

Geospatial Mapping & Student Success: Breaking Barriers & Building Community



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Data... Insight... Impact



What Are The
Barriers That
Separate Us?

“N.M. at bottom in child well-being”
Albuquerque Journal, June 24, 2013

“Dropping Out Can Lead To A Hard Life”
Albuquerque Journal, August 4, 2013

“Children fare worse in New Mexico”
Albuquerque Journal, April 12, 2014

“N.M.’s Child Death Rate Increase”
Albuquerque Journal, July 26, 2006

A Sense Of Disadvantage & Despair

“New Mexico in bottom five in child well-being”
El Defensor Chieftain, July 31, 2010

“N.M. Still Battling Teen Pregnancy”
Albuquerque Journal, December 16, 2012

“More Children in Poverty Near Mexico Border”
Albuquerque Journal, February 10, 2005

“Severe child-abuse cases pile up in Albuquerque”
Albuquerque Journal, April 18, 2014

“Hunger, poverty need public policies”
Albuquerque Journal, October 21, 2013

Geospatial Mapping

Geospatial mapping is an approach to applying statistical analyses, data visualization, and other analytic techniques to data that have geographical dimensions.

We have focused on major educational issues around equity, educational achievement and attainment, early childhood, health, juvenile justice, economic development and inter-generational poverty.

- Geospatial Mapping approaches make these variables obvious and easier to understand in the specific context of educational achievement.
- Some authors (e.g. Hoglebe & Tate, 2012) argue that a geospatial perspective is essential in developing a type of visual political literacy in the areas of education, health and human services.

Mapping Is Powerful

- Geospatial mapping is an important tool for policy development because:
 - images, illustrations, and graphic representations strongly support learning, understanding and other aspects of cognition
 - maps have long been useful in engaging multiple groups in civic debates and other political discussions because they can be used as planning tools.
- Geospatial mapping is used extensively in other fields including health and human services, natural resources, public safety, defense, and urban and regional planning.
- The data in the maps are immediately accessible to a wide range of audiences including policy-makers, community members, educators, students, and parents.
- Maps are powerful conversation starters. Everybody sees something different in the maps based on their perspectives and experiences.
- Maps equalize the conversations among different groups at the table. People want to know what others think!

How We Use Mapping and Data Visualization

- **Advocacy:** Our assumptions and arguments
 - Education, Statesmanship, and The Civic Debate
 - A Child's Chance For Success
- **Description:** Making the data accessible to all audiences
 - Painting the picture of urgency
 - Identifying risk, needs, and assets
- **Analysis:** Making sense of the data
 - Identifying gaps in resources
 - Setting priorities
 - Measuring impact
- **Action:** Using data for change
 - Strengthening public engagement and civic debate
 - Focus the narrative on success and opportunity
 - Developing policy
 - Creating the basis for mutual accountability

Education, Statesmanship And The Civic Debate

“...wherever the people are well informed, they can be trusted with their own government...If a nation expects to be ignorant and free, in a state of civilization, it expects what never was and never will be.”

Thomas Jefferson

“A good leader can engage in a debate frankly and thoroughly, knowing that at the end he and the other side must be closer, and thus emerge stronger.”

Nelson Mandela

“To save man from the morass of propaganda, in my opinion, is one of the chief aims of education. Education must enable one to sift and weigh evidence, to discern the true from the false, the real from the unreal, and the facts from the fiction.’

Martin Luther King

Quality Counts Framework: A Child's Chance For Success

- **Early Foundations**

- Family income: Percent of children in families with incomes at least 200% of poverty level
- Parental education: Percent of children with at least one parent with a postsecondary degree
- Parental employment: Percent of children with at least one parent working full time and year-round
- Linguistic integration: Percent of children whose parents are fluent English speakers

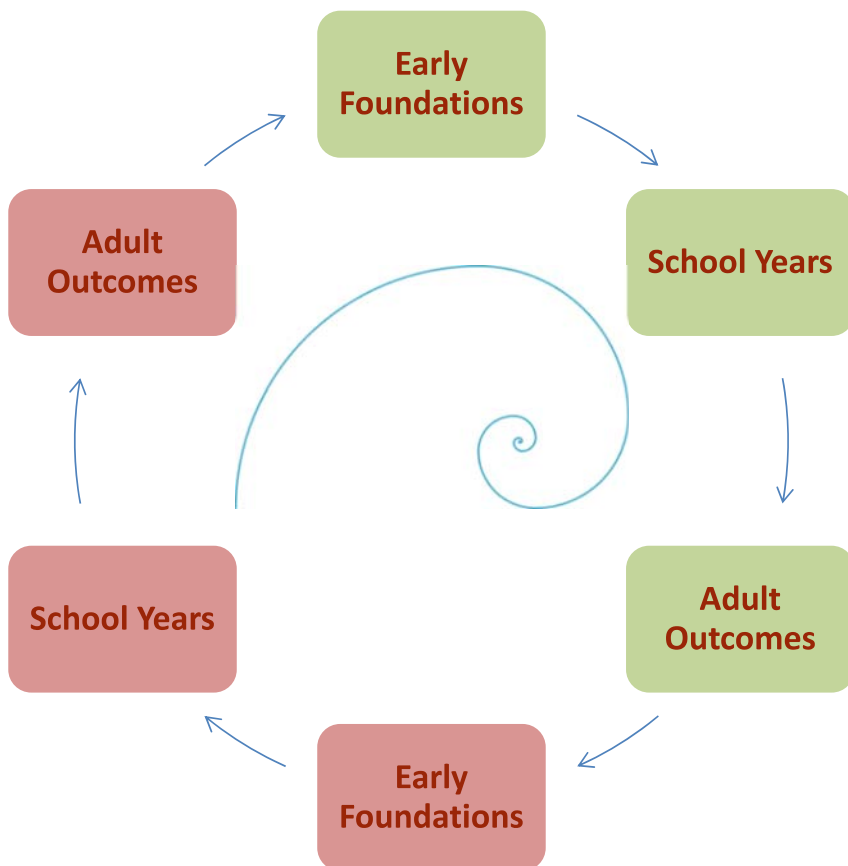
- **School Years**

- Preschool enrollment: Percent of 3- and 4-year-olds enrolled in preschool
- Kindergarten enrollment: Percent of eligible children enrolled in kindergarten programs
- 4th grade reading: Percent of 4th grade public school student “proficient” on NAEP
- 8th grade math: Percent of 8th grade public school student “proficient” on NAEP
- High school graduation: Percent of public high school students who graduate with a diploma
- Young adult (18 – 24) education: Percent of young adults (18 – 24) enrolled in postsecondary education or with a degree

- **Adult Outcomes**

- Adult educational attainment: Percent of adults (25 – 64) with a 2- or 4-year postsecondary degree
- Annual income: Percent of adults (25 – 64) with incomes at or above national median
- Steady employment: Percent of adults (25 – 64) in labor force working full time and year-round

A Child's Chance For Success Impacts The Generations That Follow For Better Or Worse



Early Foundations

- Family income
- Parental education
- Parental employment
- Linguistic integration

