000	26125120000	Census Tract 1200, Oakland County, Michigan	3115	3062	2979	19
7	1400000US26125120300	26125120300	Census Tract 1203, Oakland County, Michigan	3230	3215	3156	22
8	1400000US26125121000	26125121000	Census Tract 1210, Oakland County, Michigan	3408	3337	3172	70
9	1400000US26125121400	26125121400	Census Tract 1214, Oakland County, Michigan	3991	3913	3714	69
10	1400000US26125121500	26125121500	Census Tract 1215, Oakland County, Michigan	3436	3390	3267	65
11	1400000US26125121700	26125121700	Census Tract 1217, Oakland County, Michigan	5198	5131	5019	31
12	1400000US26125121800	26125121800	Census Tract 1218, Oakland County, Michigan	4499	4435	4303	43
13	1400000US26125122200	26125122200	Census Tract 1222, Oakland County, Michigan	3517	3493	3419	27
14	1400000US26125122400	26125122400	Census Tract 1224, Oakland County, Michigan	6755	6642	6430	67
15	1400000US26125122700	26125122700	Census Tract 1227, Oakland County, Michigan	3022	2987	2926	20
16	1400000US26125122900	26125122900	Census Tract 1229, Oakland County, Michigan	1881	1849	1790	13
17	1400000US26125123000	26125123000	Census Tract 1230, Oakland County, Michigan	2396	2361	2277	35
18	1400000US26125123100	26125123100	Census Tract 1231, Oakland County, Michigan	3080	3048	2982	23
19	1400000US26125124000	26125124000	Census Tract 1240, Oakland County, Michigan	5283	5183	4854	168
20	1400000US26125124500	26125124500	Census Tract 1245, Oakland County, Michigan	6079	5963	5776	70
21	1400000US26125125000	26125125000	Census Tract 1250, Oakland County, Michigan	3457	3401	3277	56
22	1400000US26125125600	26125125600	Census Tract 1256, Oakland County, Michigan	2793	2774	2717	24
23	1400000US26125126200	26125126200	Census Tract 1262, Oakland County, Michigan	2657	2631	2547	28
24	1400000US26125126300	26125126300	Census Tract 1263, Oakland County, Michigan	4491	4418	4238	70
25	1400000US26125126400	26125126400	Census Tract 1264, Oakland County, Michigan	3674	3619	3526	26
26	1400000US26125126500	26125126500	Census Tract 1265, Oakland County, Michigan	3118	3076	2992	33
27	1400000US26125127000	26125127000	Census Tract 1270, Oakland County, Michigan	5736	5622	5474	59
28	1400000US26125127100	26125127100	Census Tract 1271, Oakland County, Michigan	5296	5239	5093	56
29	1400000US26125127200	26125127200	Census Tract 1272, Oakland County, Michigan	1650	1620	1568	26
30	1400000US26125127300	26125127300	Census Tract 1273, Oakland County, Michigan	4368	4275	4038	86
31	1400000US26125127400	26125127400	Census Tract 1274, Oakland County, Michigan	1686	1643	1584	15
32	1400000US26125127500	26125127500	Census Tract 1275, Oakland County, Michigan	6522	6411	6027	162

- Once unzipped, open the table in Excel.
- AFF provides a table with a column with the unique geographic identifier (GEO.id2), but it is not formatted as text and that is necessary for use in ArcGIS. To avoid any confusion, you can delete this column.
- Then, we can extract the unique geographic identifier in the correct format from the GEO.id column.

DEC_10_PL_P1 - Microsoft Excel 96

Home Insert Page Layout Formulas Data Review View Add-Ins Acrobat

Clipboard Font Alignment Number Styles Cells Editing

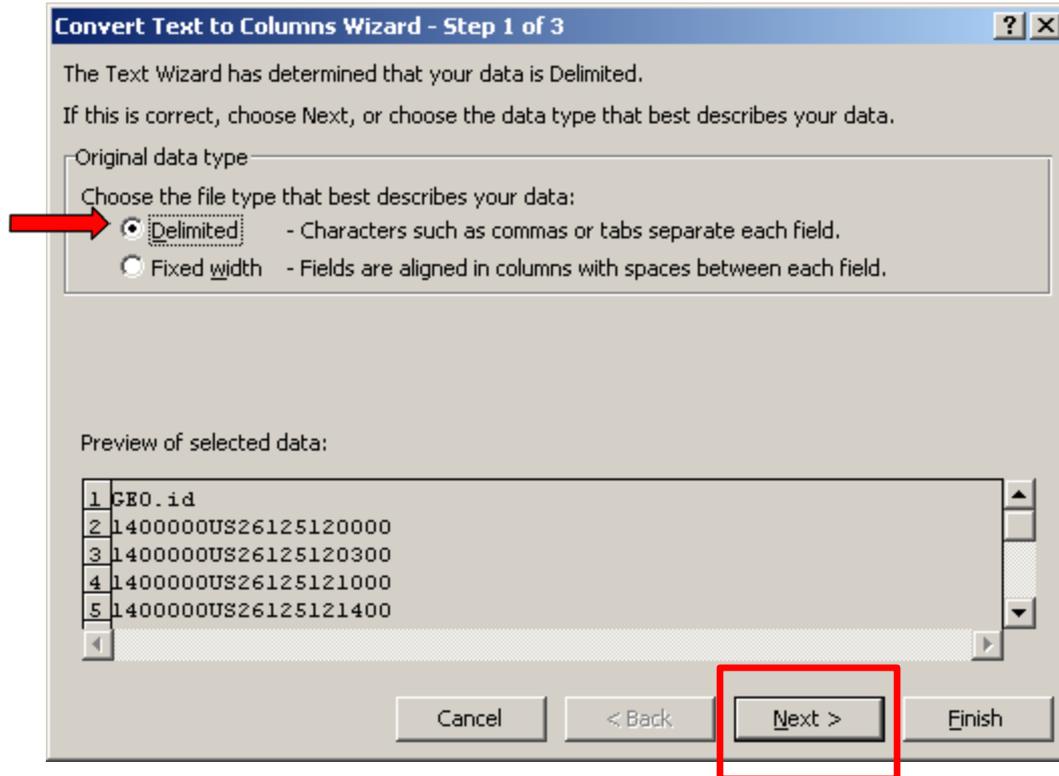
	A	B	C	D	E	F	
1			D001	D002	D003	D004	D005
2			Total:	Total:	Total:	Total:	Total:
3				Population of one race:	Population of one race:	Population of one race:	Population of one race:
4	GEO.id	GEO.display-label			White alone	Black or African American alone	American Indian and
5	Id	GEO					
6	1400000US26125120000	Census Tract 1200, Oakland County, Michigan	3115	3062	2979	19	
7	1400000US26125120300	Census Tract 1203, Oakland County, Michigan	3230	3215	3156	22	
8	1400000US26125121000	Census Tract 1210, Oakland County, Michigan	3408	3337	3172	70	
9	1400000US26125121400	Census Tract 1214, Oakland County, Michigan	3991	3913	3714	69	
10	1400000US26125121500	Census Tract 1215, Oakland County, Michigan	3436	3390	3267	65	
11	1400000US26125121700	Census Tract 1217, Oakland County, Michigan	5198	5131	5019	31	
12	1400000US26125121800	Census Tract 1218, Oakland County, Michigan	4499	4435	4303	43	
13	1400000US26125122200	Census Tract 1222, Oakland County, Michigan	3517	3493	3419	27	
14	1400000US26125122400	Census Tract 1224, Oakland County, Michigan	6755	6642	6430	67	
15	1400000US26125122700	Census Tract 1227, Oakland County, Michigan	3022	2987	2926	20	
16	1400000US26125122900	Census Tract 1229, Oakland County, Michigan	1881	1849	1790	13	
17	1400000US26125123000	Census Tract 1230, Oakland County, Michigan	2396	2361	2277	35	
18	1400000US26125123100	Census Tract 1231, Oakland County, Michigan	3080	3048	2982	23	
19	1400000US26125124000	Census Tract 1240, Oakland County, Michigan	5283	5183	4854	168	
20	1400000US26125124500	Census Tract 1245, Oakland County, Michigan	6079	5963	5776	70	
21	1400000US26125125000	Census Tract 1250, Oakland County, Michigan	3457	3401	3277	56	
22	1400000US26125125600	Census Tract 1256, Oakland County, Michigan	2793	2774	2717	24	
23	1400000US26125126200	Census Tract 1262, Oakland County, Michigan	2657	2631	2547	28	
24	1400000US26125126300	Census Tract 1263, Oakland County, Michigan	4491	4418	4238	70	
25	1400000US26125126400	Census Tract 1264, Oakland County, Michigan	3674	3619	3526	26	

- First, remove excess header rows so that only one exists.
- Next, insert a column between **GEO.id** and **GEO.display-label** and label it *GEOID2*.

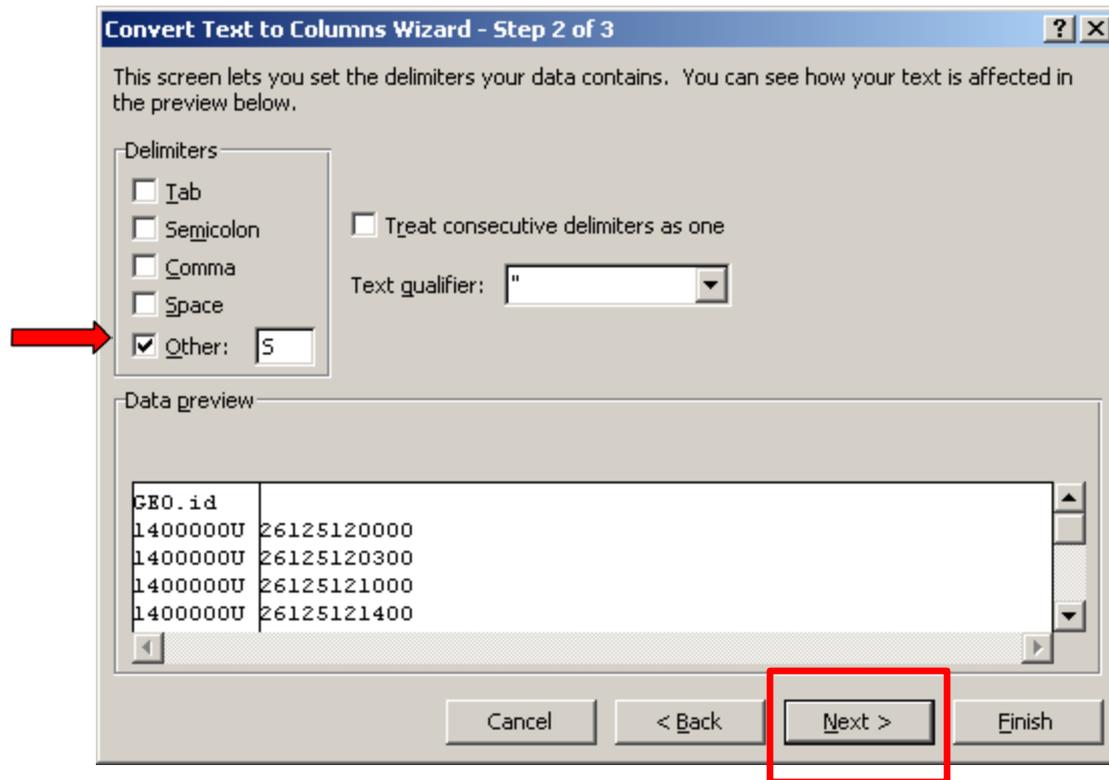
The screenshot shows the Microsoft Excel interface with the 'Data' tab selected in the ribbon. The 'Text to Columns' button is highlighted with a red box. A red arrow points to the 'A1' cell in the spreadsheet. The spreadsheet contains the following data:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	GEO.id	GEOID2	GEO.display-label	D001	D002	D003	D004	D005	D006	D007	D008	D009	D010	D011	D012	D013	D014	D015
2	1400000US26125120000		Census Tract 1200, Oakland County, Michigan	3115	3062	2979	19	10	22	0	32	53	51	16	24	6	1	
3	1400000US26125120300		Census Tract 1203, Oakland County, Michigan	3230	3215	3156	22	12	20	1	4	15	14	3	3	6	0	
4	1400000US26125121000		Census Tract 1210, Oakland County, Michigan	3408	3337	3172	70	13	35	1	46	71	70	21	23	14	0	
5	1400000US26125121400		Census Tract 1214, Oakland County, Michigan	3991	3913	3714	69	18	93	2	17	78	71	16	19	23	0	
6	1400000US26125121500		Census Tract 1215, Oakland County, Michigan	3436	3390	3267	65	7	25	1	25	46	41	10	12	6	2	
7	1400000US26125121700		Census Tract 1217, Oakland County, Michigan	5198	5131	5019	31	15	44	3	19	67	66	11	22	20	0	
8	1400000US26125121800		Census Tract 1218, Oakland County, Michigan	4499	4435	4303	43	18	43	4	24	64	64	11	24	19	0	
9	1400000US26125122200		Census Tract 1222, Oakland County, Michigan	3517	3493	3419	27	16	25	1	5	24	24	2	15	4	0	
10	1400000US26125122400		Census Tract 1224, Oakland County, Michigan	6755	6642	6430	67	32	59	1	53	113	108	38	36	22	0	
11	1400000US26125122700		Census Tract 1227, Oakland County, Michigan	3022	2987	2926	20	4	15	2	20	35	35	4	24	1	0	
12	1400000US26125122900		Census Tract 1229, Oakland County, Michigan	1881	1849	1790	13	8	32	0	6	32	31	13	10	4	0	
13	1400000US26125123000		Census Tract 1230, Oakland County, Michigan	2396	2361	2277	35	9	19	0	21	35	35	14	10	3	0	
14	1400000US26125123100		Census Tract 1231, Oakland County, Michigan	3080	3048	2982	23	8	31	0	4	32	31	3	13	11	0	
15	1400000US26125124000		Census Tract 1240, Oakland County, Michigan	5283	5183	4854	168	29	94	9	29	100	92	20	35	15	2	
16	1400000US26125124500		Census Tract 1245, Oakland County, Michigan	6079	5963	5776	70	36	34	0	47	116	108	35	48	15	0	
17	1400000US26125125000		Census Tract 1250, Oakland County, Michigan	3457	3401	3277	56	15	41	0	12	56	55	20	26	4	0	
18	1400000US26125125600		Census Tract 1256, Oakland County, Michigan	2793	2774	2717	24	10	15	1	7	19	18	1	11	5	0	
19	1400000US26125126200		Census Tract 1262, Oakland County, Michigan	2657	2631	2547	28	15	22	0	19	26	26	4	15	6	0	
20	1400000US26125126300		Census Tract 1263, Oakland County, Michigan	4491	4418	4238	70	8	55	3	44	73	67	16	19	19	0	
21	1400000US26125126400		Census Tract 1264, Oakland County, Michigan	3674	3619	3526	26	22	32	0	13	55	55	11	24	6	0	

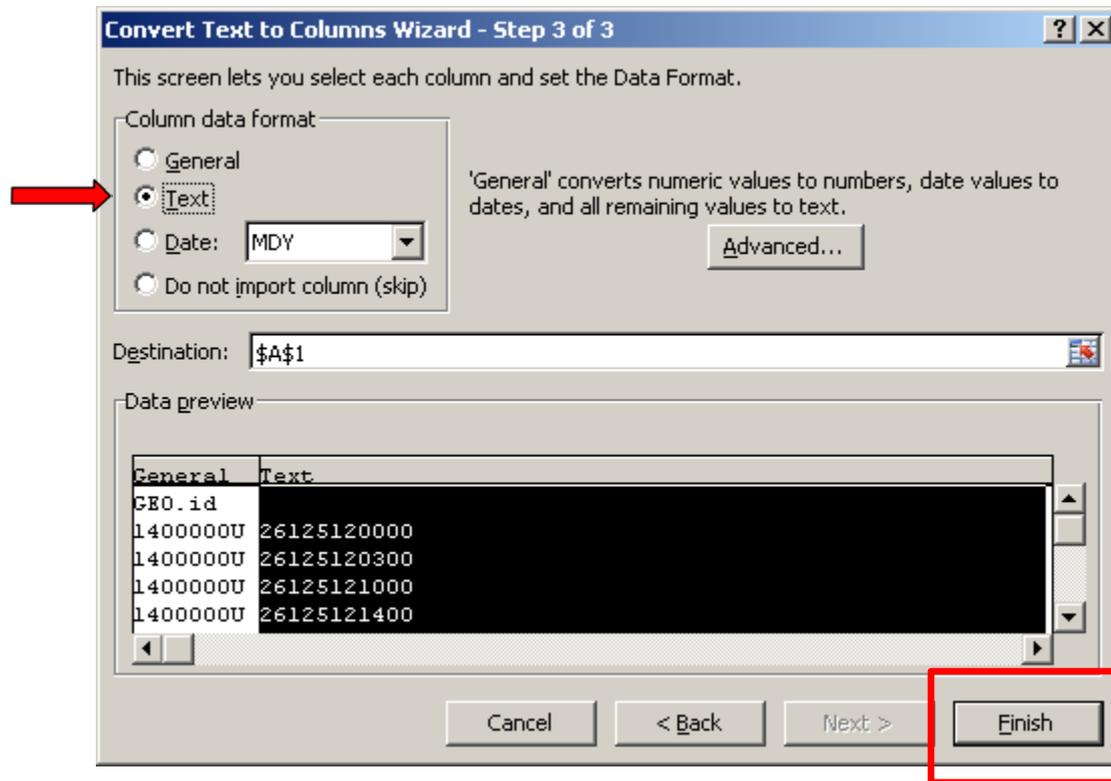
- Now, highlight the **GEO.id** column
- Click **Text to Columns**



- Choose **Delimited**
- Click **Next**



- Choose **Other** and type “S” in the box
- Click **Next**



- The column data format for the GEOID2 column should be **Text**.
 - Click on the header in the second column and under Column data format, choose Text.
 - This is very important and makes sure all of the numbers will stay in place
- Click **Finish**
 - If Excel asks if you want to replace all of the values in the column, choose **Yes**.
 - You may have to retype the column header.