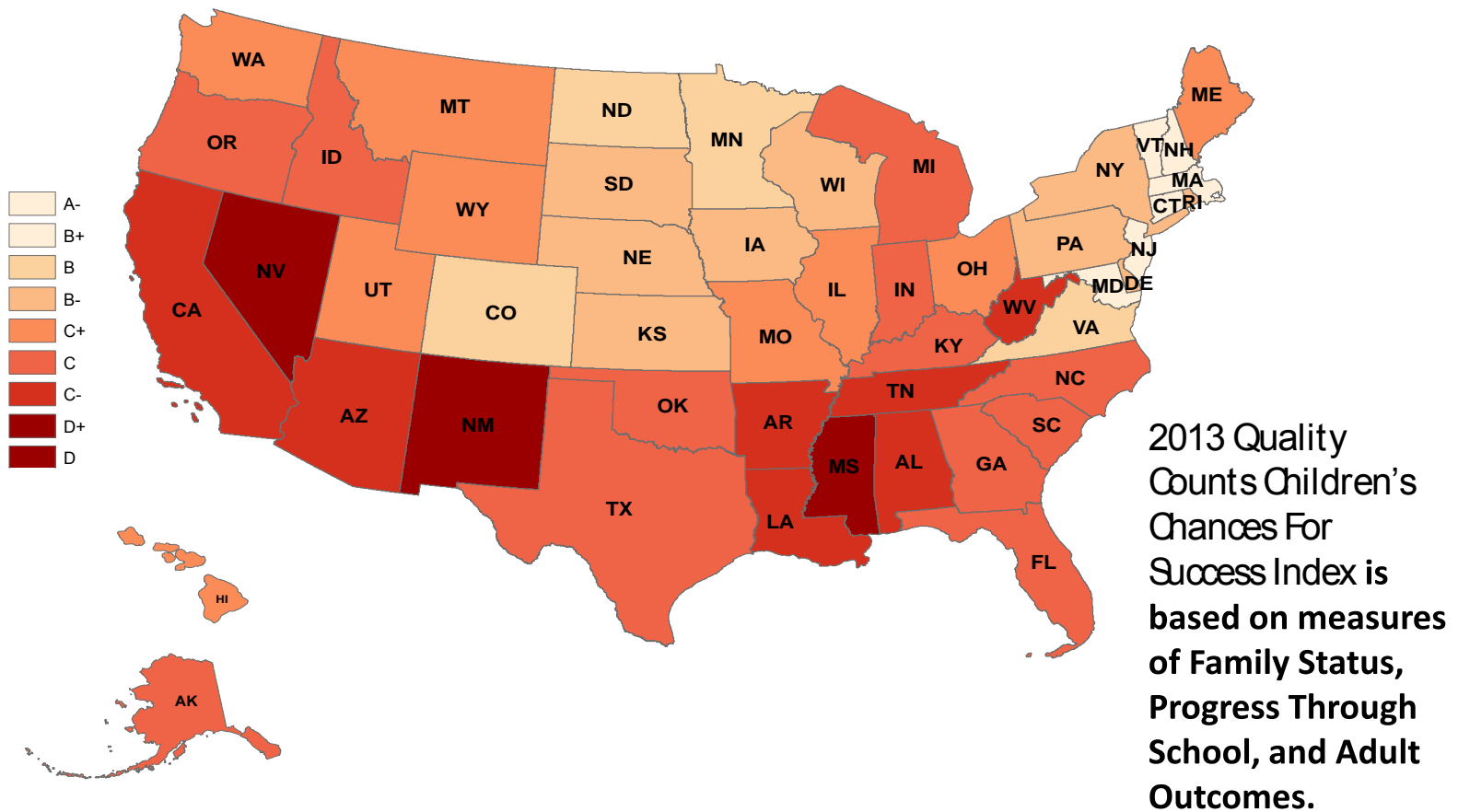
School Years

- Preschool enrollment
- Kindergarten enrollment
- 4th grade reading
- 8th grade mathematics
- High school graduation
- Young adult [18-24] education

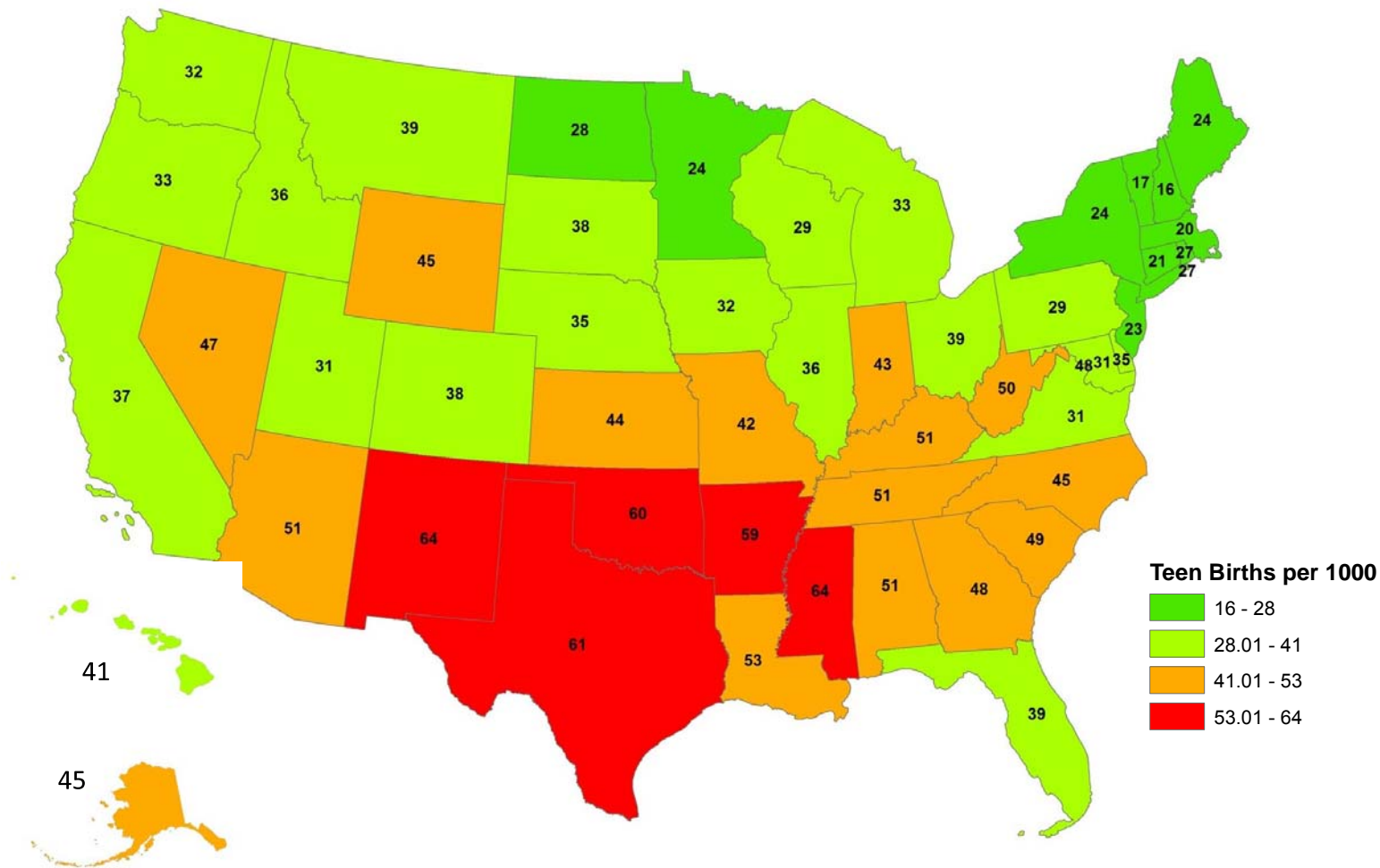
Adult Outcomes

- Adult educational attainment
- Annual income
- Steady employment

New Mexico Children's Chances For Success Are Among The Worst In The Nation, 2013

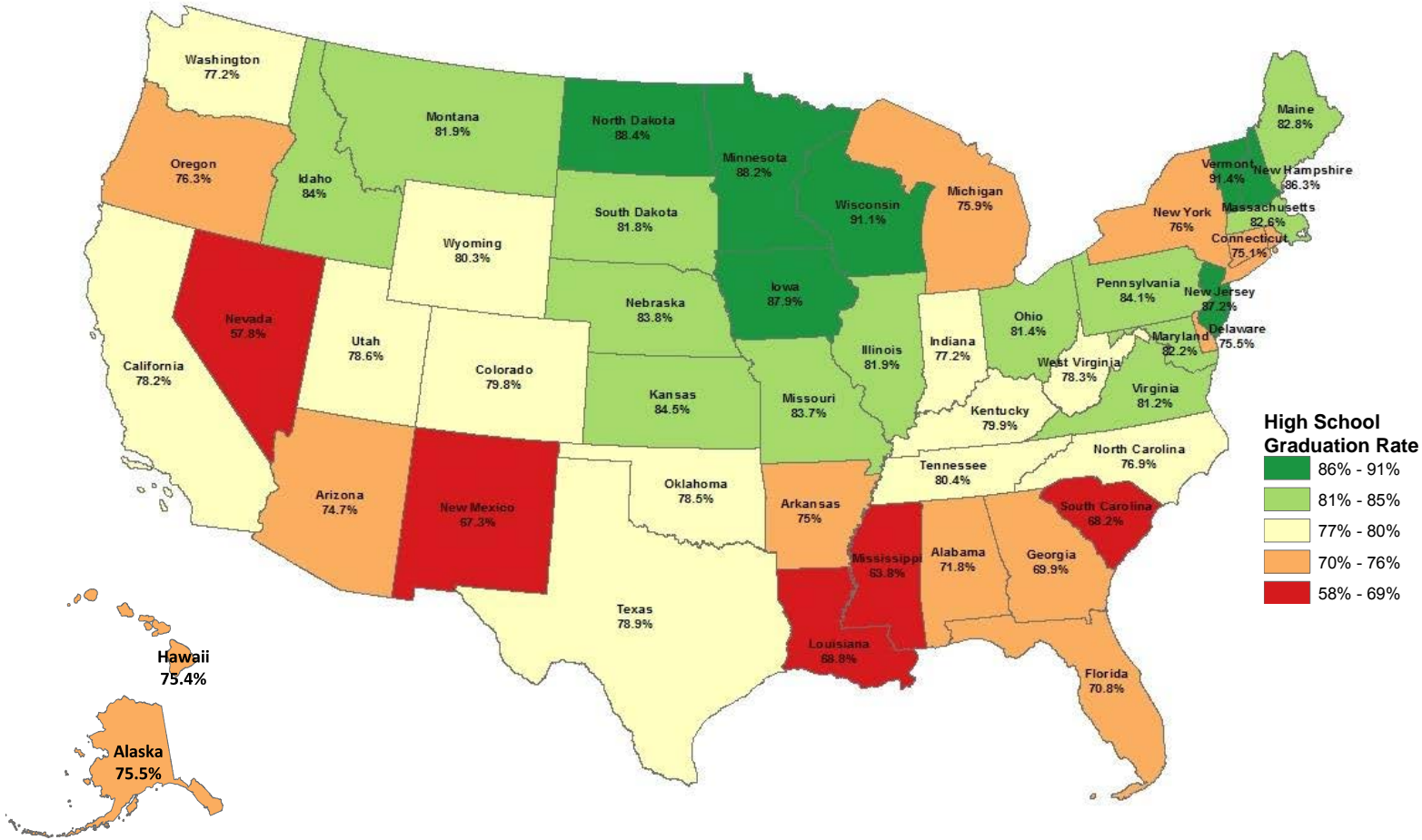


Early Foundations: Teen Births Per 1000, 2009

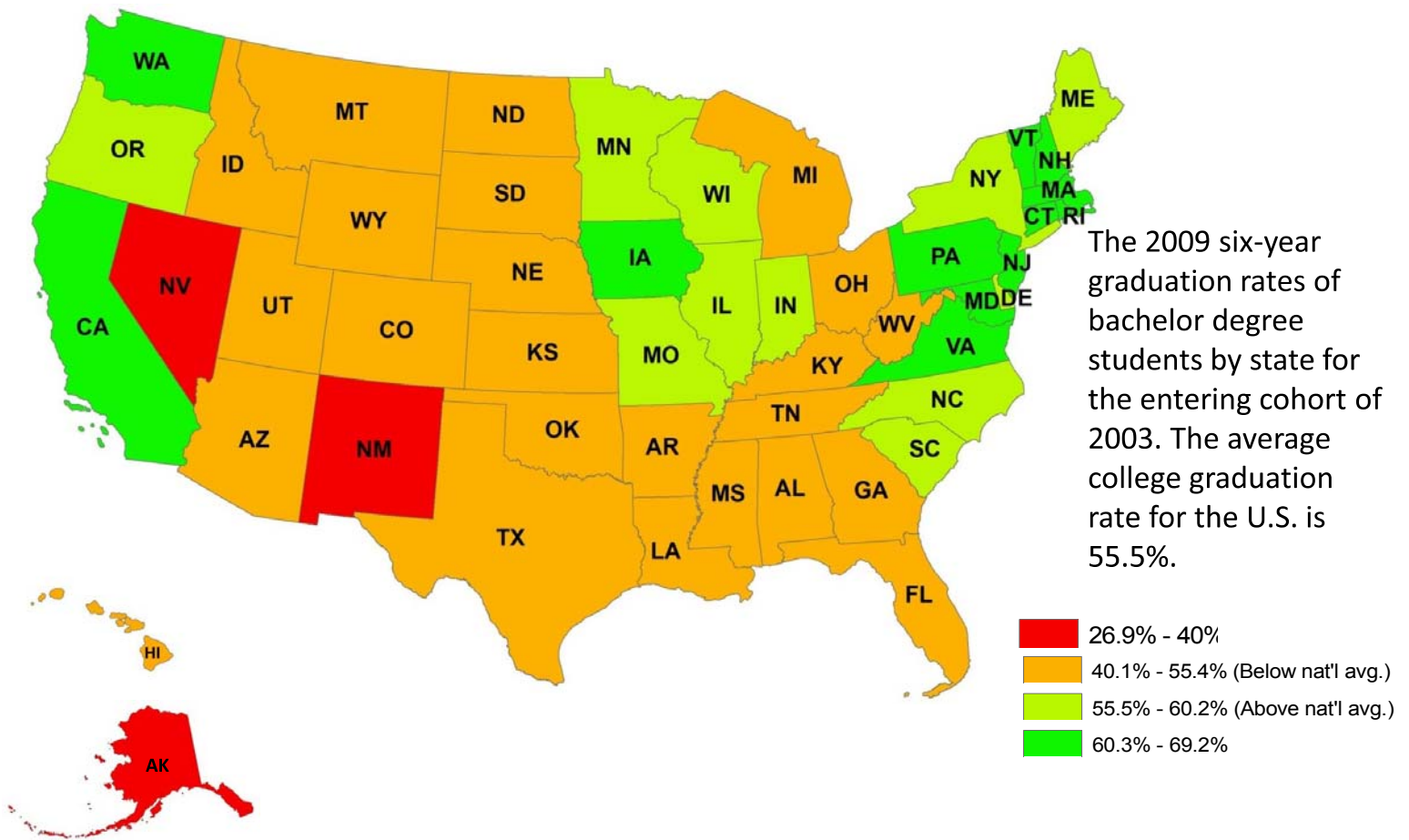


School Years: High School Graduation Rates, By State

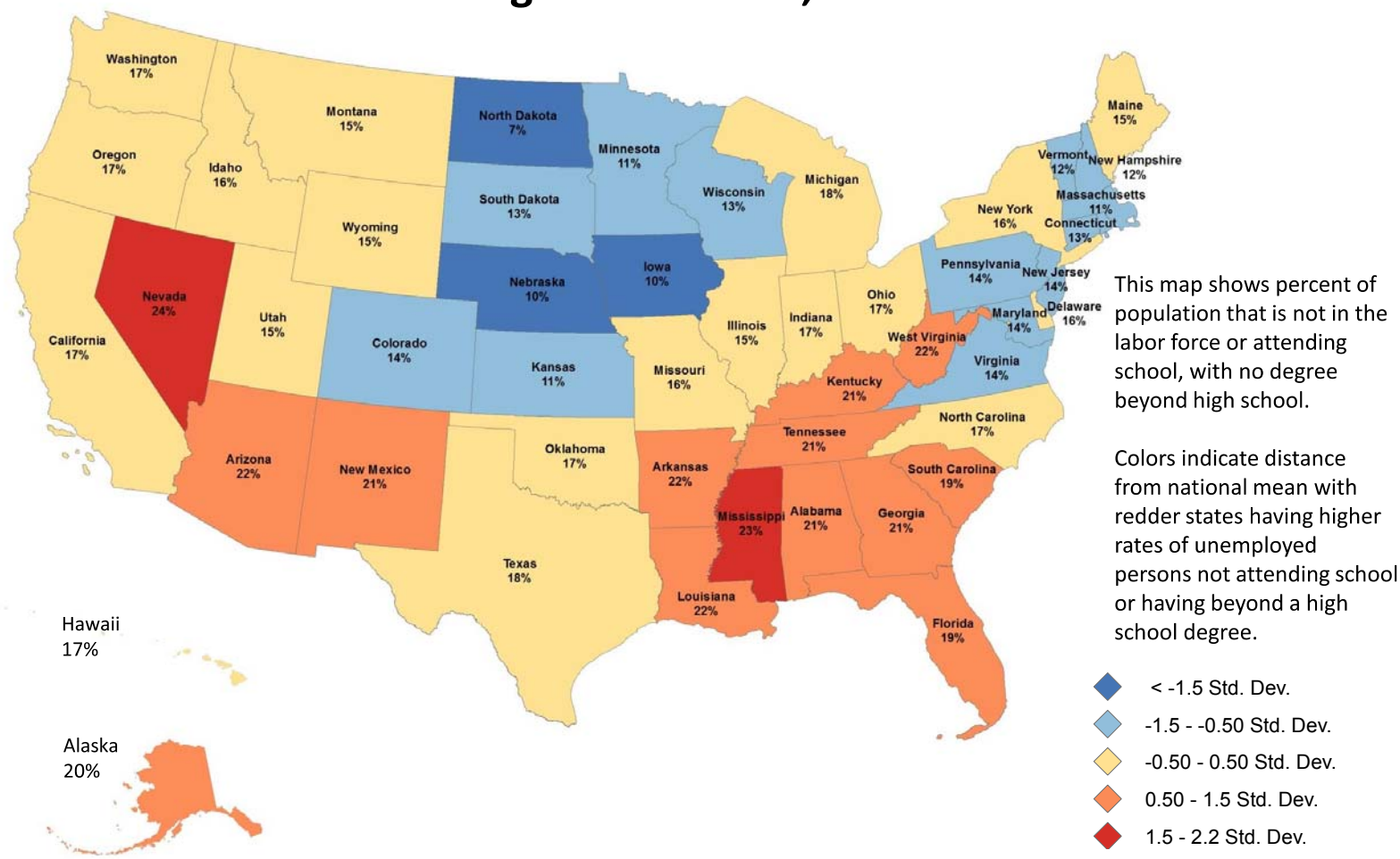
2009-2010



School Year 2008-2009 New Mexico's College Graduation Rate Are Among The Worst In The Nation



Adult Outcomes: Persons 18-24 Not In Labor Force Or School, No Degree Above HS, 2010



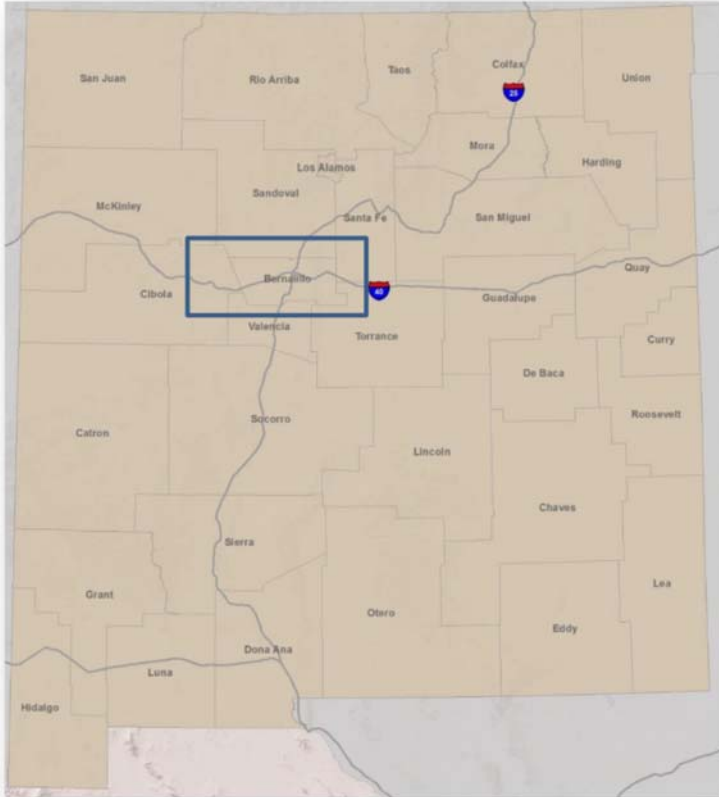
**As Go Our Children,
So Goes Our
Community**



Focusing on New Mexico's Critical Areas of Concern

“Education must enable one to sift and weigh evidence, to discern the true from the false, the real from the unreal, and the facts from the fiction.”