DEC_10_PL_P1 - Microsoft Excel

Home Insert Page Layout Formulas Data Review View Add-Ins Acrobat

From Access From Web From Text From Other Sources Existing Connections Refresh All Connections Sort & Filter Filter Clear Reapply Advanced Text to Columns Remove Duplicates Data Validation Consolidate What-If Analysis Group Ungroup Subtotal Outline

A1 GEO.id

	A	B	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	
1	GEO.id	GEOID2	GEO.display-label	D001	D002	D003	D004	D005	D006	D007	D008	D009	D010	D011	D012	D013	D014	D015
2	1400000U	26125120000	Census Tract 1200, Oakland County, Michigan	3115	3062	2979	19	10	22	0	32	53	51	16	24	6	1	
3	1400000U	26125120300	Census Tract 1203, Oakland County, Michigan	3230	3215	3156	22	12	20	1	4	15	14	3	3	6	0	
4	1400000U	26125121000	Census Tract 1210, Oakland County, Michigan	3408	3337	3172	70	13	35	1	46	71	70	21	23	14	0	
5	1400000U	26125121400	Census Tract 1214, Oakland County, Michigan	3991	3913	3714	69	18	93	2	17	78	71	16	19	23	0	
6	1400000U	26125121500	Census Tract 1215, Oakland County, Michigan	3436	3390	3267	65	7	25	1	25	46	41	10	12	6	2	
7	1400000U	26125121700	Census Tract 1217, Oakland County, Michigan	5198	5131	5019	31	15	44	3	19	67	66	11	22	20	0	
8	1400000U	26125121800	Census Tract 1218, Oakland County, Michigan	4499	4435	4303	43	18	43	4	24	64	64	11	24	19	0	
9	1400000U	26125122200	Census Tract 1222, Oakland County, Michigan	3517	3493	3419	27	16	25	1	5	24	24	2	15	4	0	
10	1400000U	26125122400	Census Tract 1224, Oakland County, Michigan	6755	6642	6430	67	32	59	1	53	113	108	38	36	22	0	
11	1400000U	26125122700	Census Tract 1227, Oakland County, Michigan	3022	2987	2926	20	4	15	2	20	35	35	4	24	1	0	
12	1400000U	26125122900	Census Tract 1229, Oakland County, Michigan	1881	1849	1790	13	8	32	0	6	32	31	13	10	4	0	
13	1400000U	26125123000	Census Tract 1230, Oakland County, Michigan	2396	2361	2277	35	9	19	0	21	35	35	14	10	3	0	
14	1400000U	26125123100	Census Tract 1231, Oakland County, Michigan	3080	3048	2982	23	8	31	0	4	32	31	3	13	11	0	
15	1400000U	26125124000	Census Tract 1240, Oakland County, Michigan	5283	5183	4854	168	29	94	9	29	100	92	20	35	15	2	
16	1400000U	26125124500	Census Tract 1245, Oakland County, Michigan	6079	5963	5776	70	36	34	0	47	116	108	35	48	15	0	
17	1400000U	26125125000	Census Tract 1250, Oakland County, Michigan	3457	3401	3277	56	15	41	0	12	56	55	20	26	4	0	
18	1400000U	26125125600	Census Tract 1256, Oakland County, Michigan	2793	2774	2717	24	10	15	1	7	19	18	1	11	5	0	
19	1400000U	26125126200	Census Tract 1262, Oakland County, Michigan	2657	2631	2547	28	15	22	0	19	26	26	4	15	6	0	
20	1400000U	26125126300	Census Tract 1263, Oakland County, Michigan	4491	4418	4238	70	8	55	3	44	73	67	16	19	19	0	
21	1400000U	26125126400	Census Tract 1264, Oakland County, Michigan	3674	3619	3526	26	22	32	0	13	55	55	11	24	6	0	
22	1400000U	26125126500	Census Tract 1265, Oakland County, Michigan	3118	3076	2992	33	9	26	0	16	42	40	3	16	10	0	
23	1400000U	26125127000	Census Tract 1270, Oakland County, Michigan	5736	5622	5474	59	14	57	4	14	114	112	14	47	36	1	

- Once you have completed all of the steps, the data should look something like this.
 - The data are now ready for ArcGIS
- Save the table in a format compatible with ArcGIS, using a short name with no spaces. For example, save as a .xlsx file or you may need to use Access to save the file as a .dbf.

Interview Instruments: Appendix

Key informant script and questions

These interviews are part of a project to understand what factors may explain which citizens are at risk of “transportation disadvantage,” meaning that their transportation options do not match well with their needs to travel to work, shopping, services and other activities. For this project, “key informants” are professionals such as planners or local government officials, or other local leaders knowledgeable about the residents of the community and about transportation patterns and options.

We are interested in learning about how easy or difficult it is for residents to get around to important destinations. In addition to interviewing key informants, we are meeting separately with a group of citizens to ask about their travel habits and needs.

Informed Consent

We appreciate your willingness to share your time and knowledge with us. This interview will last about a half-hour. We have taken steps to assure careful handling of the information you share with us. This includes limited access to the audiotapes and transcribed interviews (limited to seven undergraduate students, two graduate students, and three faculty advisors). You may choose not to answer any questions that you do not wish to answer. You may end this interview at any time for any reason. We will provide you with a transcript of the interview to review for accuracy.

We will not identify you or use any information that would make it possible for anyone to identify you in any presentation or written reports about this study. However, we note that you are a key informant with exposure in your community, and as such your views already may be well-known and your identity guessed by readers. There is no known potential harm to you for participating in this interview. There is no compensation for your participation. We will ask for your oral consent to be interviewed and recorded before we begin asking questions.

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject, or if you would like to obtain information or offer input, you may contact the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu. This project is IRB study #13-1531.

Interview Questions

Thank you for taking the time to meet with us today. I’m [name], and this is my colleague [name].

We are here in [county or city] today as part of a project to understand the factors that may help explain which people are at risk of experiencing “transportation-disadvantage,” meaning that their need to travel to get to goods, services, and activities they value does not match well with their available transportation options.

We'd like to audiotape this conversation, so that we can refer back to it for accuracy. Is that ok with you? If so, we'll start taping now.

1. Can you tell me about your work? Particularly, how is it involved with transportation?
2. Using this map, will you help us identify places in [community] that you would consider to be transportation deserts? By this, we mean places where transportation services and land use patterns don't fit well with the needs of the residents.
3. What are some of the biggest challenges transportation-disadvantaged people face in getting where they need to go, such as to jobs, school, health care, social activities, groceries?
- 4a. Your community is served by [transit/para-transit service]. Can you show [on the map] where the greatest demand is for this service?
- 4b. Are there areas not served by public transportation? [probe for location on the map]
- 5a. Do you know, roughly, what percentage of [county or city] population uses transit for any purpose? [% of population transit-dependent for some/all trips, NOT % trips made by transit]
- 5b. What would make transit a better option for people? [probe: more frequent, better schedules]
6. Your county's population has experienced [% growth/decline] in population in the last decade. How have you kept up with changing demand for transportation services? [and/or housing]
- 7a. Do you know what percentage of people in [county or city] walk or bicycle for transportation? [% of population, not % of trips]
- 7b. What policies or programs would make walking or bicycling a more viable transportation option in the community?
8. Do a lot of your residents drive very long distances to get to work or basic services? If so, why do you think that is?
9. One of the goals of this study is to determine whether we can use census data to identify places where people are likely to be transportation-disadvantaged. So, we used census data to make our own map of [county or city]. Would you mind looking at our map and seeing if you think we got it right? Are there places we missed, or places we identified that aren't actually disadvantaged, in your opinion? We are trying to determine how useful this kind of data is in identifying the location of transportation disadvantaged populations.
10. Is there anything else you'd like to tell us about transportation, travel conditions, or the locations of housing and important destinations for the residents of [county or city]? [anything we need to explore further here? suggest anyone else we might to talk to about this topic?]

Thank you for your time and helpful information. If you have any questions or comments, please feel free to follow up with us at [contact info].



Transportation deserts and transportation poverty

Focus group—mapping exercise and discussion

Mapping exercise

Thank you for taking time to meet with us this [afternoon or evening]. My name is [name], and I'm here with my co-workers [name] and [name]. We are here [in county or city] today as part of a project to understand what factors may explain which citizens are at risk of “transportation disadvantage,” meaning that their transportation options do not match well with their needs to travel to work, shopping, services and other activities. We'd like to do quick introductions, just going around the room: your first name [and, if appropriate, city of residence, or some other item].

We are interested in learning about how easy or difficult it is for you here in [county or city] to get around to important destinations. We want to start by spending 10 minutes on individual maps of [county or city], then have a discussion about your daily lives and routines and your travel options.

You each have a map of [county or city and nearby region], showing roads and major features [provide some map-reading hints, like: “here's the intersection of Columbia and Franklin; here's the municipal parking deck; and here's MLK heading north toward Timberlyne”].

We don't need your name or address; the maps will be kept anonymous. But please write down the number of children and adults in your household here [hold up map and show blank lines] and how many cars you have, if any. We'd also like to know your age, ethnicity, and your first or main language. This may be useful context as we learn about why residents of some areas find it easier or harder to get around and meet their routine household needs and participate in various activities.

Please mark your own key locations, like home, work, school, recreation or other common destinations. Then draw in your connections from home to major regular destinations, and write down how you travel, for example, walk, bus, drive, or carpool. Please also note travel conditions, such as heavy traffic or congestion, good or bad sidewalks, shade or sun, or steep slopes. We don't need to know your actual route, although drawing it out may help you remember where you go.

Here's an example, with this person's home, school, job, park, and grocery store marked on the map. She drew a line from home to these locations and wrote down how she usually travels: walk to the grocery store and elementary school, both along decent sidewalks, and bus to work.

If you have any questions, just flag down one of us wearing names tags. [~10 mins for map work]

Discussion

Thank you for taking time to map out your routine travel. *After our discussion, we'll return to the maps, and ask for some additional comments.*

We'd like to ask a few questions about your transportation options and whether it is easy or difficult for you to get around to your important destinations. We'll write down answers and comments on this easel, and also take notes on a laptop. But you may also give comments to any of the team members who are here, and we'll make a note of it. A few ground rules: one person talking at a time, and everyone gets a turn—or turns—if they want to speak up.

- 1) Where do you travel on a routine basis? To get a sense for major destinations, would some of you briefly share what you drew on your maps?

- 1a) How about weekend travel? Are your destinations and travel different from weekdays?
1b) What about rare but important destinations: airport or hospital? How would you get there?
- 2) [For the whole group] Do you ever use the bus? If no, why not? If yes, how often?
Where do you typically go on the bus?
- 3) What works well with your public transportation? What would you like to see improved?
- 4) Is public transit reliable enough to use for important trips, like getting to work or school?
- 5) How often do you walk or bike somewhere? Is it safe? Are there times you can't walk or bike?
Why? [probe shelters, crosswalks, sidewalks, lights, facilities, traffic, crime, etc.]
Would you let your children walk or bike? Where? Under what conditions? [alone, with adult]
- 6) Can you recall a situation when you had trouble getting to work, school, or some other place because of a lack of adequate transportation? [If yes, ask some to tell the group about their particular situation] How often does this happen?
6a) Can you describe trips that work well for you, that is, where it's easy, affordable, and convenient for you to get where you need to go?
- 7) For those of you with a car: Could you get around reasonably well without it? Do you spend more, less, or about the same amount of time driving as most people in [county or city]?
7a) For those of you without a car: In what situations would access to a car be most helpful?
- 8) Are there places you would like to go to, but can't reach? Where?

Back-of-the-map questions

Thank you for all this useful information. This discussion has raised a lot of interesting points, and ties in to some questions on the back of your maps. We'd like to take some time now for you to return to those maps, and have you answer some questions on the back. Specifically:

- 1) Are there any trips you would take or places you would like to go to, but don't? If so, what is keeping you from making those trips? [some controlled responses, plus "other"]
- 2) Do you ever carpool? Where to? With whom do you carpool? [family, neighbors, co-workers]
- 3) Where do you get your information regarding public transit? [smart phone, website, maps, etc.]
Do you have suggestions for improvements? [other languages, simpler, routes, busstops, etc.]
- 4) Are there any things about your regular travel that you would like to change? If so, what changes would you make?
- 5) Do you have any other comments you think would help us understand why residents of some areas may find it easier or harder to get around to important destinations?

Wrap-up

Thank you for taking time to meet and talk with us. We can't make any direct changes in your community, for example, changing your bus service. But we will share what we learn with some of your community leaders, and we hope it will contribute to more and better travel options for you.

We'll leave these maps on the tables, if you want to linger and see what people drew and said.

You may reach us at [point to 1-pager with contact info]

Census Data: Appendix



Defining North Carolina's Transportation Disadvantaged Populations

NCDOT RESEARCH PROJECT 2013-12

Summary of Data for GIS-Derived Maps

The following table presents a series of indicators for identifying transportation disadvantaged populations. For each indicator, one or more Census data sources have been detailed that provide useful data related to each indicator. The analysis threshold provides details about the census data used for mapping, including the North Carolina county average (and standard deviation) for each attribute. The subsequent mapping is based on the North Carolina county average plus intervals of standard deviation (i.e., county average, average plus one standard deviation, average plus two standard deviations, and greater than average plus two standard deviations). This information provides practitioners with the information needed to replicate this analysis or extend this analysis to other areas.

A summary map was developed for each county presenting the various indicators in a composite map based on thresholds of the North Carolina county average plus two standard deviations for each indicator. The purpose of these maps are to display areas where a confluence of factors exist that are indicative of transportation disadvantaged populations. The maps show a count (from a minimum of 0 factors to a maximum of 6) of the indicator thresholds that are exceeded in each area. The indicators and their respective thresholds are:

- Low-income households: $\geq 28\%$ of Population Below Poverty Level
- Households with mobility-impaired individuals: $< 73\%$ of Population 5 Years and Over Without Any Disability
- Households with youth of non-driving age: $\geq 23\%$ of Population ≤ 14 years old
- Households with seniors: $\geq 29\%$ of Population ≥ 62 years old
- Ethnic minority households: $\geq 64\%$ Minority Population
- LEP households: $\geq 8\%$ of Population speaking English less than "Very Well"

The data used for NCDOT CIAs from the US Census include:

- Population Change – US Census Bureau, Census 2010 and Census 2000, Summary File 1 100% Data, Table P1 and P001 "Total Population"
- Race – US Census Bureau, American Community Survey 5-Year Estimates (2006-2010), Table B020001, "Race"
- Hispanic – US Census Bureau, American Community Survey 5-Year Estimates (2006-2010), Table B03002, "Hispanic or Latino Origin by Race"

- Poverty – US Census Bureau, American Community Survey 5-Year Estimates (2006-2010), Table S1701, “Poverty Status in the Past 12 Months,” and Table C17002, “Ratio of Income to Poverty Level in the Past 12 months”
- LEP – US Census Bureau, American Community Survey 5-Year Estimates (2006-2010), Table B16001, “Language Spoken at Home by Ability to Speak English for the Population 5 Years and Over”
- Percentage of Households Without Cars - US Census Bureau, American Community Survey 2011 5-Year Estimates, Table B08021. *Note: Percentage of Households Without Cars was not used for the mapping process.*

Notes/Thoughts for Further Analysis:

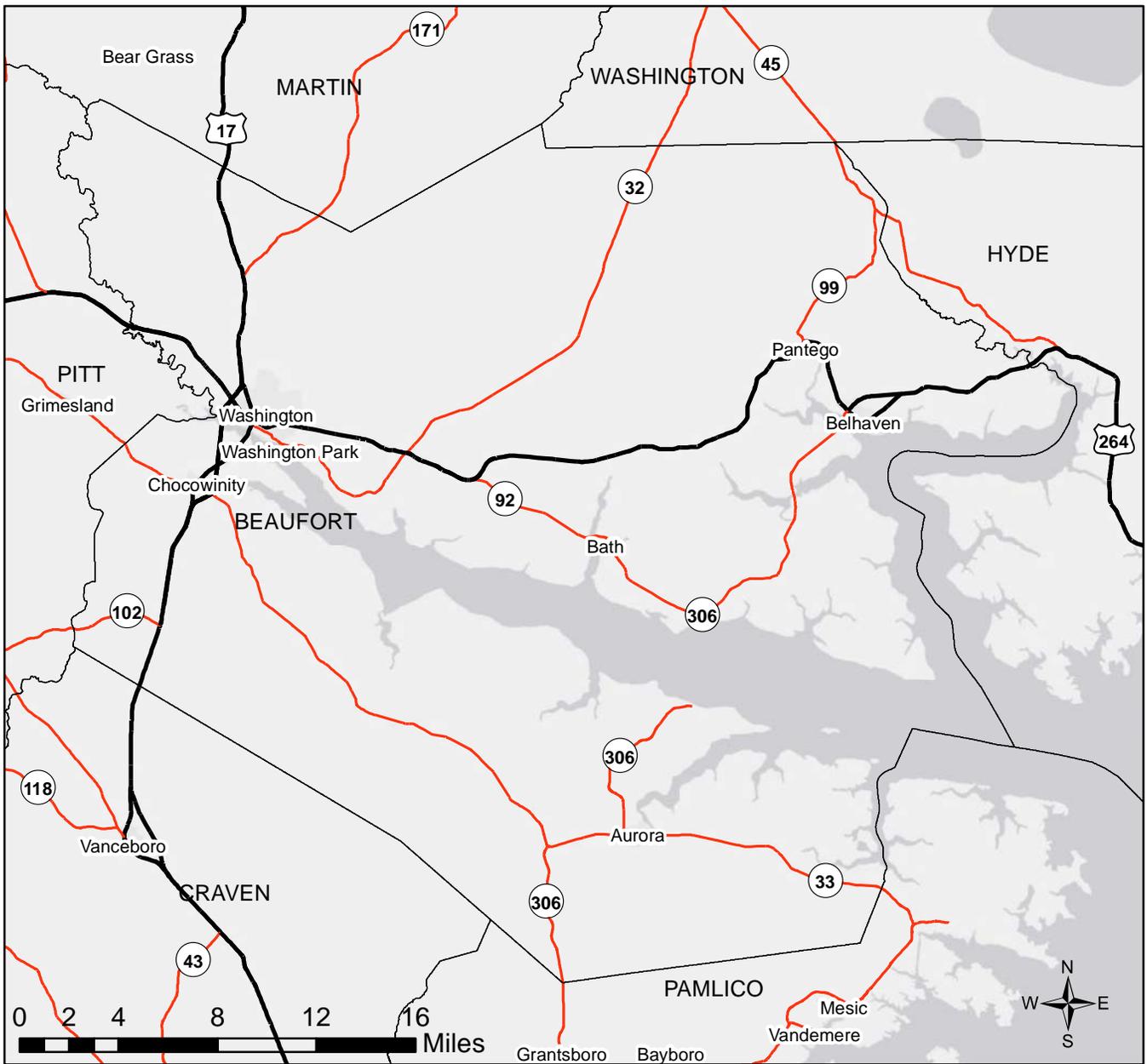
- S1701: Poverty could be stratified by age, sex, race, employment status, work status
- C17002: Using a different level of poverty (i.e. under .5, .5 to .99, 1 to 1.24, 1.25 to 1.49, 1.50 to 1.84, 1.85 to 1.99, or 2.0 and greater)

Disadvantaged Population Indicator	Census Data Source(s)	Analysis Threshold
Low-income households	S1701: Poverty Status in the Past 12 Months – Tract (US Census Bureau, American Community Survey 2011 5-Year Estimates)* C17002: Ratio of Income to Poverty Level in the Past 12 months – Tract (US Census Bureau, American Community Survey 2011 5-Year Estimates)*	S1701: Percentage of Population Below Poverty Level NC County Average = 18% (SD 5%) Maps of <18%, 18%-22.99%, 23%-27.99%, and ≥ 28%
Households with mobility-impaired individuals	S1801: Disability Characteristics – Cities/Towns, County (2007 American Community Survey 3-Year Estimates) S1810: Disability Characteristics – Cities/Towns, County (2011 American Community Survey 3-Year Estimates) S1811: Selected Economic Characteristics for the Civilian Non institutionalized Population by Disability Status – Cities/Towns, County (2011 American Community Survey 3-Year Estimates)	S1801: Population 5 Years and Over Without Any Disability (sensory, physical, mental, self-care, go-outside-home, employment) NC County Average = 81% (SD 4%) Maps of <73%, 73%-76.99%, 77%-80.99%, ≥81% (Higher is more desirable)
Households with youth of non-driving age	P12: Sex by Age – Block (2010 Census Summary File 1)	P12: Male and Female Population ≤ 14 years old NC County Average = 19% (SD 2%) Maps of <19%, 19%-20.99%, 21%-22.99%, and ≥ 23%
Households with seniors	P12: Sex by Age – Block (2010 Census Summary File 1)	P12: Male and Female Population ≥ 62 years old NC County Average = 19% (SD 5%) Maps of <19%, 19%-23.99%, 24%-28.99%, and ≥ 29%
Ethnic minority households	B02001: Race – Tract (US Census Bureau, American Community Survey 2011 5-Year Estimates)* B03002: Hispanic or Latino Origin by Race – Tract (US Census Bureau, American Community Survey 5-Year Estimates (2006-2010))*	B02001: 100% - Percentage of White Alone NC County Average = 28% (SD 18%) Maps of <28%, 28%-45.99%, 46%-63.99%, and ≥ 64%
LEP households	B16001: Language Spoken at Home by Ability to Speak English for the Population 5 Years and Over – Tract (US Census Bureau, American Community Survey 2011 5-Year Estimates)*	B16001: Percentage of all Languages comprised of speaking English less than “Very Well” ≥ 8% of Population or >1000 persons per tract speaking English less than “Very Well”
Carless households**	B08021: Tract (US Census Bureau, American Community Survey 2011 5-Year Estimates)*	B08021: Percentage of Households Without Cars NC County Average = 7% (SD 3%) Maps of <7%, 7%-9.99%, 10%-12.99%, and ≥ 13%

* Represents US Census data used for NCDOT CIA

**While the statewide county average is 8% for LEP households, NCDOT requested using a threshold of 5% (LEP requirement) for the case study applications.