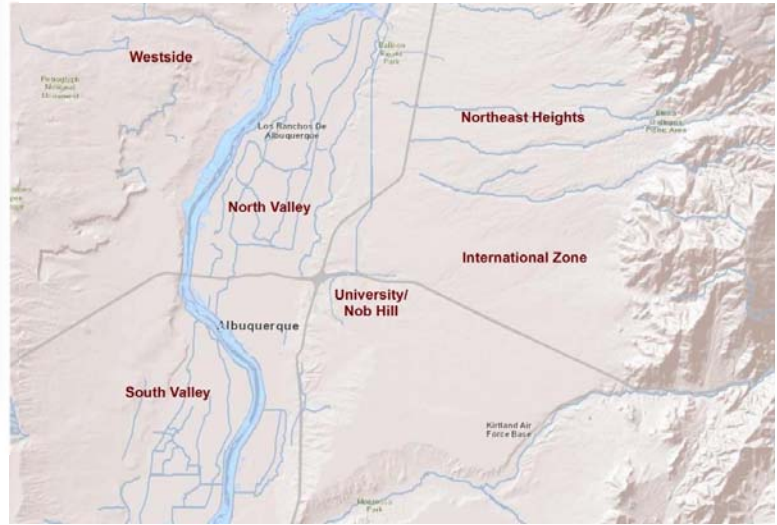
Our State



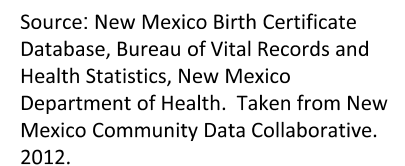
Our City



Our Neighborhoods



Research has shown a link between parental education levels and child outcomes such as educational achievement and attainment.



Map of the United States showing the percentage of the population that is Caucasian by state. The map uses a color scale from red (highest percentage) to green (lowest percentage).

State	Percentage (%)
Alabama	68.8%
Alaska	10.2%
Arizona	58.9%
Arkansas	61.8%
California	66.7%
Colorado	54.2%
Connecticut	62.4%
Delaware	88.9%
District of Columbia	68.7%
Florida	73.3%
Georgia	40.9%
Hawaii	50.8%
Idaho	59.9%
Illinois	54.5%
Indiana	51.3%
Iowa	55.3%
Kansas	41.8%
Kentucky	52.8%
Louisiana	62.9%
Maine	82.9%
Maryland	66.7%
Massachusetts	68%
Michigan	69.2%
Minnesota	68.2%
Mississippi	66.7%
Missouri	68.2%
Montana	68.2%
Nebraska	68.2%
Nevada	68.2%
New Hampshire	68.2%
New Jersey	68.2%
New Mexico	68.2%
New York	68.2%
North Carolina	68.2%
North Dakota	68.2%
Ohio	68.2%
Oklahoma	68.2%
Oregon	68.2%
Pennsylvania	68.2%
Rhode Island	68.2%
South Carolina	68.2%
South Dakota	68.2%
Tennessee	68.2%
Texas	68.2%
Utah	68.2%
Vermont	68.2%
Virginia	68.2%
Washington	68.2%
West Virginia	68.2%
Wisconsin	68.2%
Wyoming	68.2%







Map of the United States showing the percentage of the Hispanic population by state. The map uses a color scale from red (low percentage) to yellow (high percentage).

State	Percentage
Alabama	49.4%
Alaska	47.1%
Arizona	54%
Arkansas	44.7%
California	67.7%
Colorado	57.9%
Connecticut	59.1%
Delaware	44.7%
District of Columbia	67.7%
Florida	44.7%
Georgia	44.7%
Hawaii	44.7%
Idaho	44.7%
Illinois	44.7%
Indiana	44.7%
Iowa	44.7%
Kansas	44.7%
Kentucky	44.7%
Louisiana	44.7%
Maine	44.7%
Maryland	44.7%
Massachusetts	44.7%
Michigan	44.7%
Minnesota	44.7%
Mississippi	44.7%
Missouri	44.7%
Montana	44.7%
Nebraska	44.7%
Nevada	44.7%
New Hampshire	44.7%
New Jersey	44.7%
New Mexico	44.7%
New York	44.7%
North Carolina	44.7%
North Dakota	44.7%
Ohio	44.7%
Oklahoma	44.7%
Oregon	44.7%
Pennsylvania	44.7%
Rhode Island	44.7%
South Carolina	44.7%
South Dakota	44.7%
Tennessee	44.7%
Texas	44.7%
Utah	44.7%
Vermont	44.7%
Virginia	44.7%
Washington	44.7%
West Virginia	44.7%
Wisconsin	44.7%
Wyoming	44.7%

Map of North Carolina showing the percentage of the Native American population by county in 2000. The map uses a color scale from light yellow (low percentage) to dark red (high percentage). The highest percentages are concentrated in the western part of the state, particularly in the mountain region.

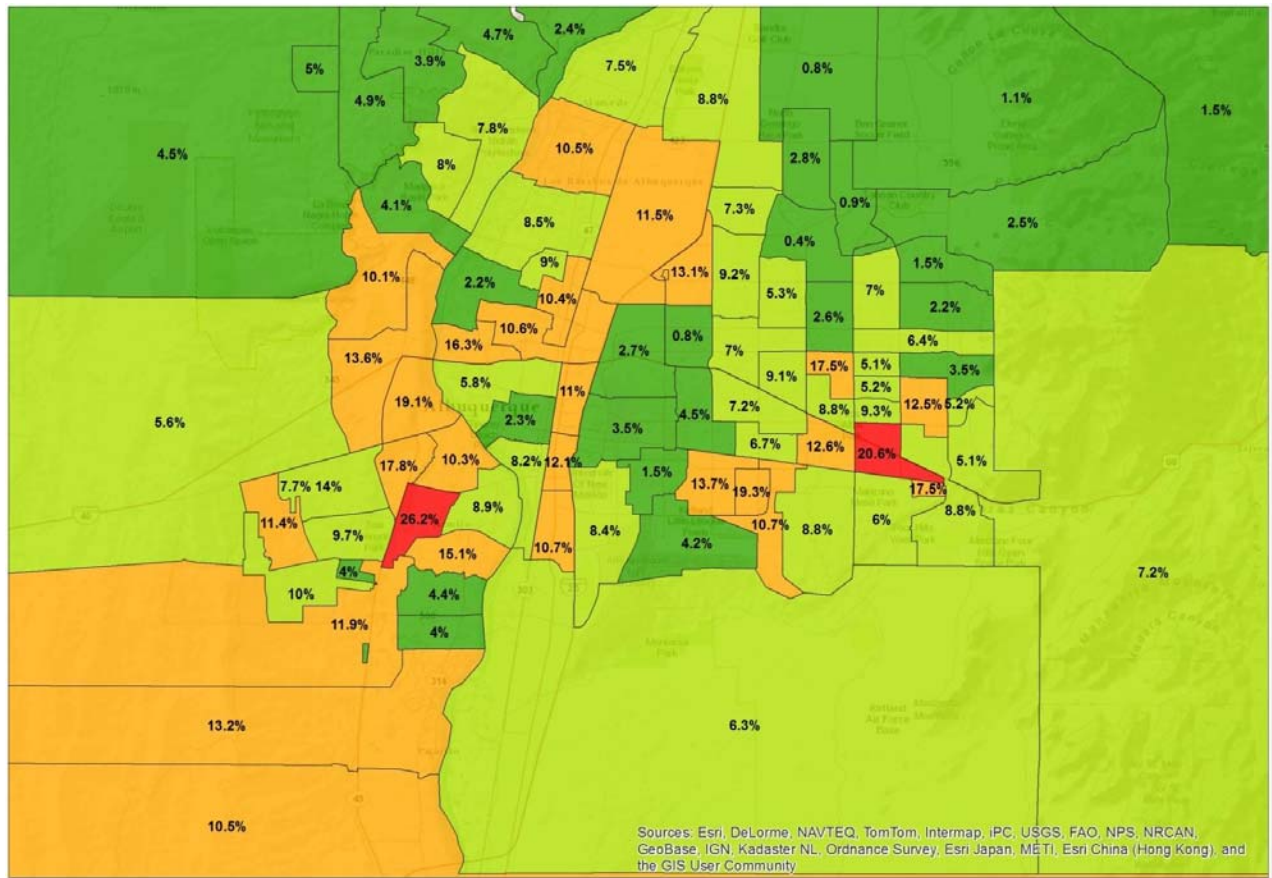
County	Percentage (%)
Swain	48.9%
Wayne	47.9%
Cherokee	38.6%
Transylvania	34.8%
Catawba	26.4%
Guilford	34.6%
Forsyth	40%
Madison	38.7%
Rocky Mount	31.4%
Orange	37.1%
Mecklenburg	30.4%
Wake	25.6%
Bladen	17.5%
Currituck	14.4%
Albemarle	81%

African American

	80.1% - 90%
	70.1% - 80%
	60.1% - 70%
	50.1% - 60%
	Less Than 50%
	No Data

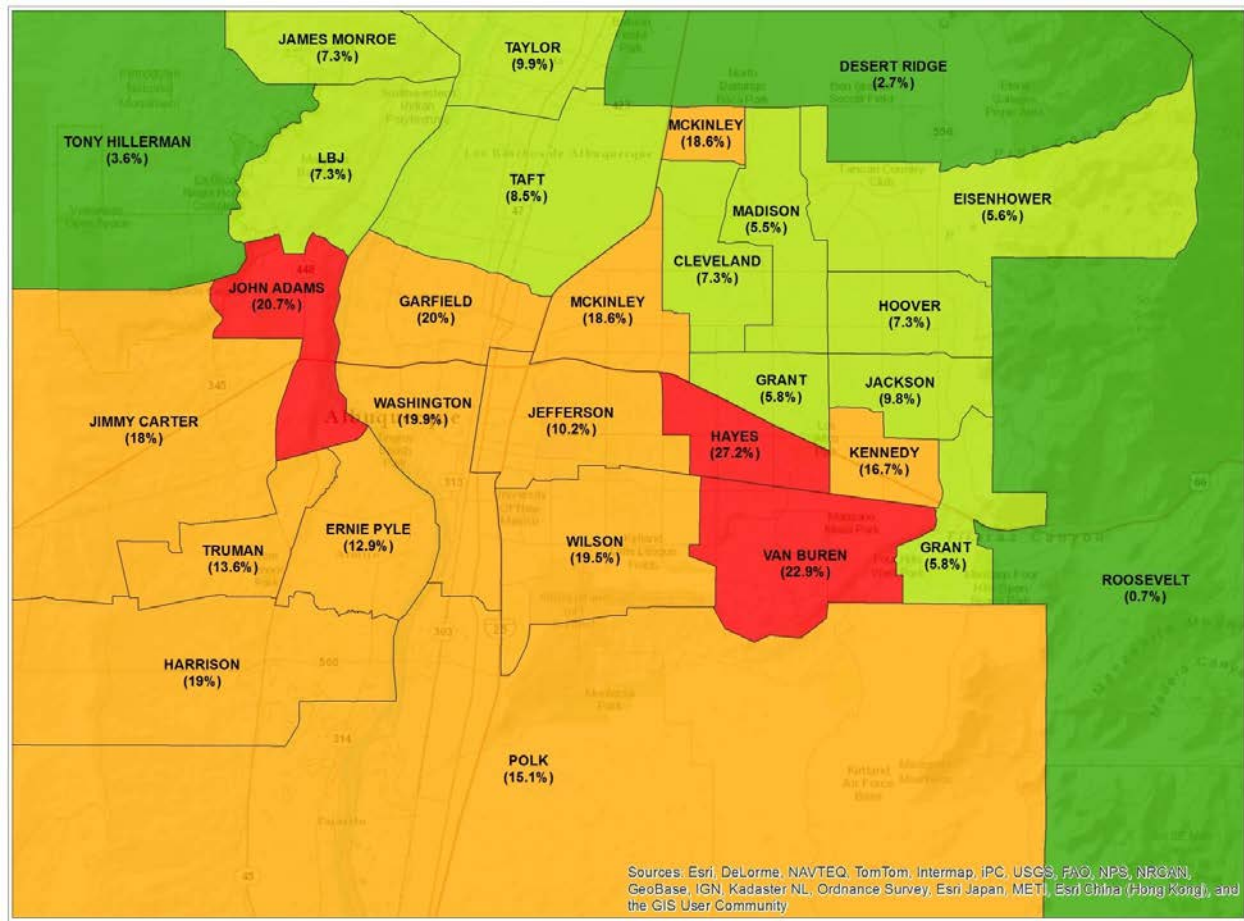
22  UNM

Percentage Of APS Elementary School Students Who Were Habitually Truant In 2011-2012



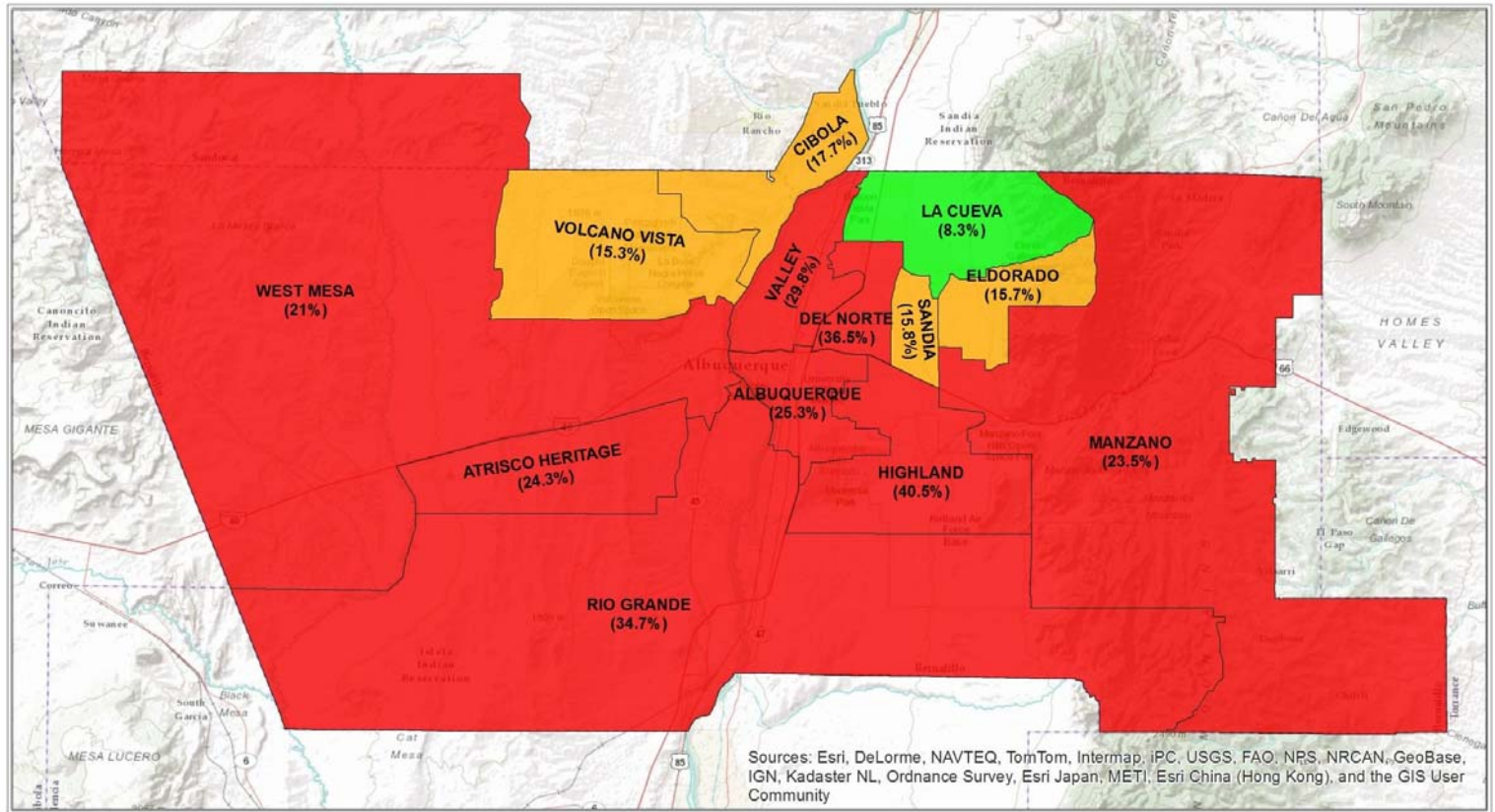
Source: Albuquerque Public Schools, RDA Department, 2011-2012 School Year. A student is identified as a Habitual Truant when the student has accumulated 10 or more days of unexcused absences.

Percentage Of APS Middle School Students Who Were Habitually Truant In 2011-2012



Source: Albuquerque Public Schools, RDA Department, 2011-2012 School Year. A student is identified as a Habitual Truant when the student has accumulated 10 or more days of unexcused absences.