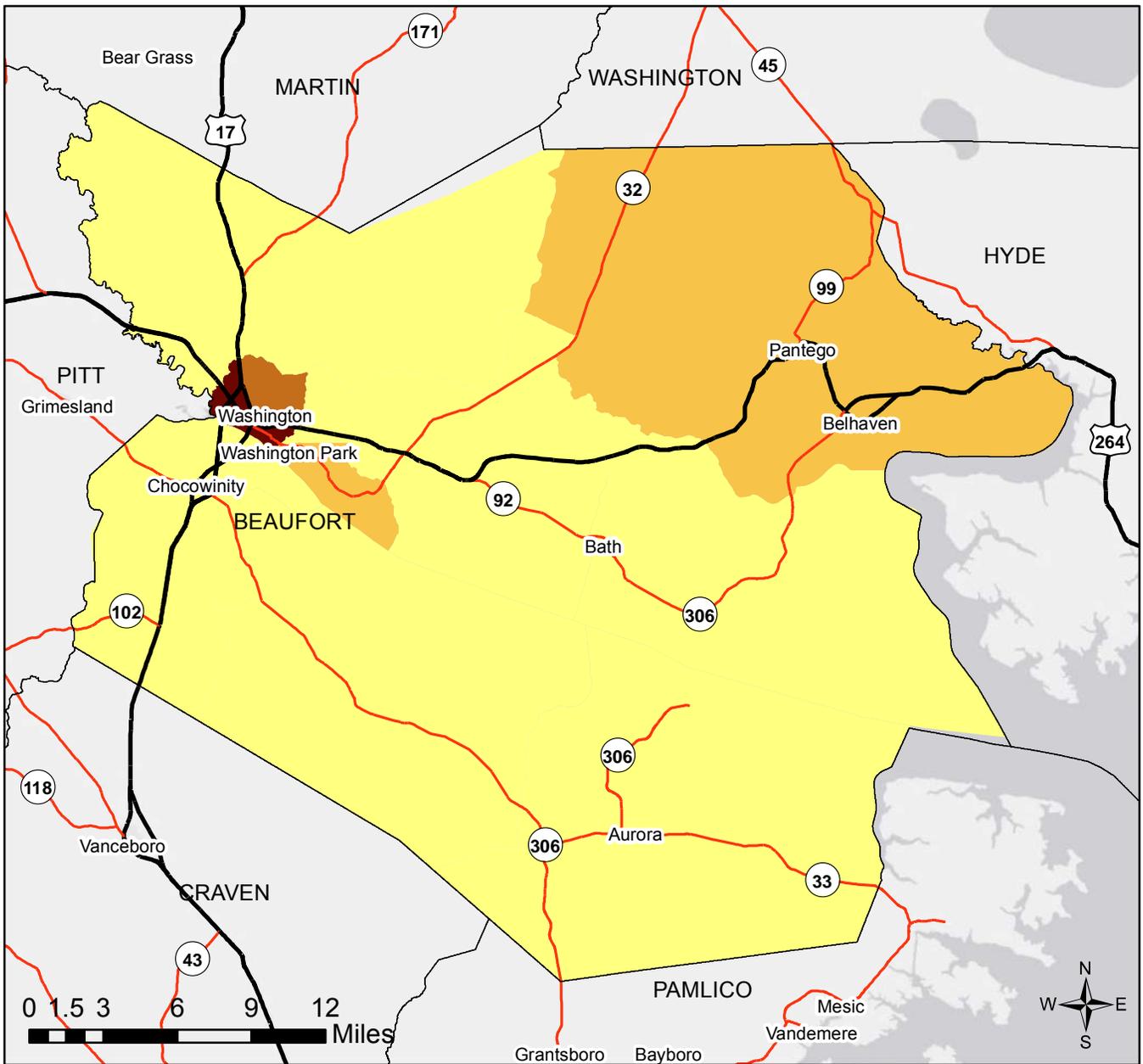
GIS MAPS: Appendix



Beaufort County

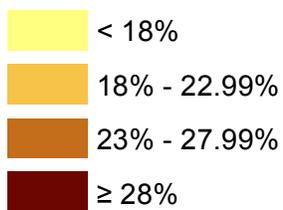
- Roads**
- NC
 - US





Low Income Distribution - Beaufort County

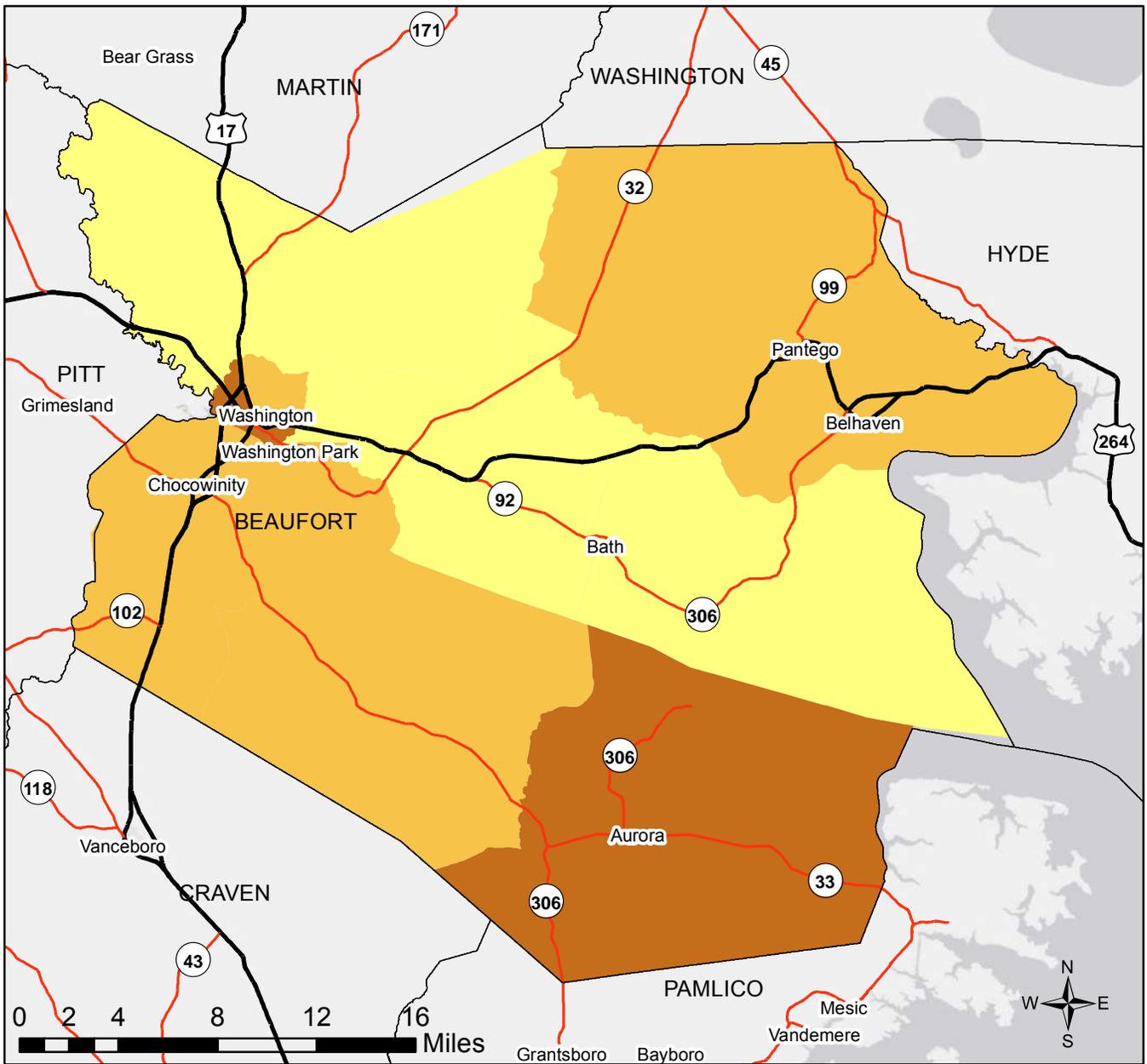
Percentage Below the Poverty Line



Roads

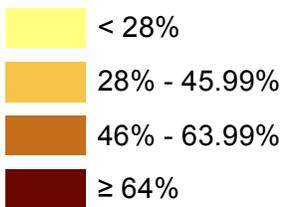


Data Source: 2011 Census Data Table S1701



Minority Distribution - Beaufort County

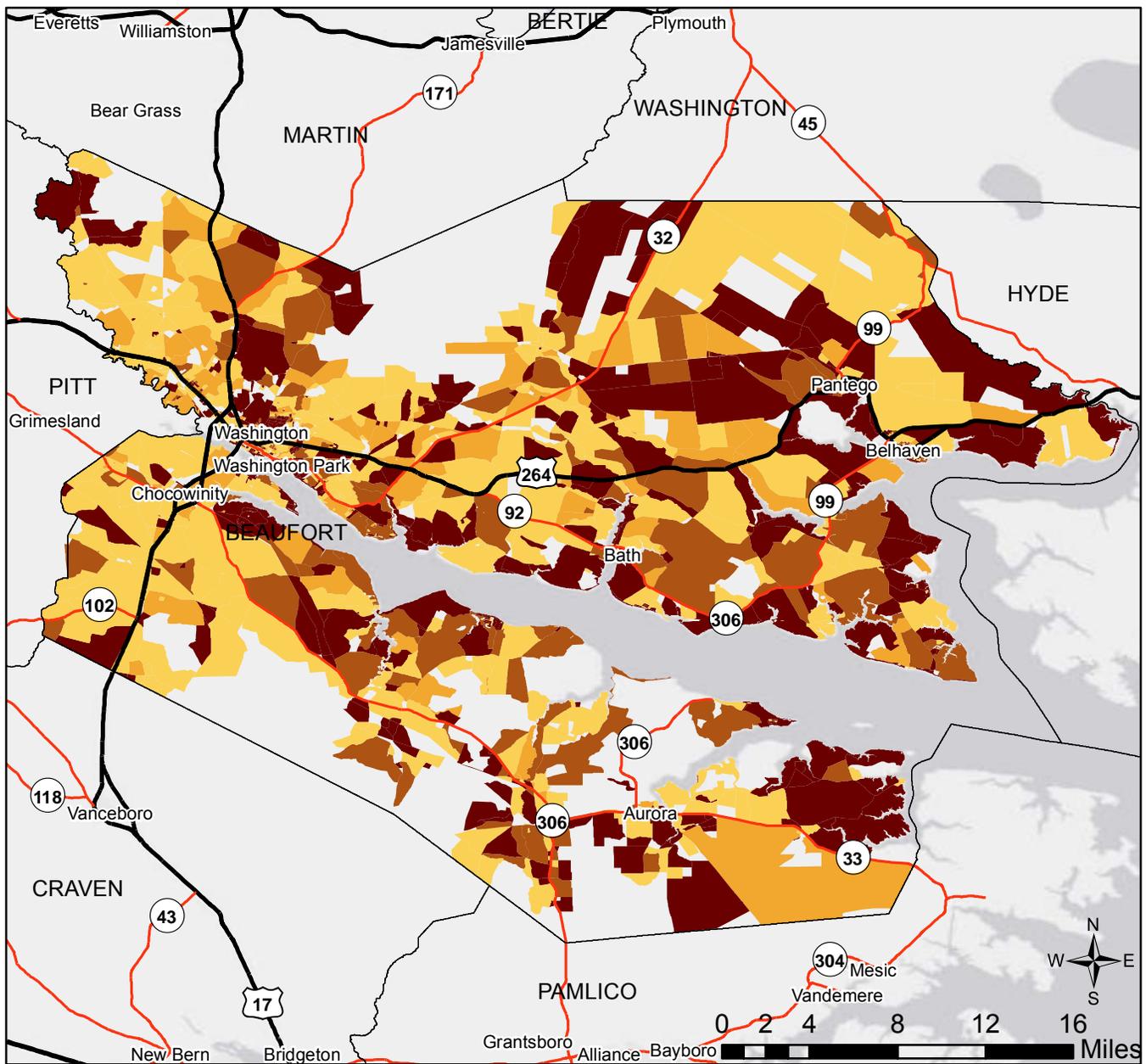
Percentage Minority



Roads

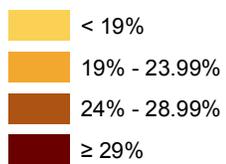


Data Source: 2011 Census Data Table B02001



Senior Distribution - Beaufort County

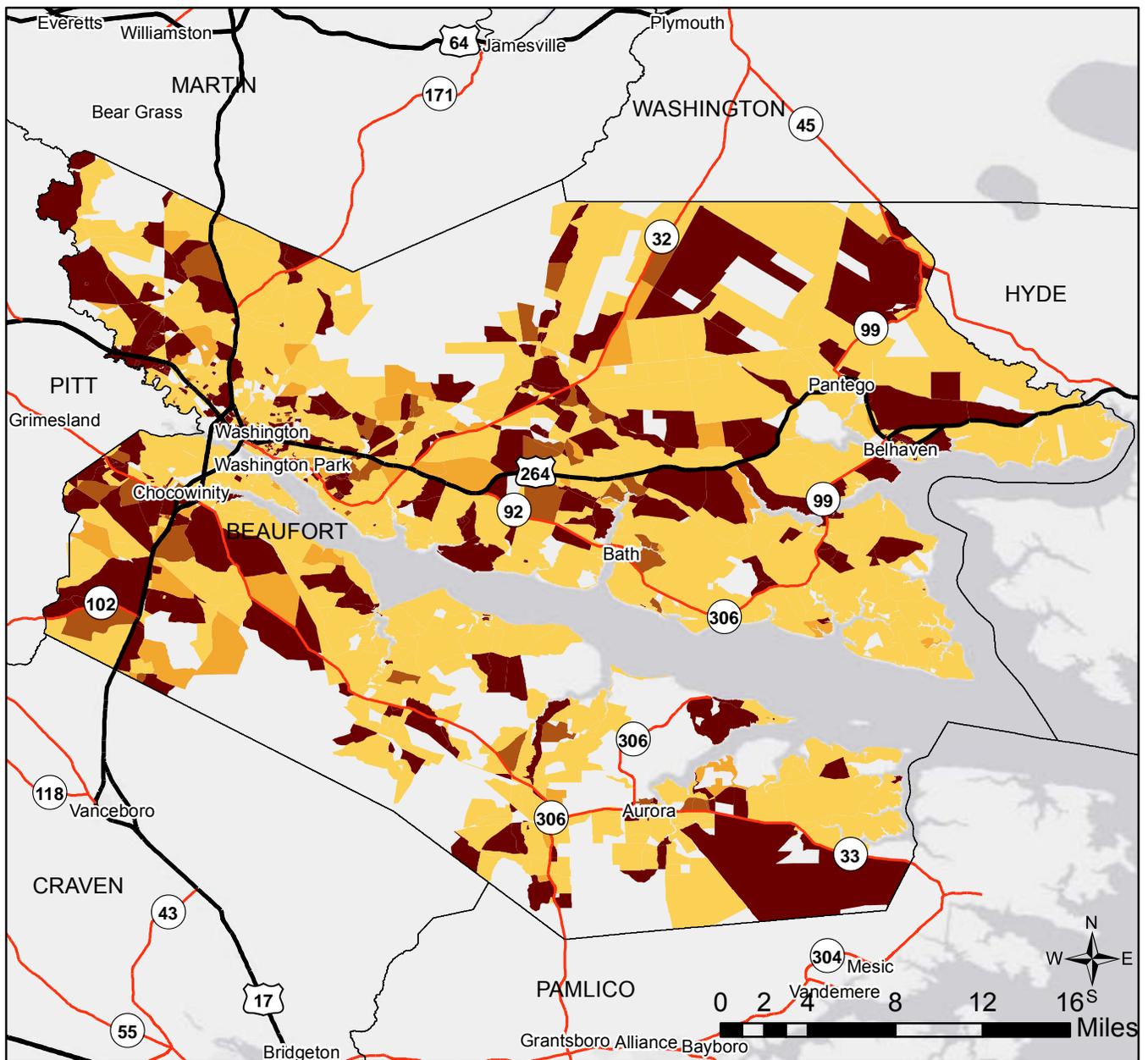
Percentage Over 62 Years Old



Roads

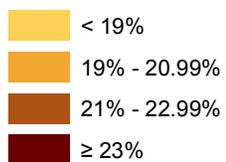


Data Source: 2011 Census Data Table P12



Youth Distribution - Beaufort County

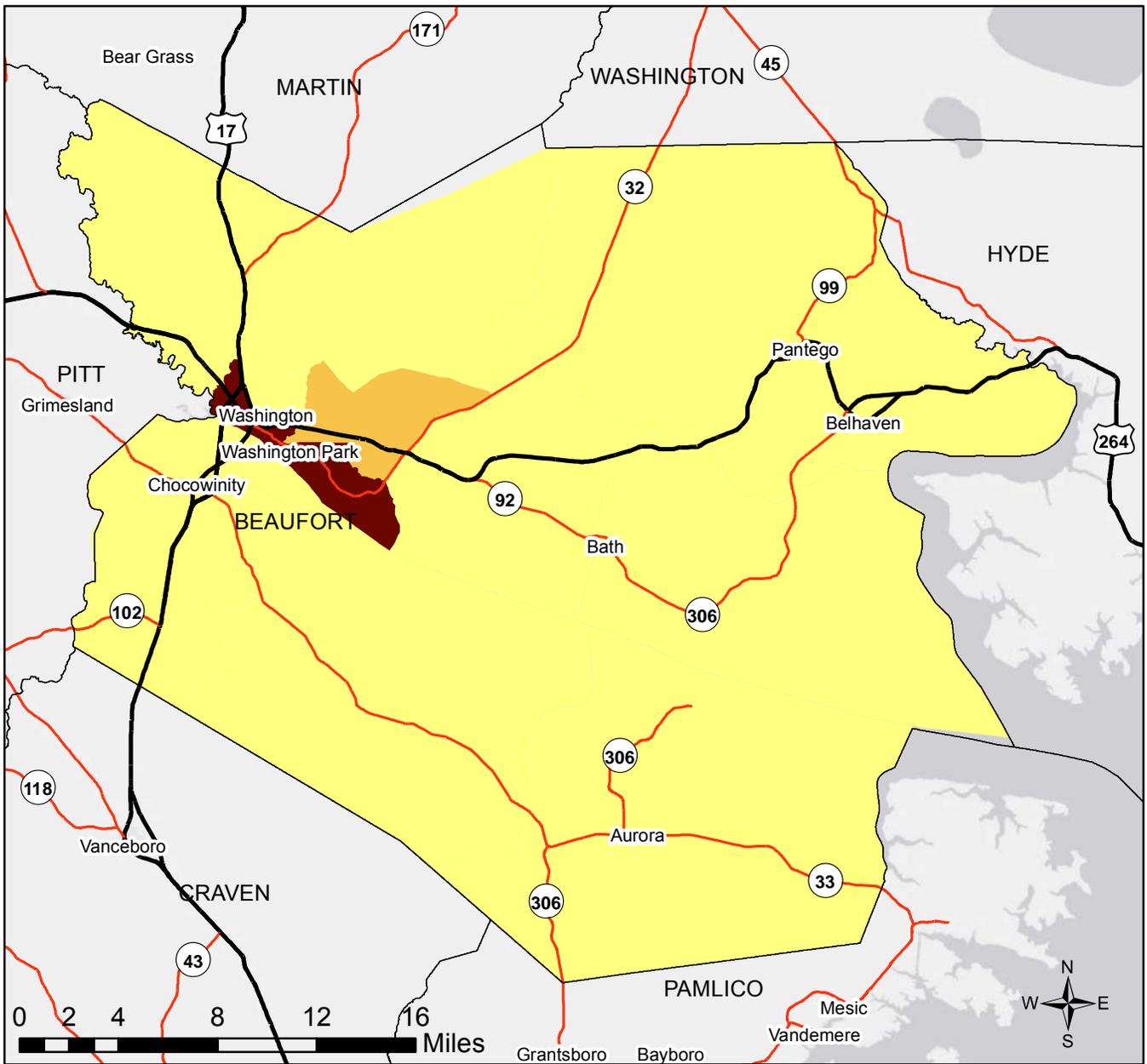
Percentage Under 14 Years Old



Roads

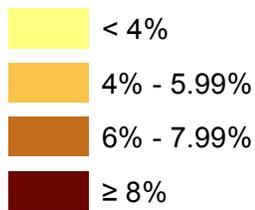


Data Source: 2011 Census Data Table P12



Limited English Proficiency Distribution - Beaufort County

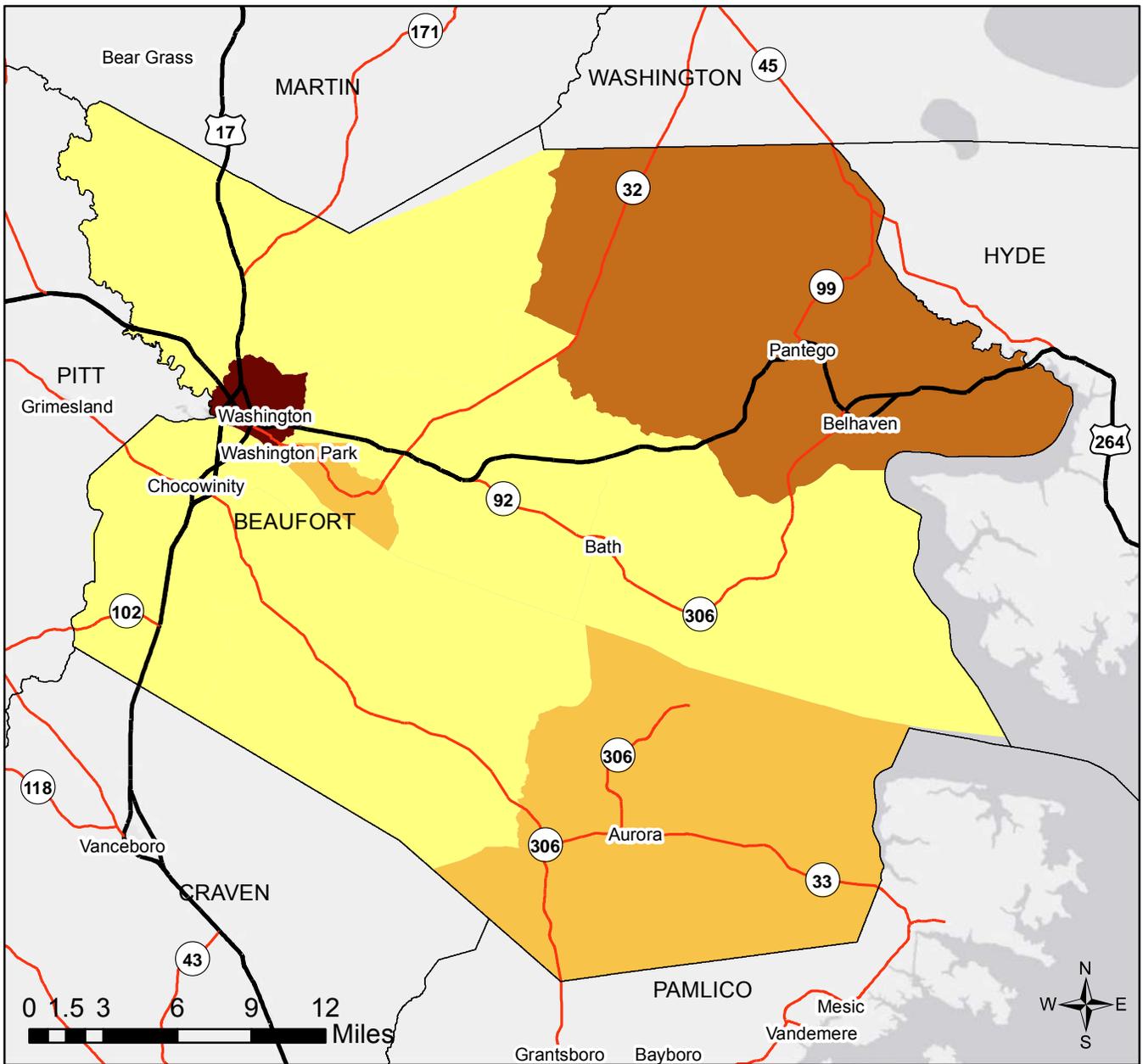
Percentage Speaks English Less Than "Very Well"



Roads

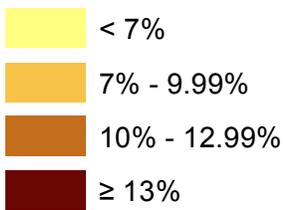


Data Source: 2011 Census Data Table B16001



Households with Zero Vehicles Distribution - Beaufort County

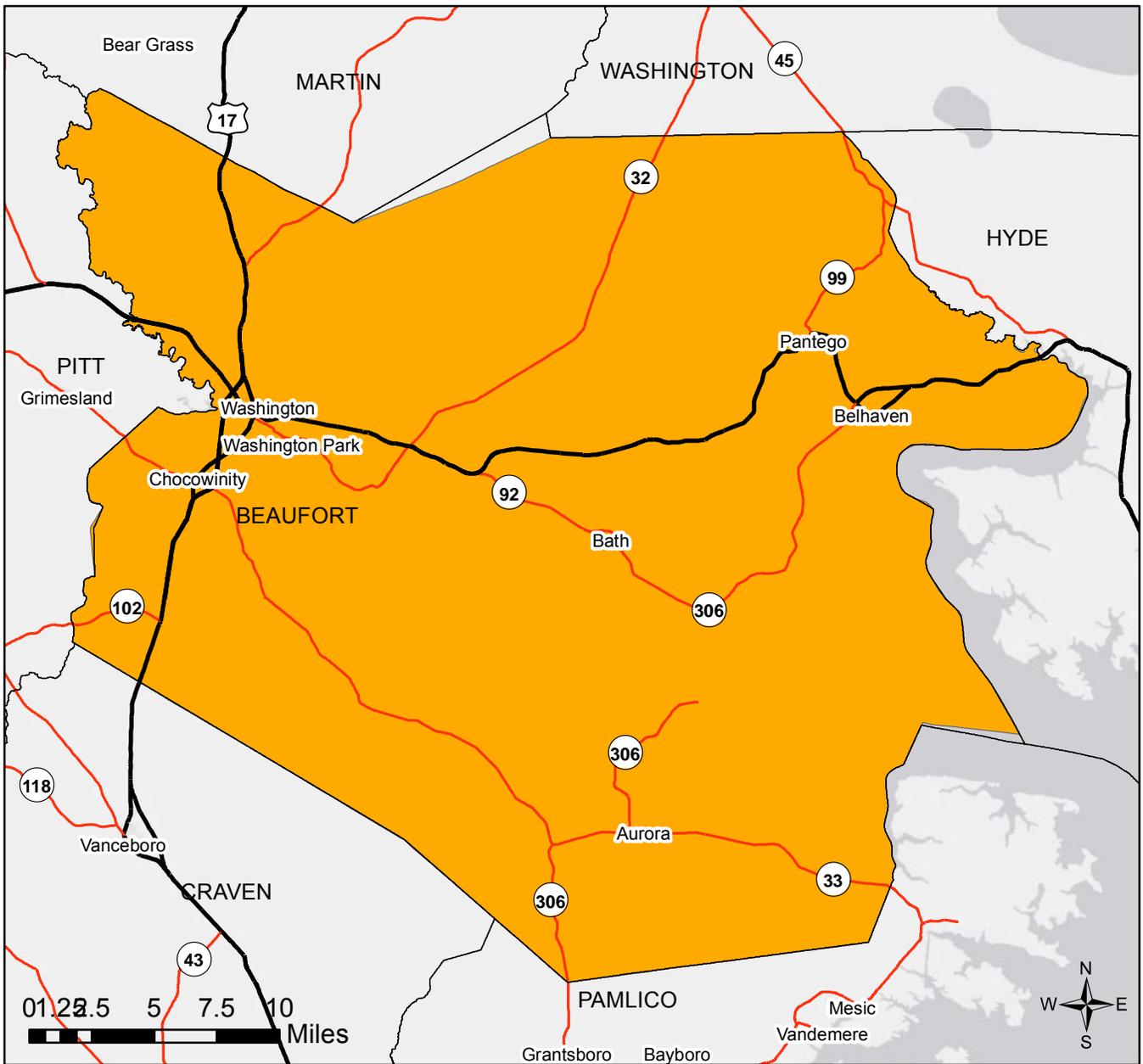
Percentage of Households with Zero Vehicles



Roads

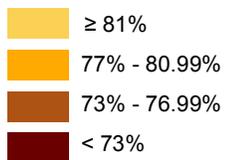


Data Source: 2011 Census Data Table B08201



Mobility-Impaired Distribution - Beaufort County

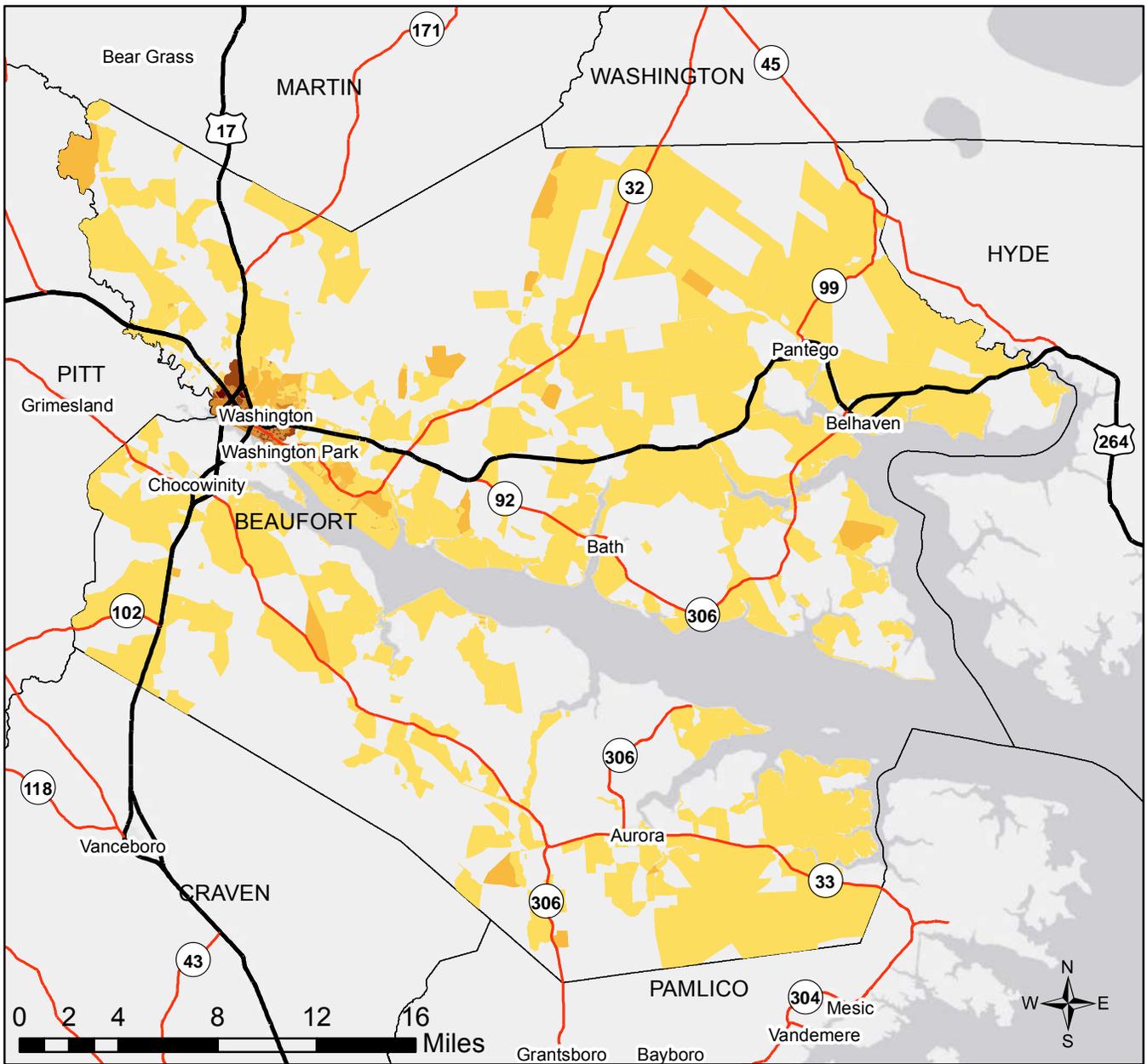
Percentage 5 Years and Over Without Any Disability



Roads

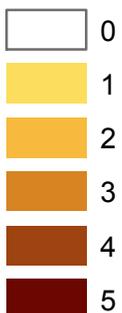


Data Source: 2011 Census Data Table S1801



Compilation of Disadvantaged Population Factors - Beaufort County

Number of Factors Exceeding Threshold (7 Total)



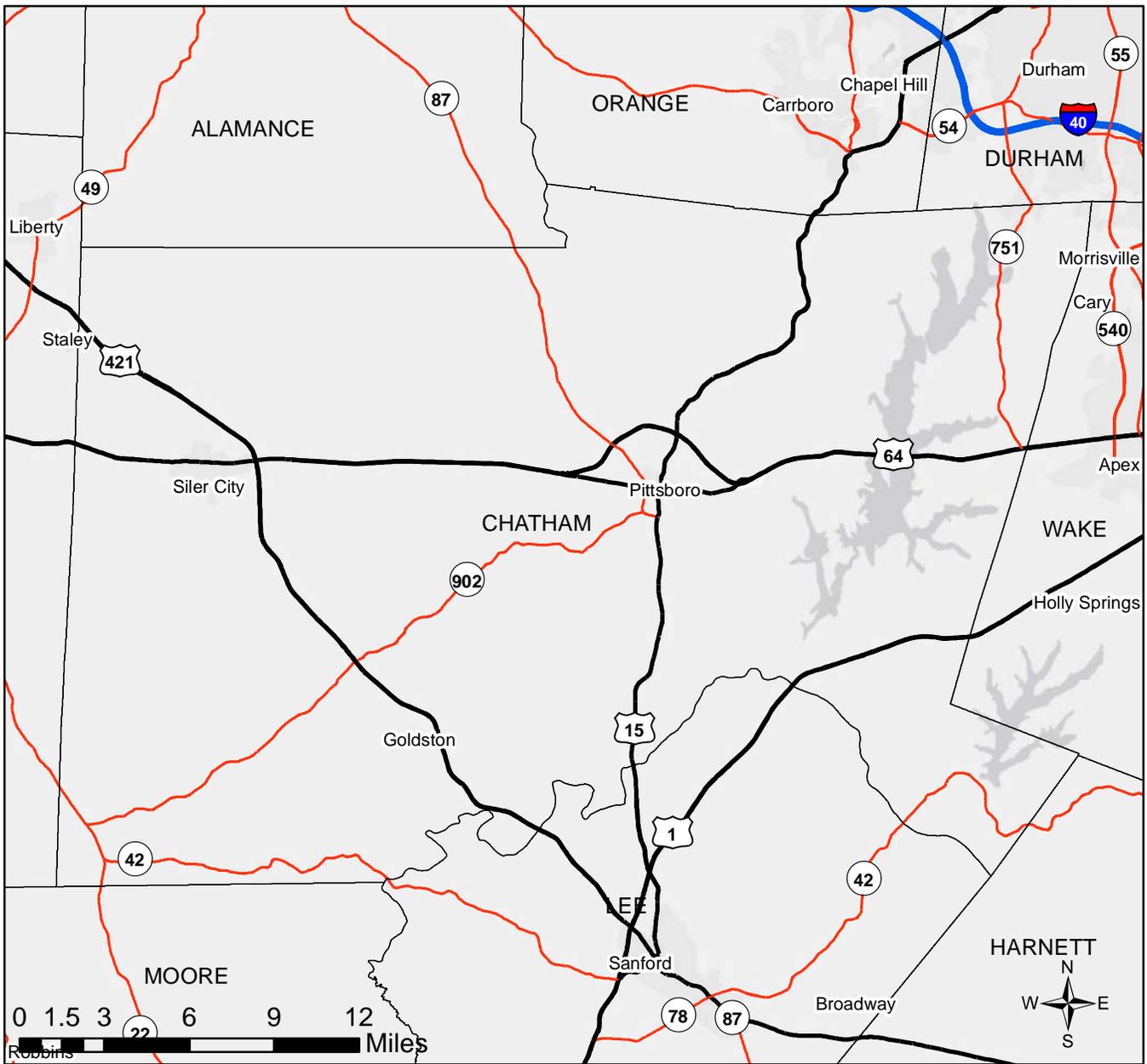
Threshold Values

- Low-income households: $\geq 28\%$ of Population Below Poverty Level
- Households with mobility-impaired individuals: $< 73\%$ of Population 5 Years and Over Without Any Disability
- Households with youth of non-driving age: $\geq 23\%$ of Population ≤ 14 years old
- Households with seniors: $\geq 29\%$ of Population ≥ 62 years old
- Ethnic minority households: $\geq 64\%$ Minority Population
- LEP households: $\geq 8\%$ of Population speaking English less than "Very Well"
- Carless Households: $\geq 13\%$ of No Vehicle Households