Percentage Of APS High School Students Who Were Habitually Truant In 2011-2012

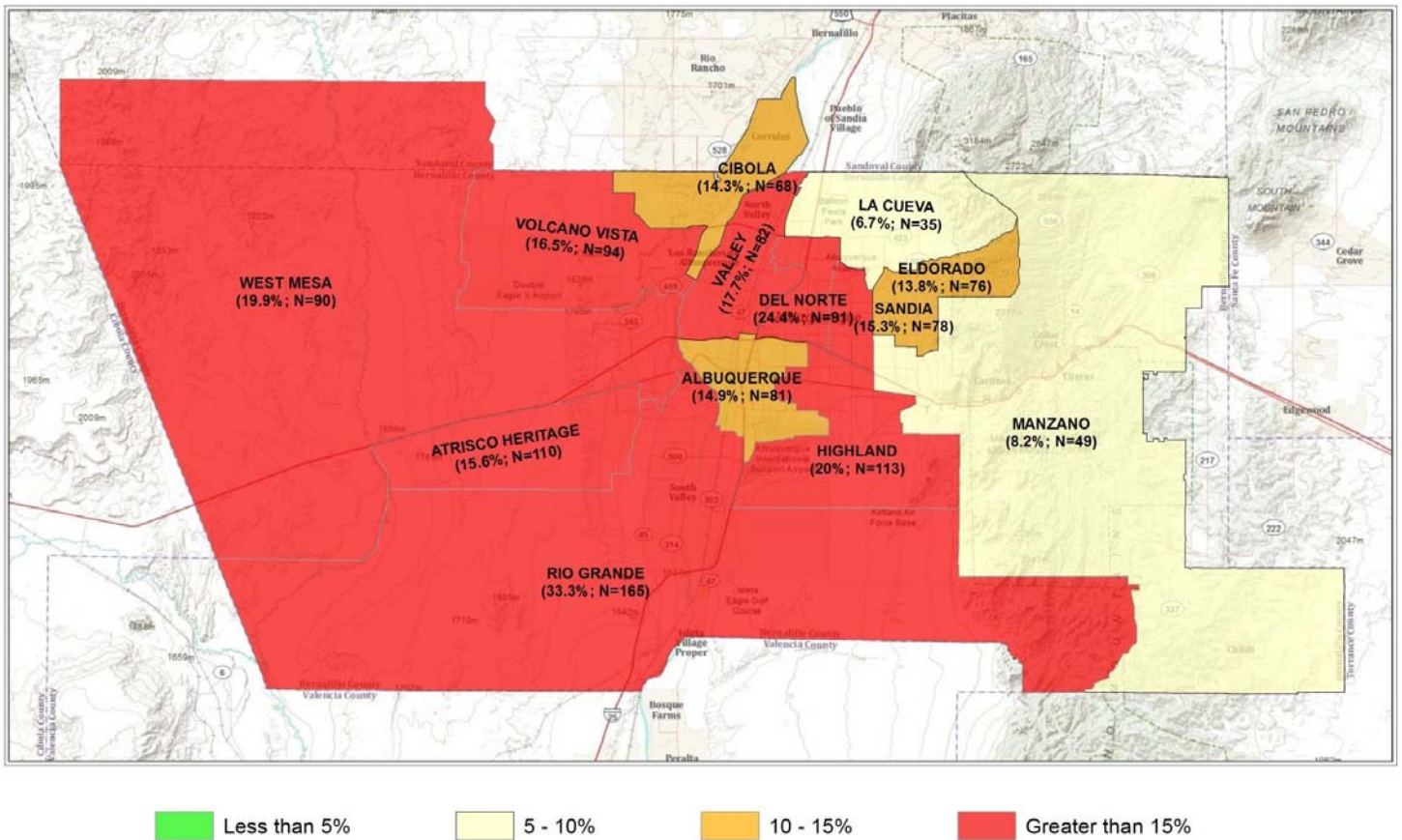


5 - 10%

10 - 20%

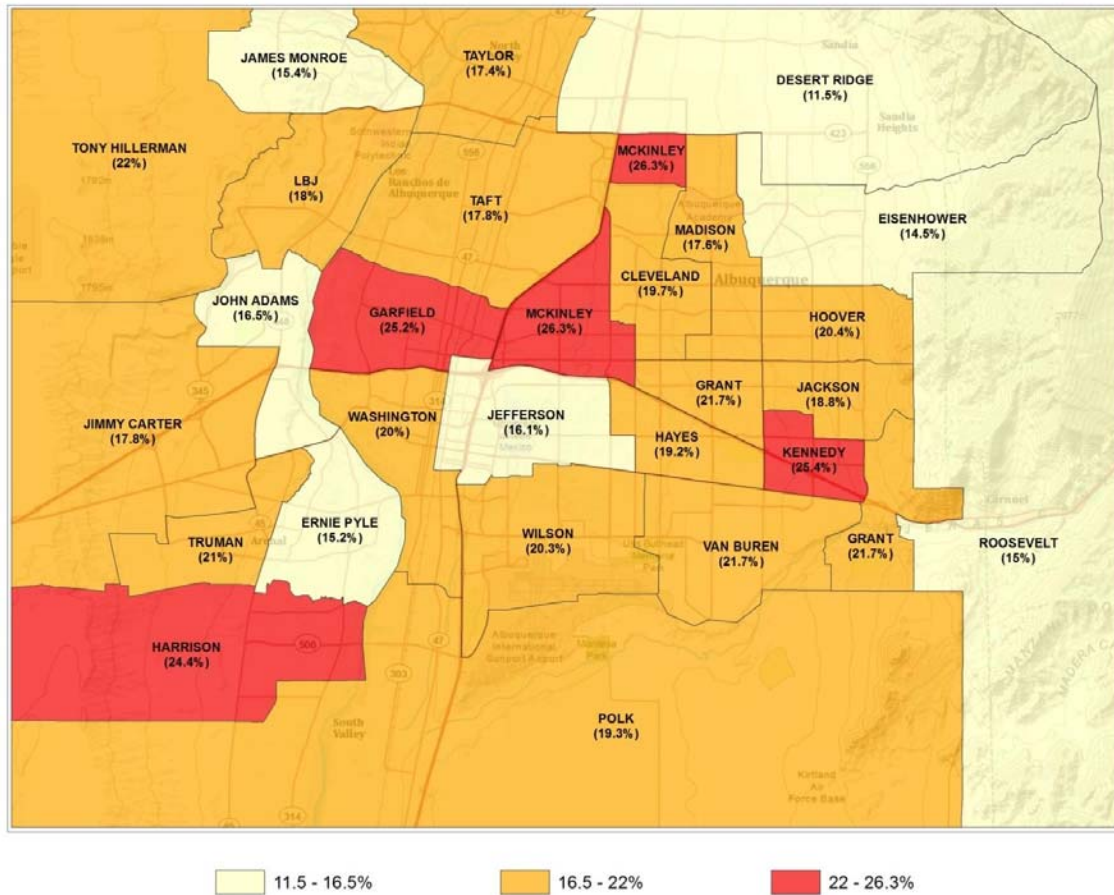
Greater than 20%

Early Warning Indicator: Percentage Of APS Students Entering 9th Grade With **One or More F Grades** And **5 Or More Absences** In 8th Grade Core Courses



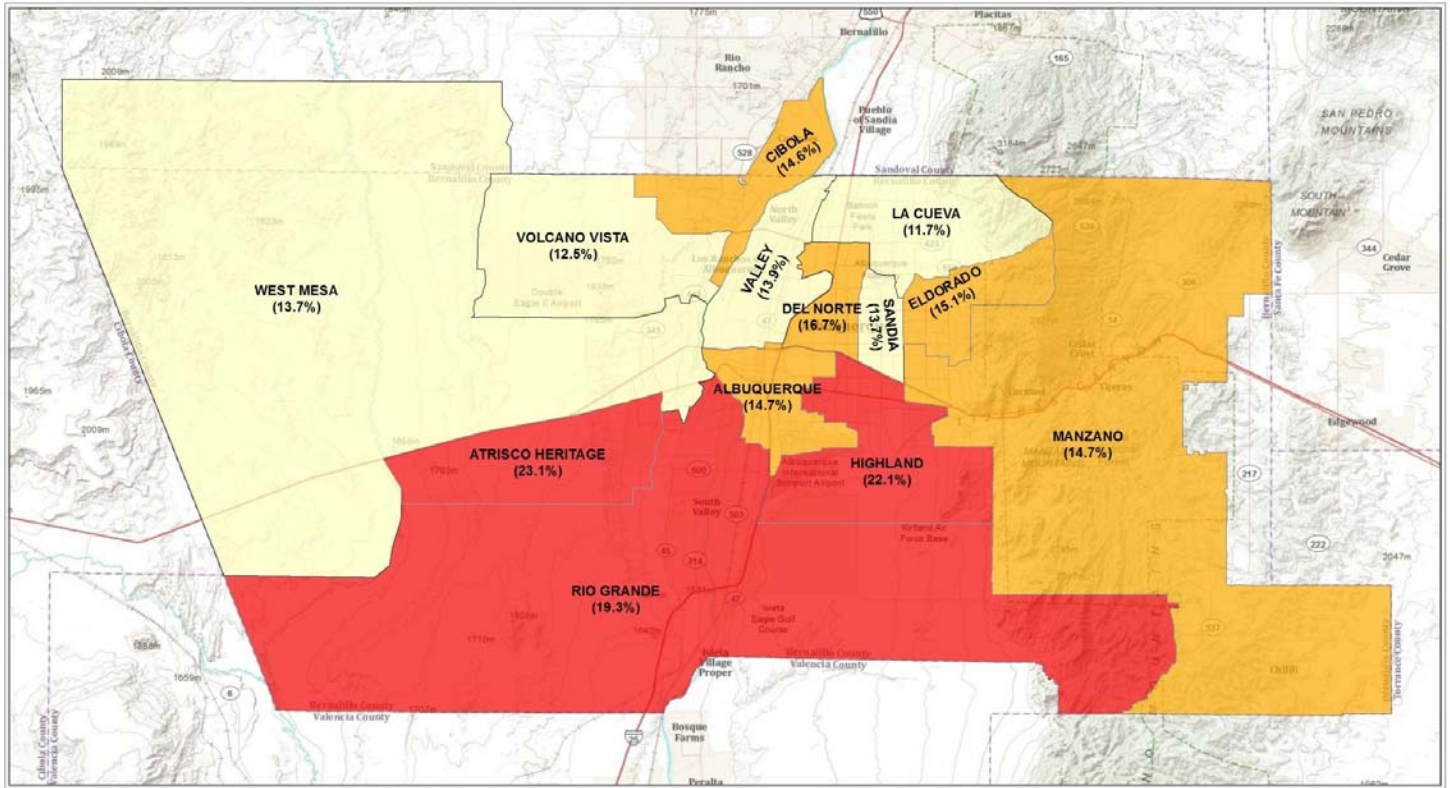
Source: Albuquerque Public Schools, School Max, 2011-2012 School Year. Data provided by APS RDA Department. Analysis performed by CEPR.