Roads

- NC
- US

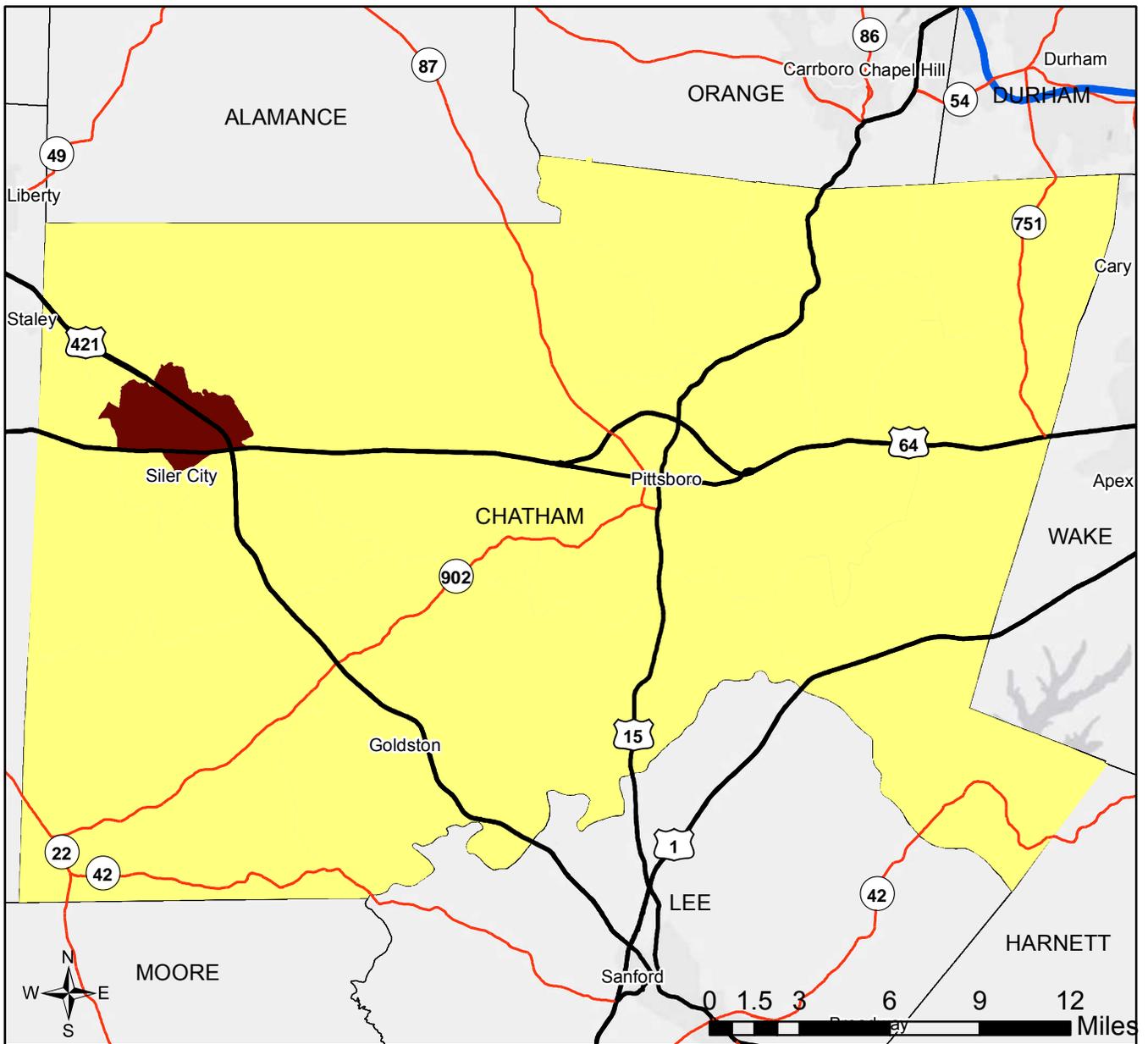




Chatham County

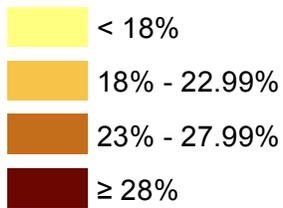
- Roads**
- NC
 - US
 - I





Low Income Distribution - Chatham County

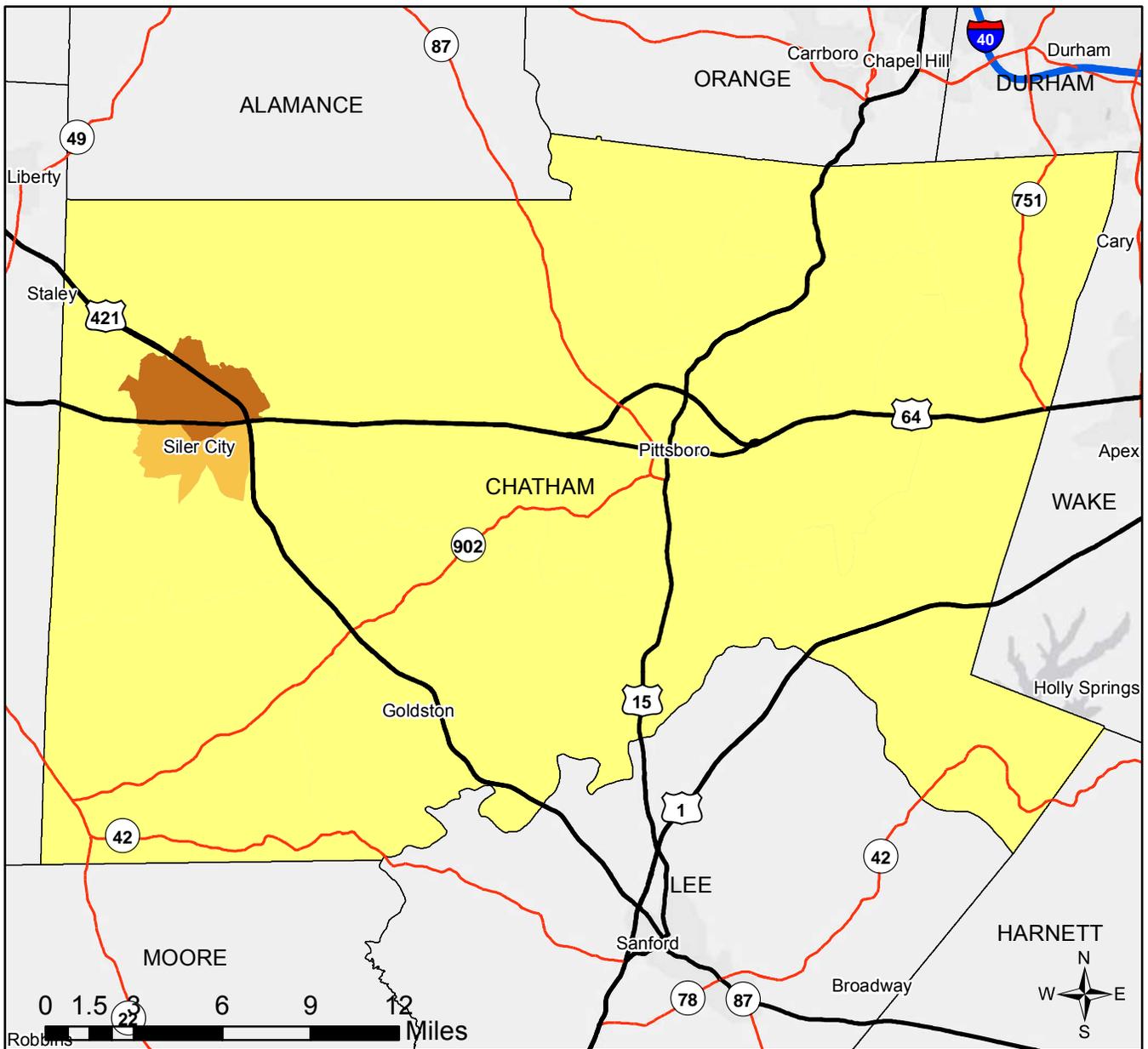
Percentage Below the Poverty Line



Roads

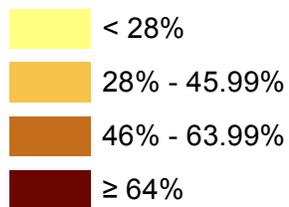


Data Source: 2011 Census Data Table S1701



Minority Distribution - Chatham County

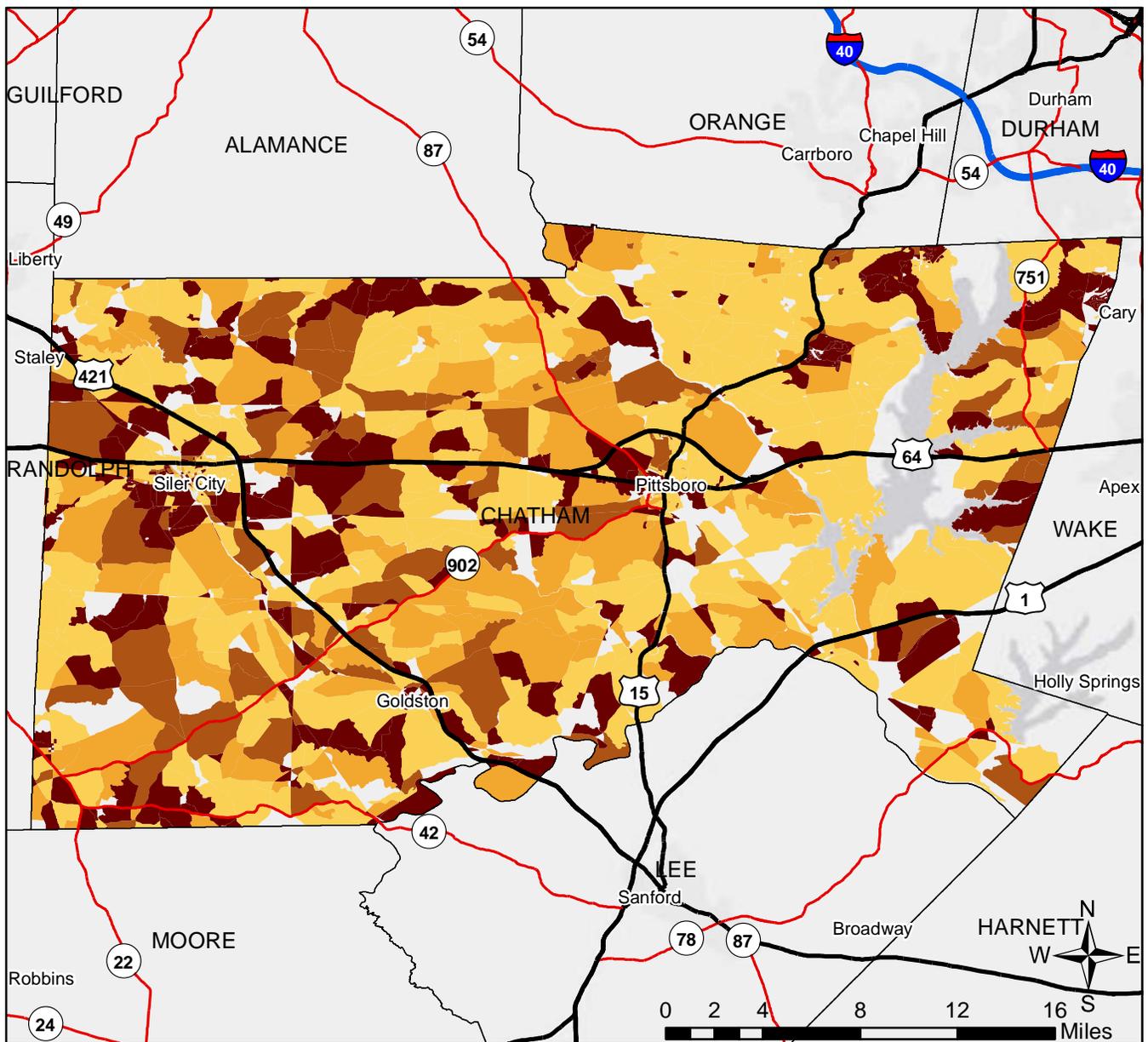
Percentage Minority



Roads

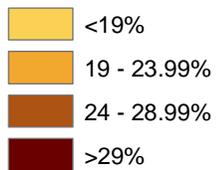


Data Source: 2011 Census Data Table B02001



Senior Distribution - Chatham County

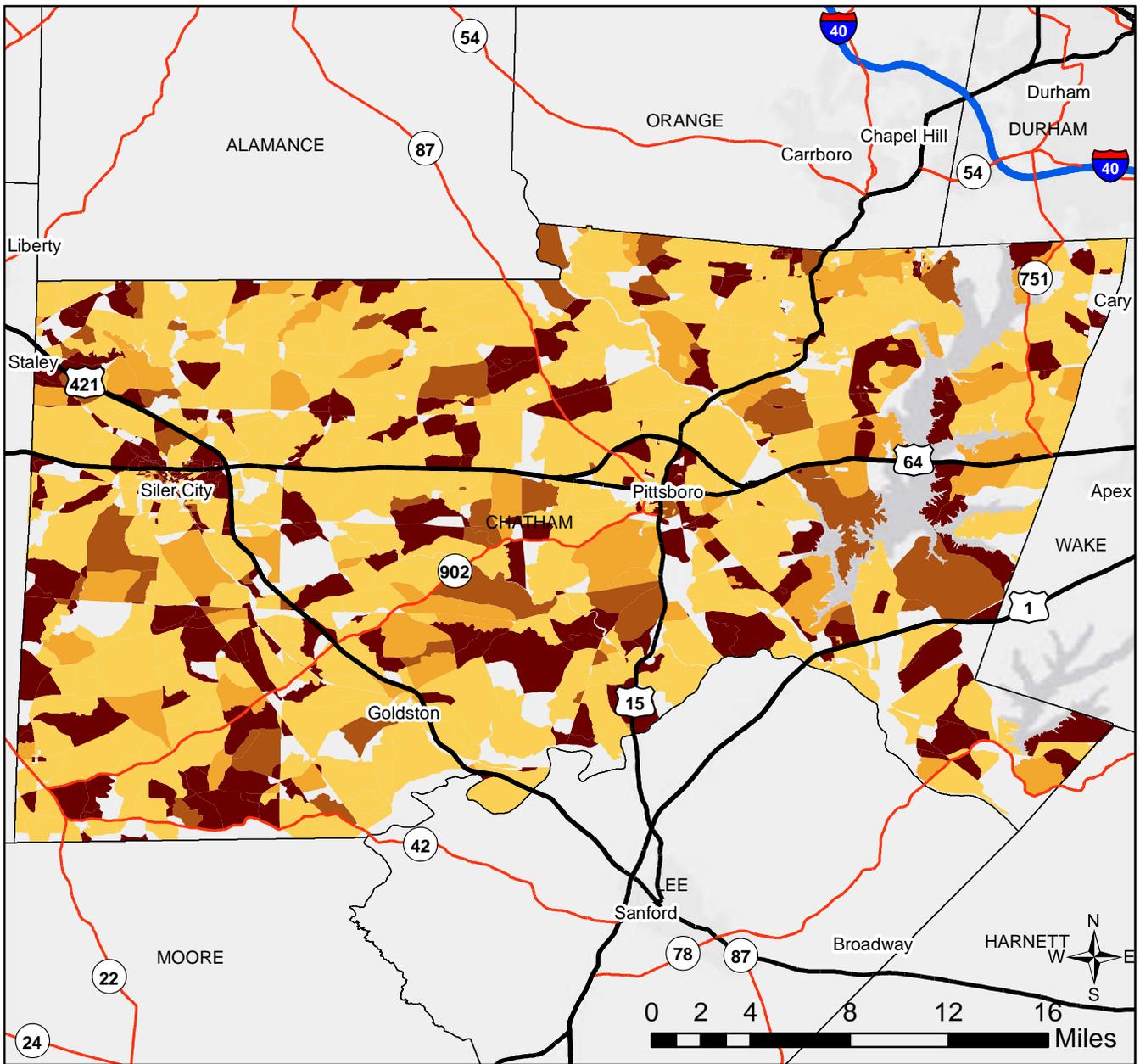
Percentage Over 62 Years Old



Roads

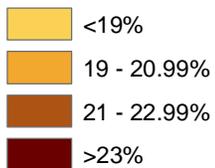


Data Source: 2011 Census Data Table P12



Youth Distribution - Chatham County

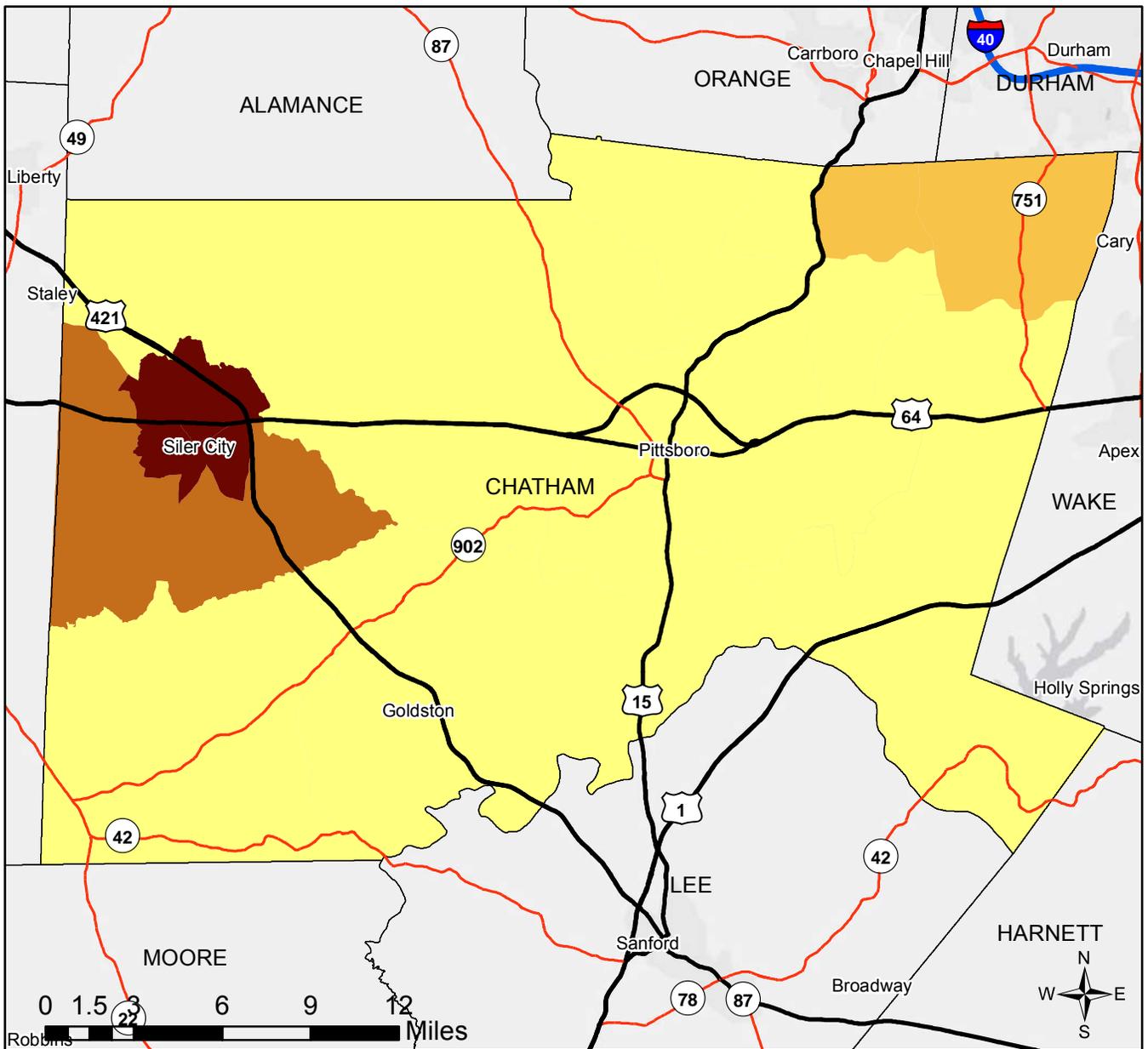
Percentage Under 14 Years Old



Roads

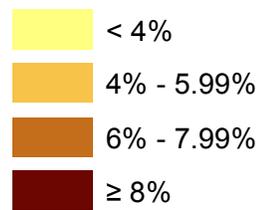


Data Source: 2011 Census Data Table P12



Limited English Proficiency Distribution - Beaufort County

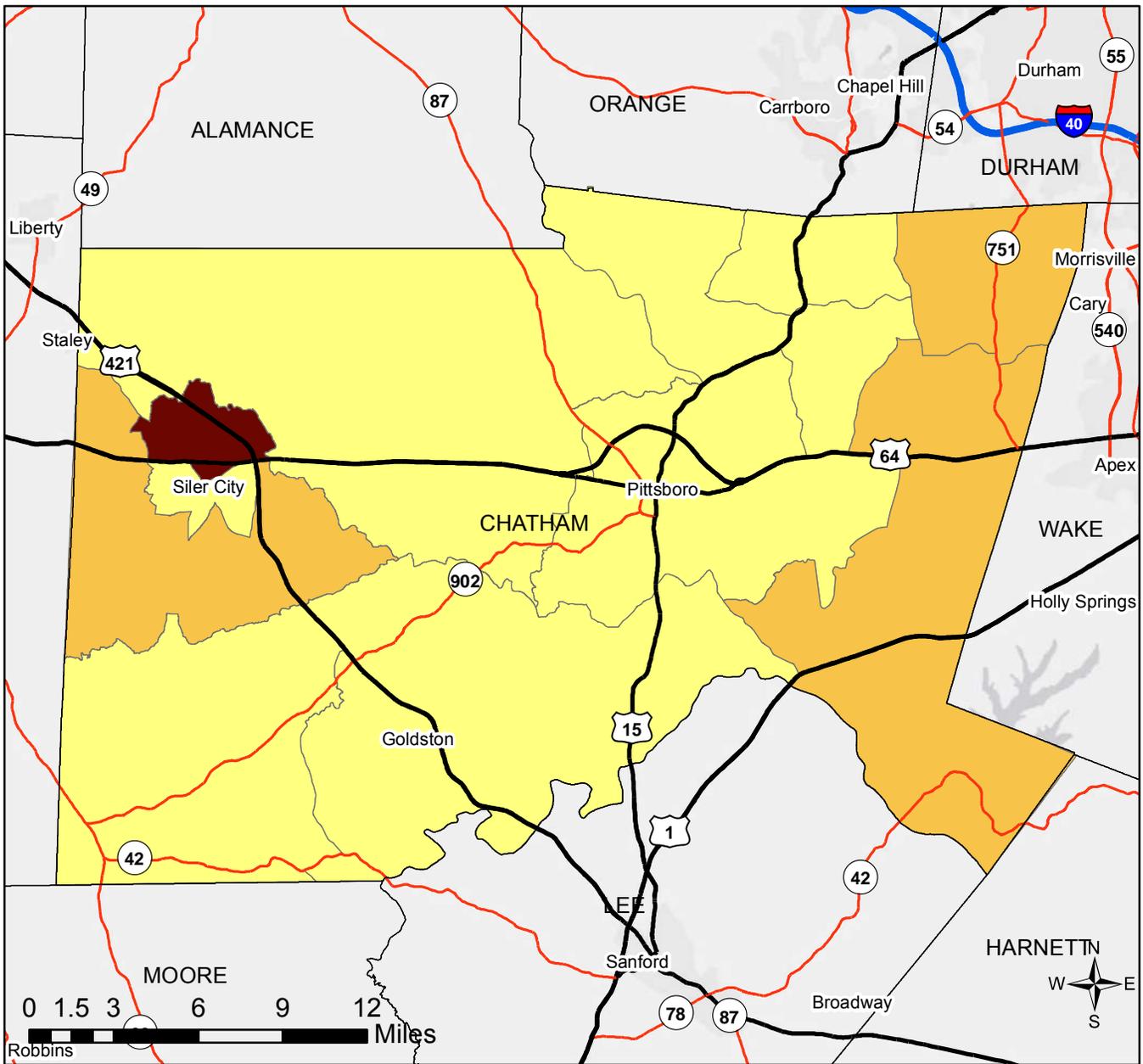
Percentage Speaks English Less Than "Very Well"



Roads

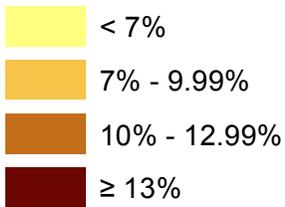


Data Source: 2011 Census Data Table B16001

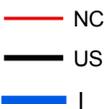


Households with Zero Vehicles Distribution - Chatham County

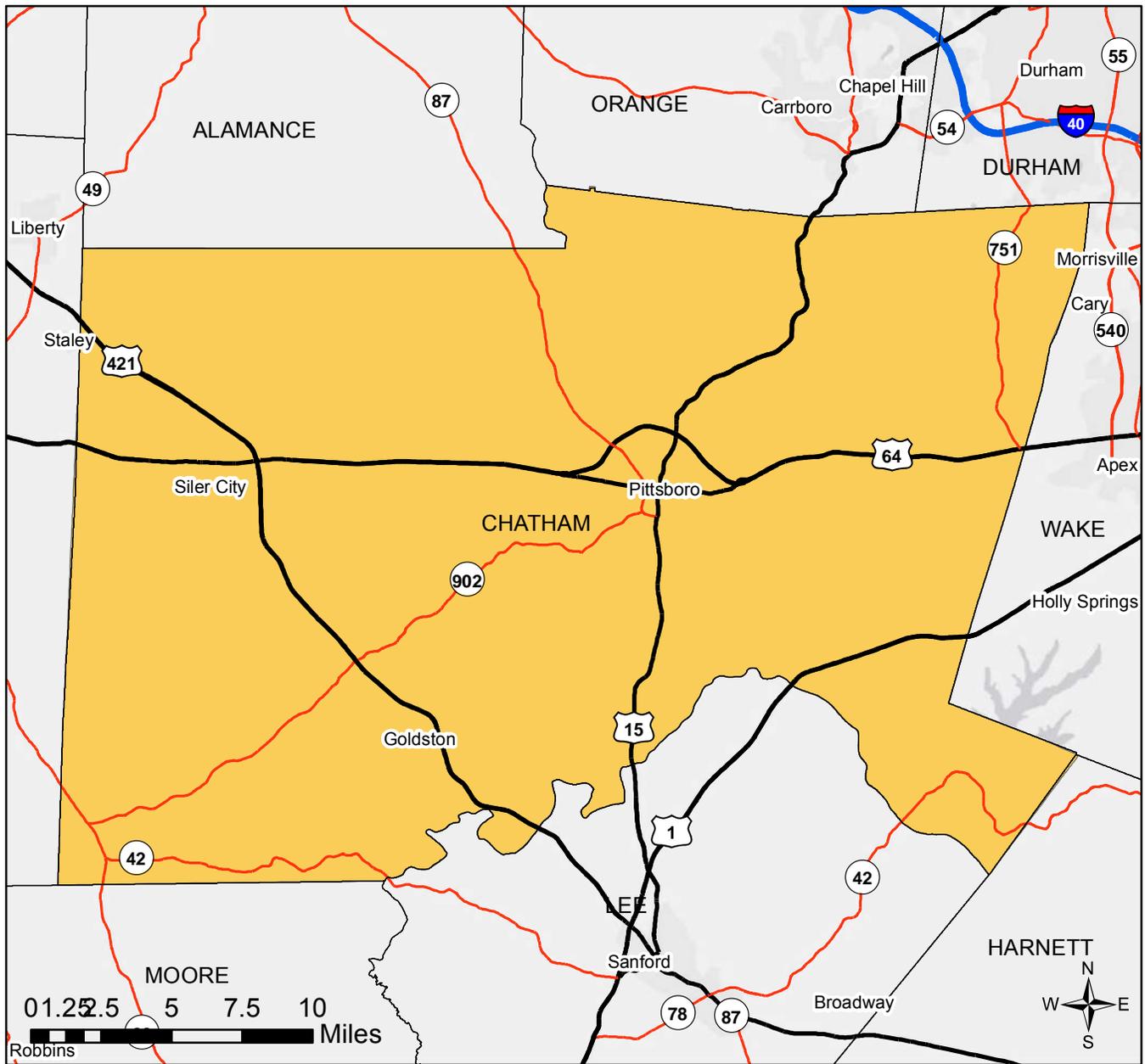
Percentage of Households with Zero Vehicles



Roads

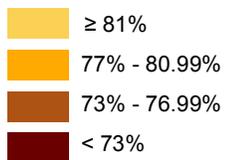


Data Source: 2011 Census Data Table B08201



Mobility-Impaired Distribution - Chatham County

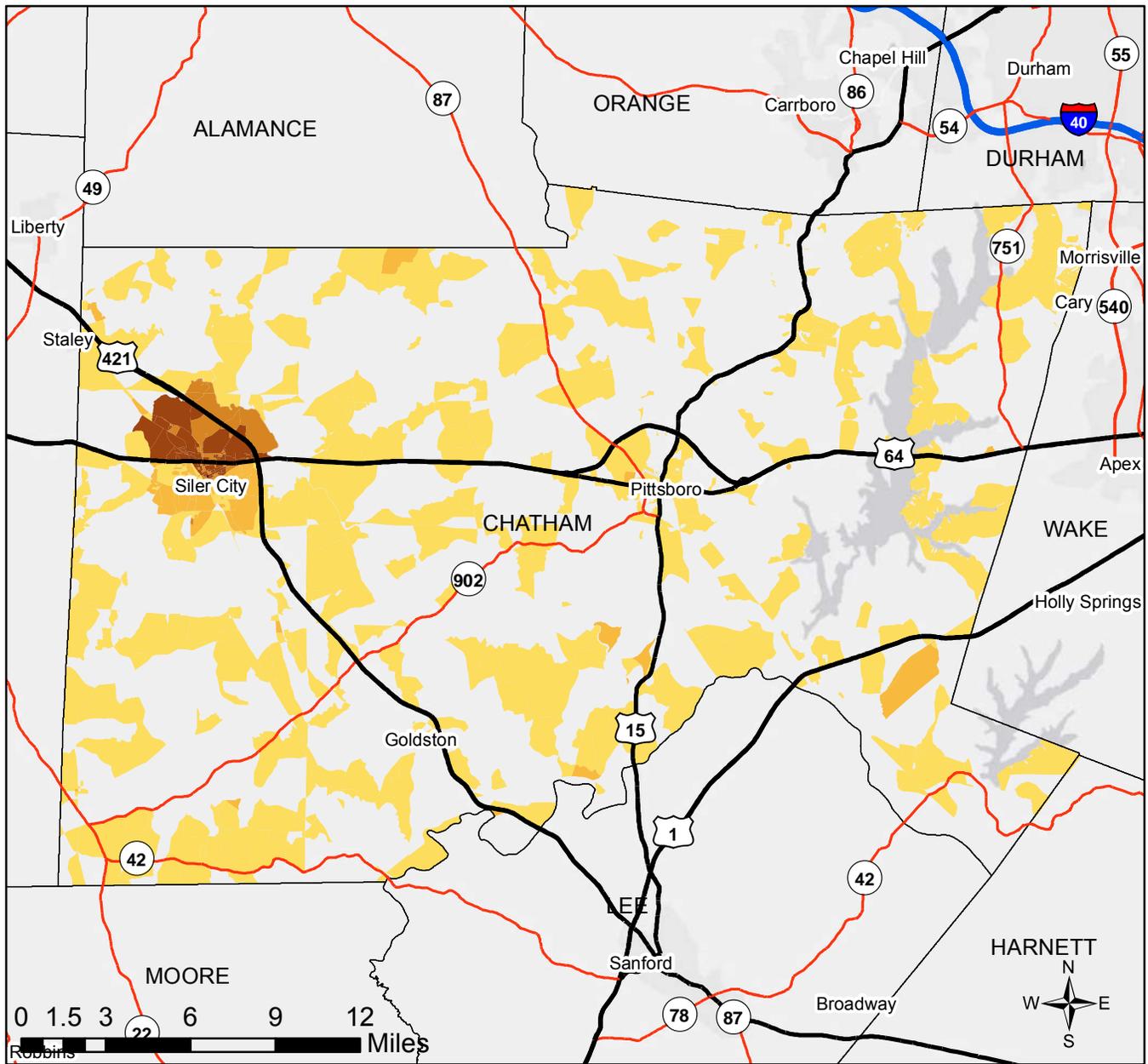
Percentage 5 Years and Over Without Any Disability



Roads

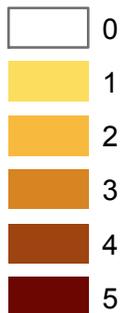


Data Source: 2011 Census Data Table S1801



Compilation of Disadvantaged Population Factors - Chatham County

Number of Factors Exceeding Threshold (7 Total)