Percentage Of Middle School Students Who Seriously Considered Attempting Suicide



Source: New Mexico Youth Risk and Resiliency Survey, 2009, New Mexico Departments of Health and Public Education and U.S. Centers for Disease Control and Prevention (CDC). Students were asked, "During the past 12 months, did you ever seriously consider attempting suicide?" The percentage reported here reflect respondent who answered "yes."

Percentage Of High School Students Who Were In A Physical Fight On School Property



11.7 - 13.9%

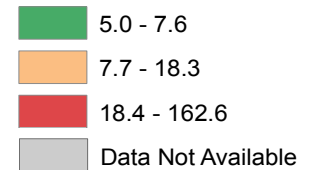
13.9 - 16.7%

16.7 - 23.1%

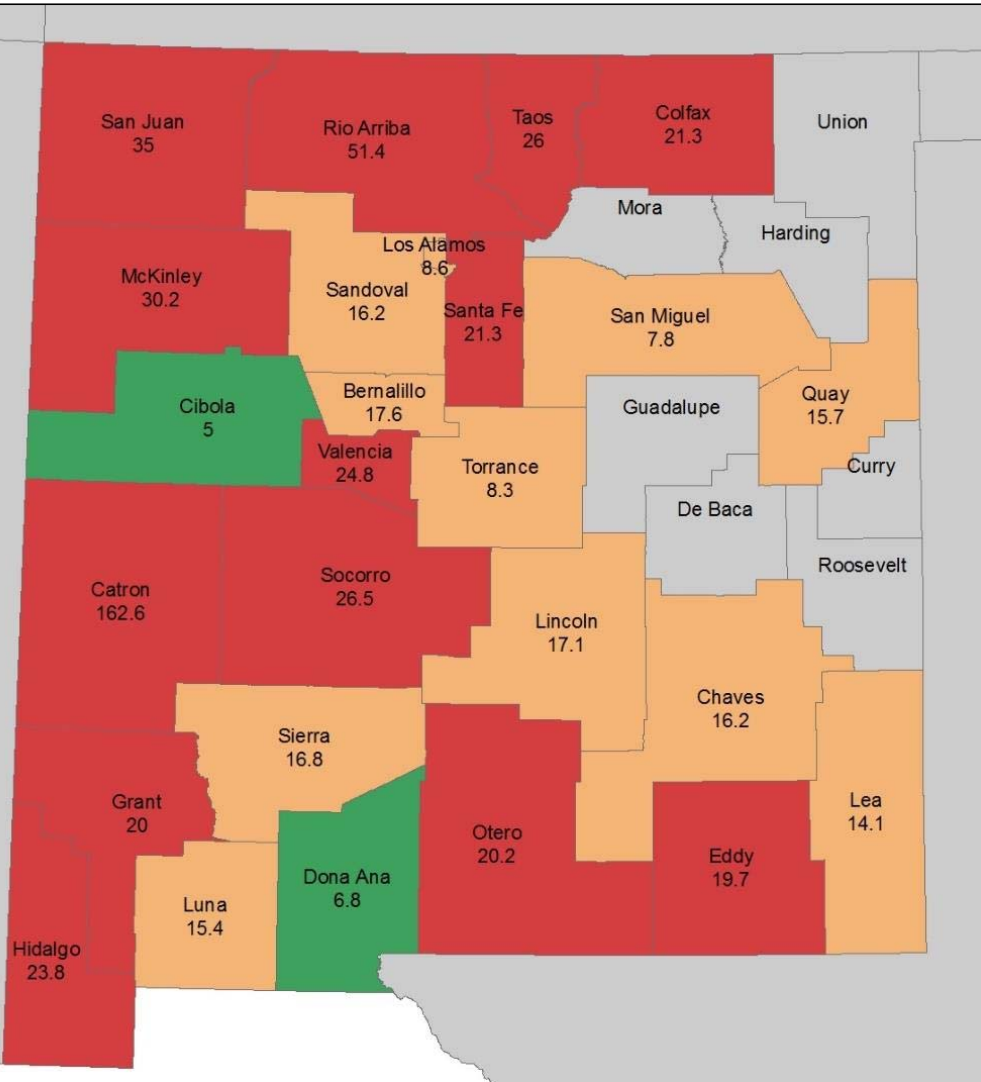
Source: New Mexico Youth Risk and Resiliency Survey, 2009, New Mexico Departments of Health and Public Education and U.S. Centers for Disease Control and Prevention (CDC). Students were asked, "During the past 12 months, how many times were you in a physical fight on school property?" The percentage reported here reflects respondents who answered one or more times.

Youth Suicide Rate, 15-19 Years of Age, by County

Suicide Deaths Per 100,000
Population Ages 15-19



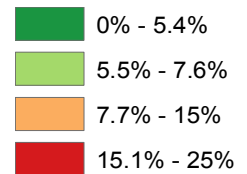
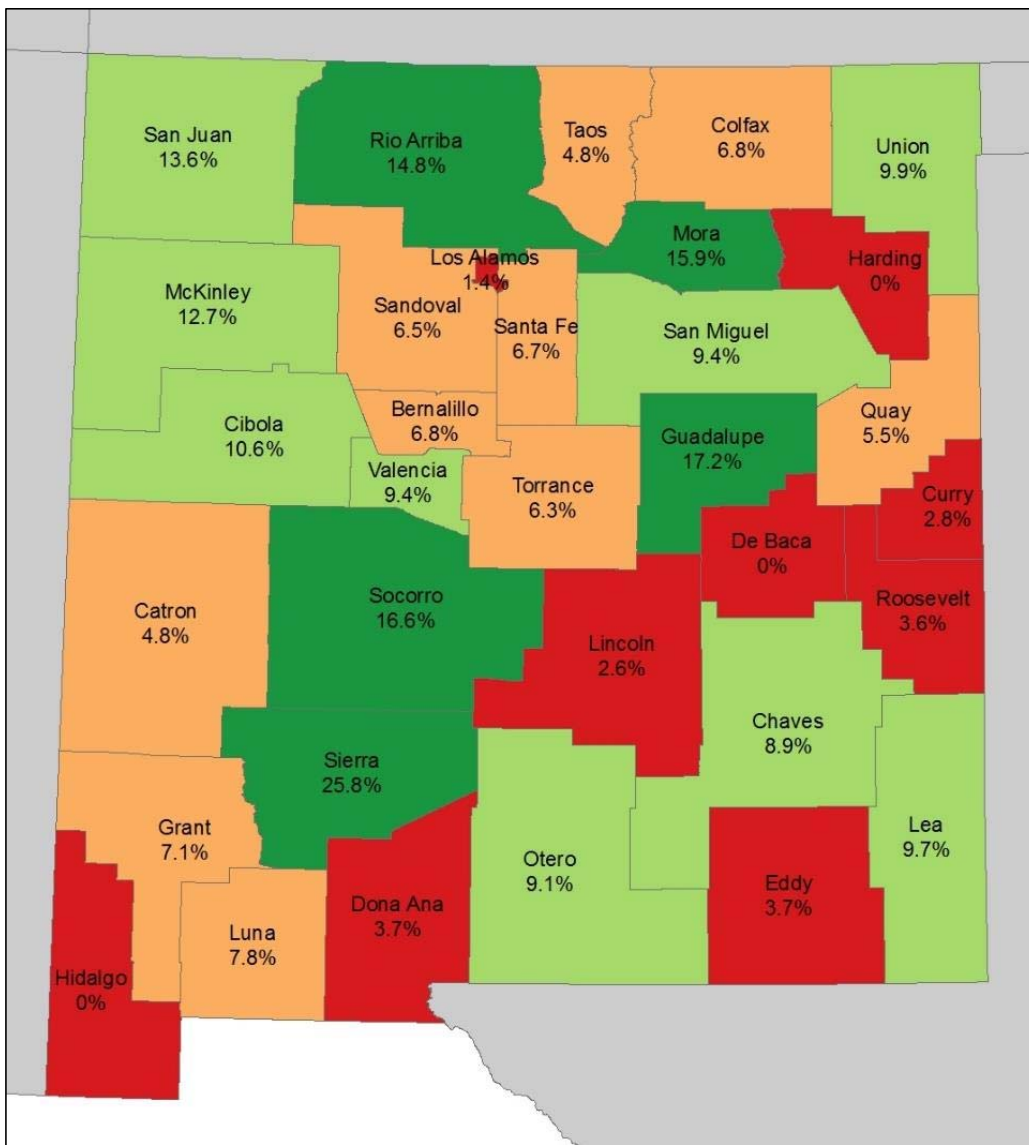
Counties shaded **green** have rates below the national average of 7.6. Counties shaded **orange** have rates above the national average but below the state average of 18.3. Counties shaded **red** have rates above both the state and national averages.