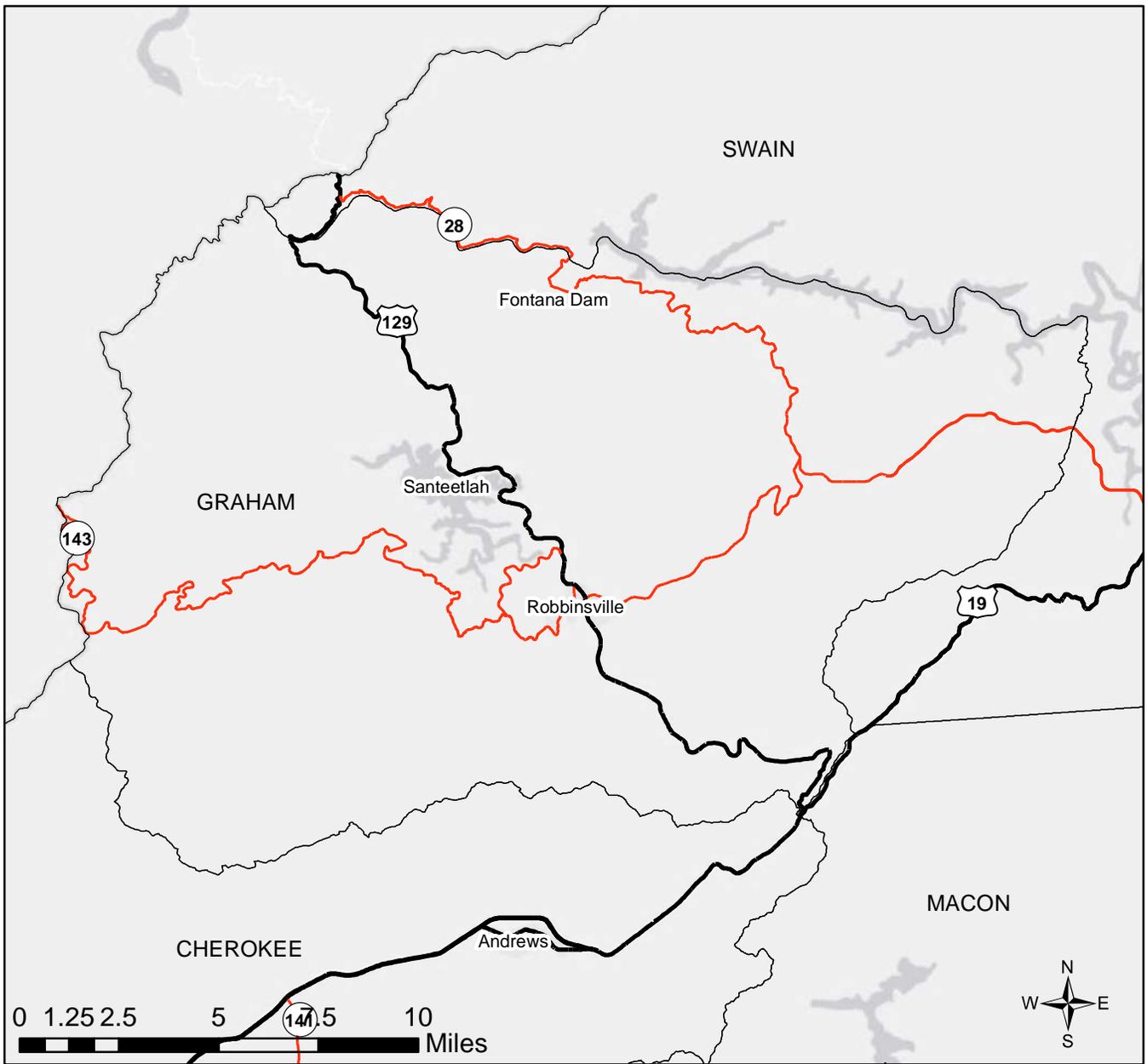


Threshold Values

- Low-income households: $\geq 28\%$ of Population Below Poverty Level
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- Households with seniors: $\geq 29\%$ of Population ≥ 62 years old
- Ethnic minority households: $\geq 64\%$ Minority Population
- LEP households: $\geq 8\%$ of Population speaking English less than "Very Well"
- Carless Households: $\geq 13\%$ of No Vehicle Households

Roads

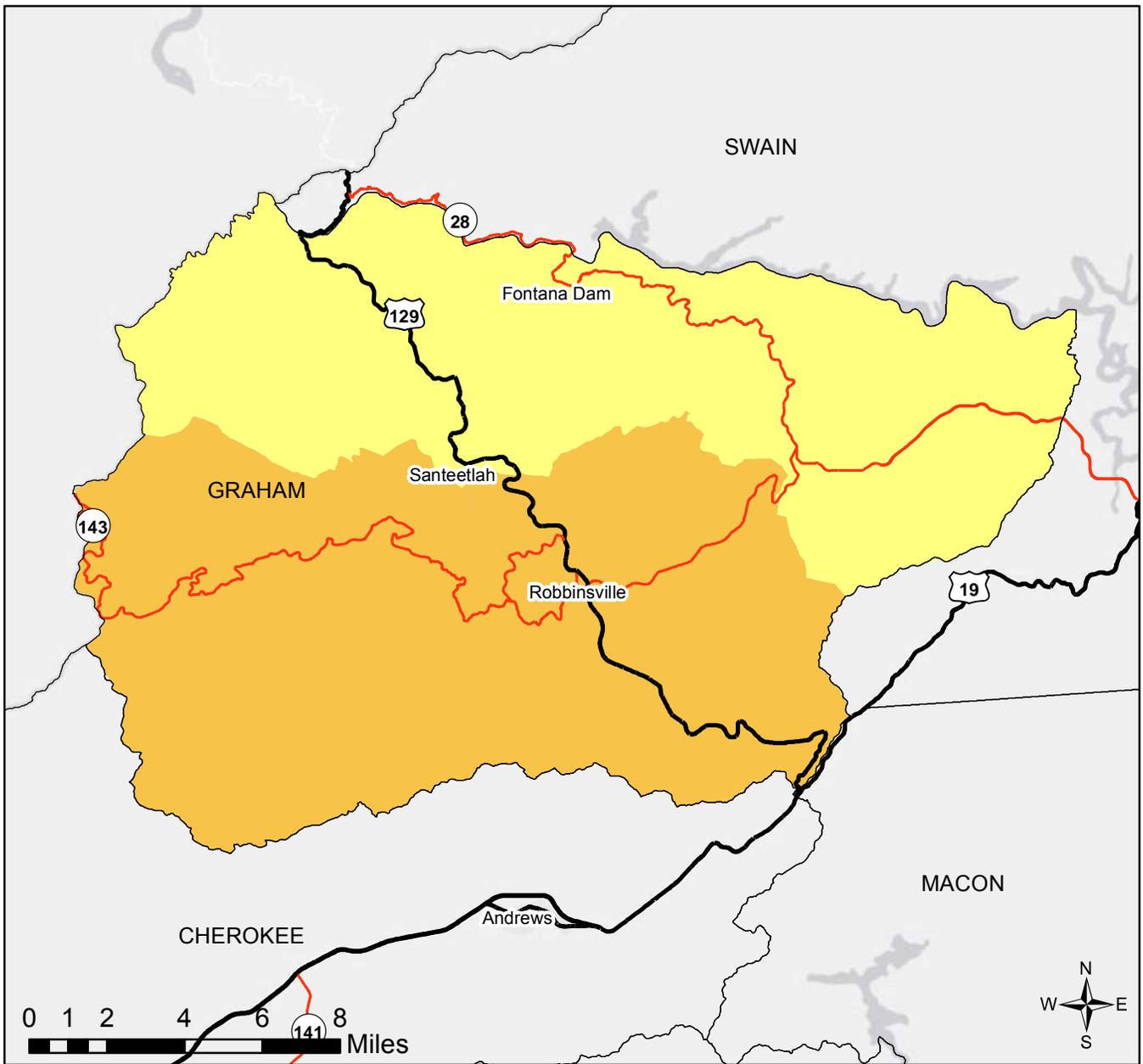




Graham County

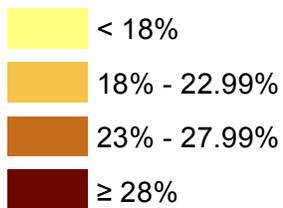
- Roads**
- NC
 - US
 - I





Low Income Distribution - Graham County

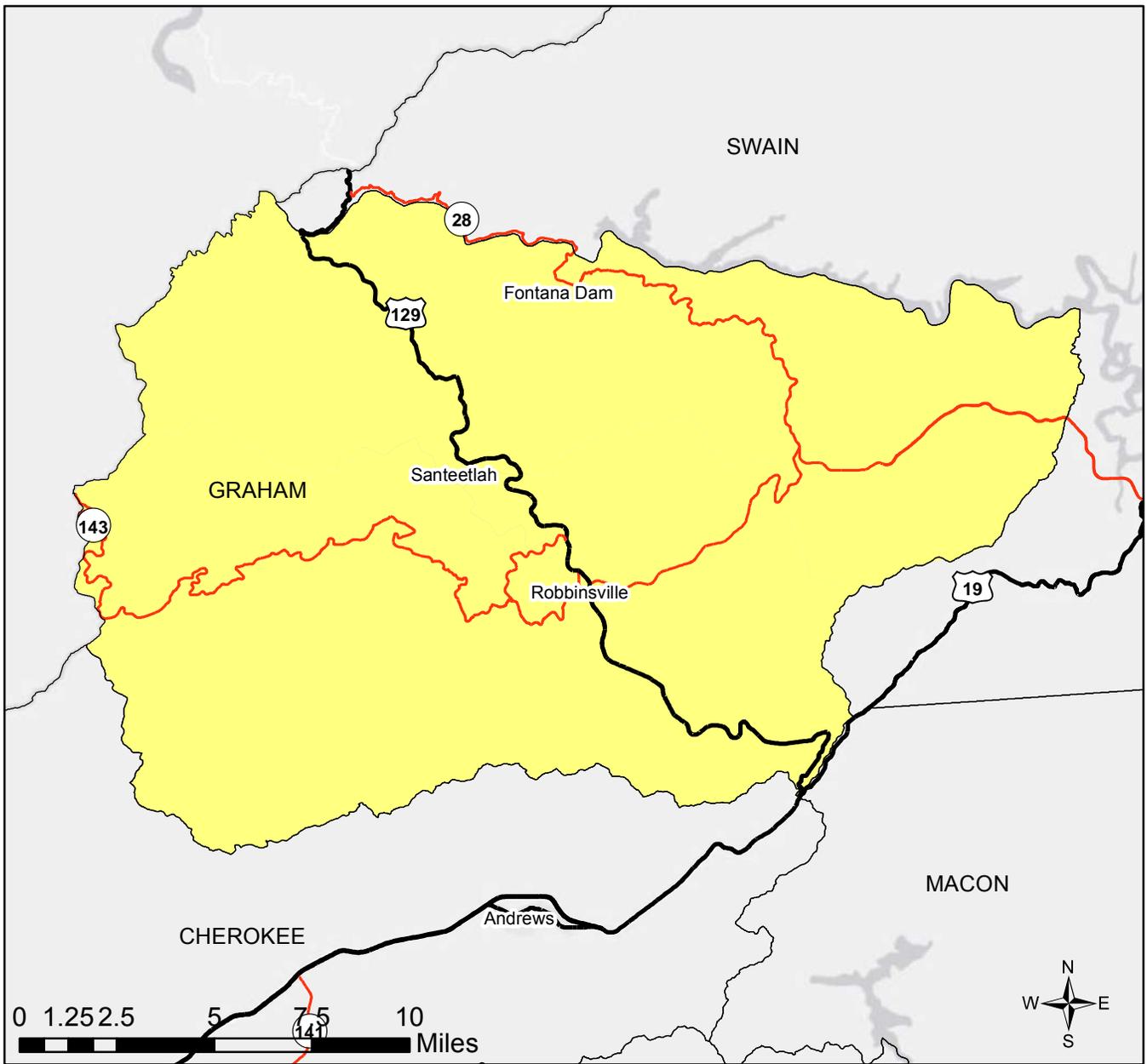
Percentage Below the Poverty Line



Roads

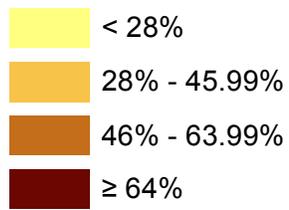


Data Source: 2011 Census Data Table S1701



Minority Distribution - Graham County

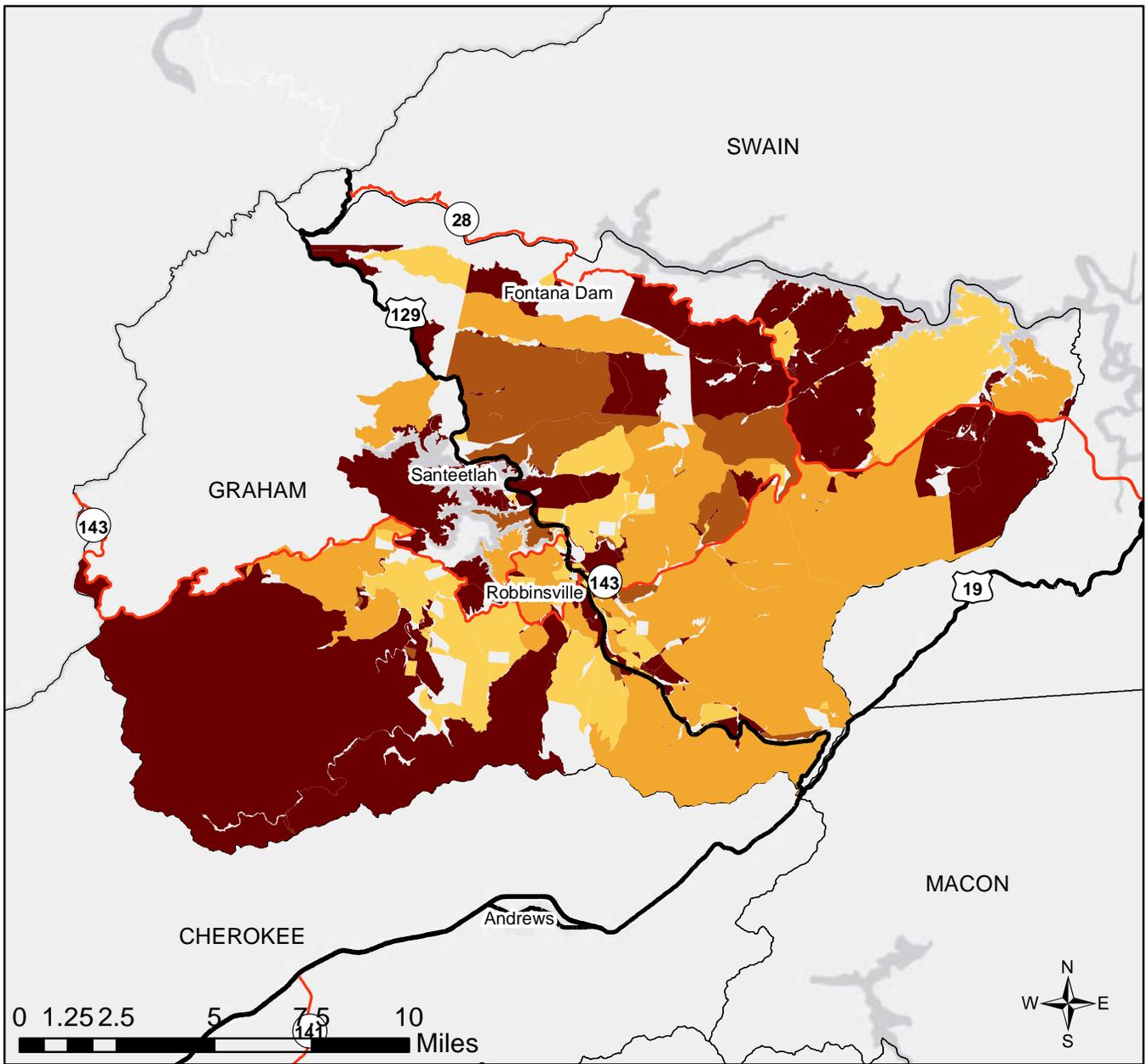
Percentage Minority



Roads

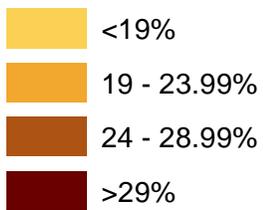


Data Source: 2011 Census Data Table B02001



Senior Distribution - Graham County

Percentage Over 62 Years Old



Roads