Source: New Death Certificate Database, Bureau of Vital Records and Health Statistics, New Mexico Department of Health. The suicide rate for each county is averaged over the time period 2003 to 2012 and includes all New Mexico residents, ages 15-19. The national average is based on data from the Centers for Disease Control and Prevention over the time period 1999 to 2007 and includes all youth, ages 15-19.

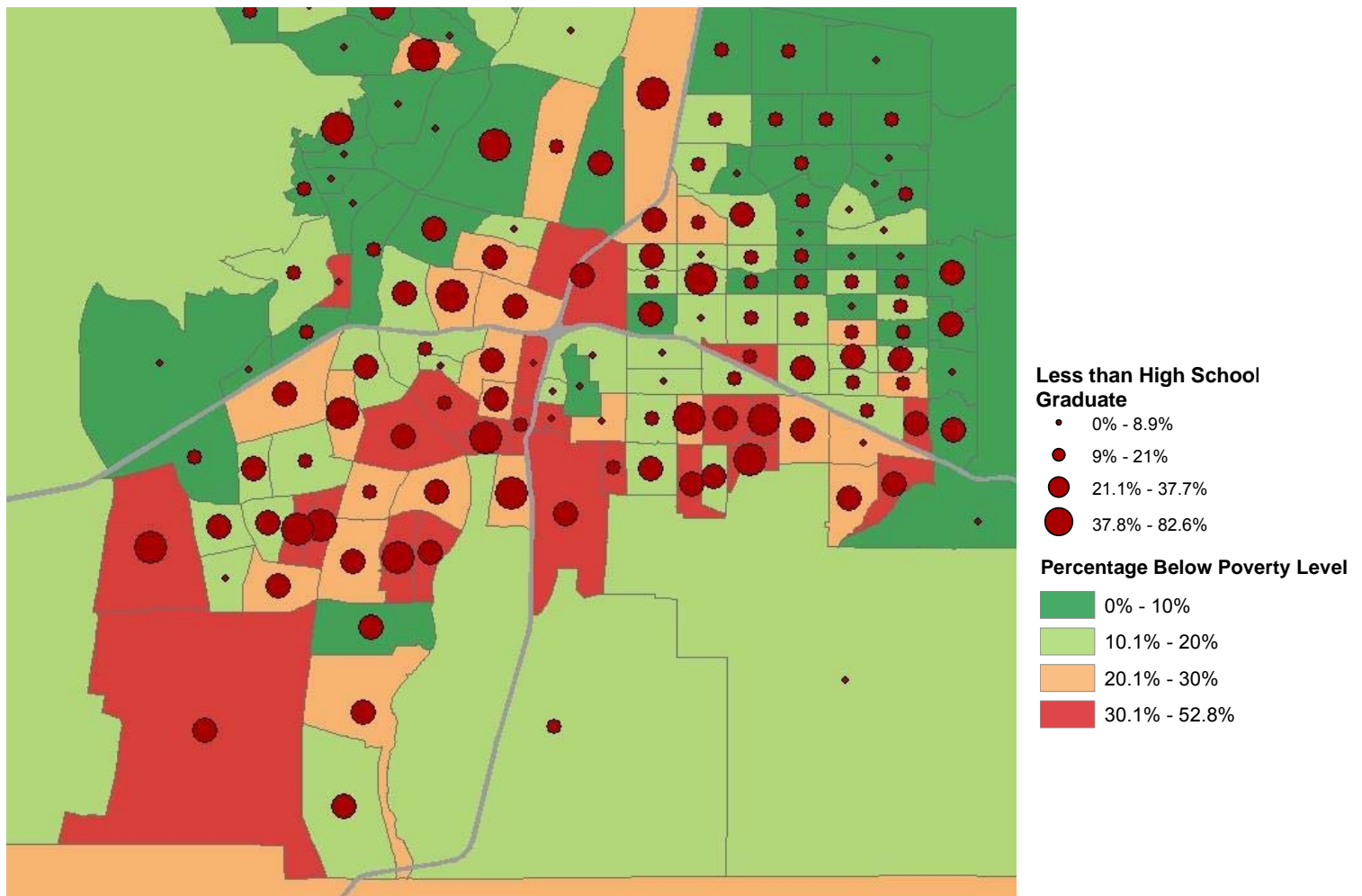
Percentage of 16-19 Year Olds Not in School or Labor Force, By County

National average = 5.4%
State Average = 7.6%



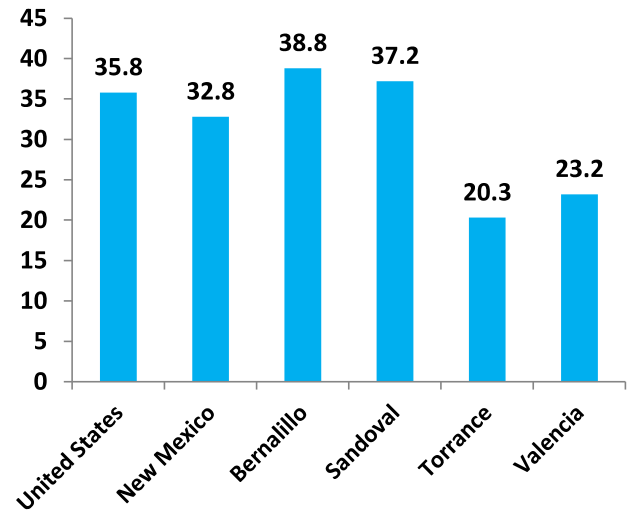
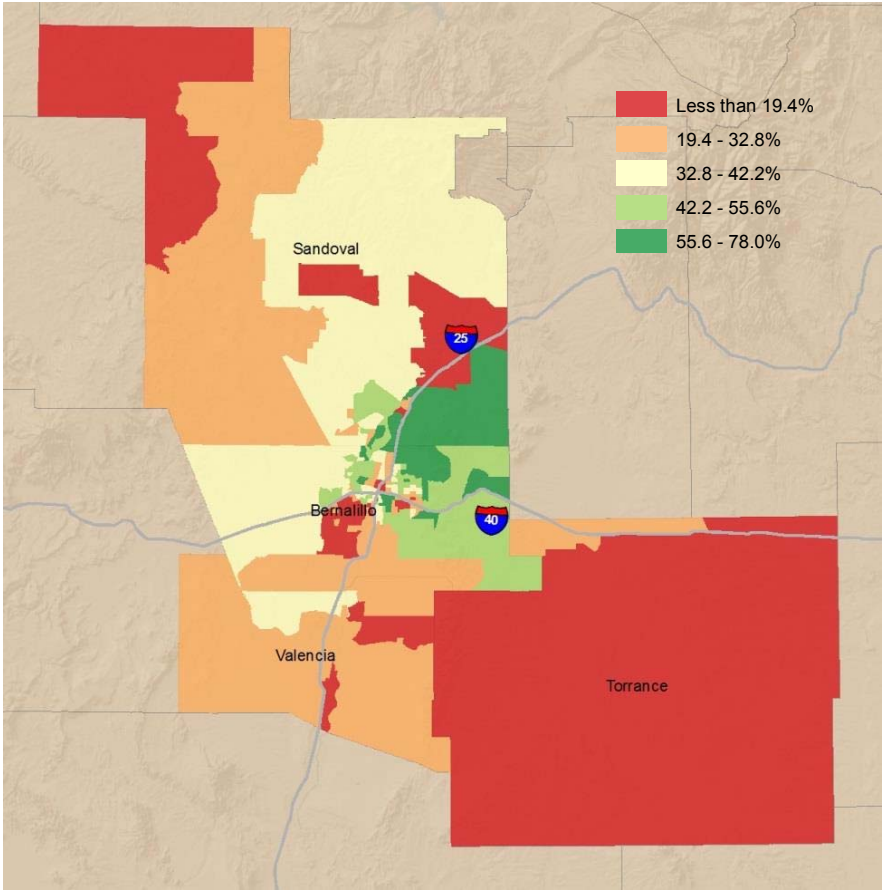
Source: U.S. Census, American Community Survey 2008- 2012, 5-Year Estimates. Table B14005. SEX BY SCHOOL ENROLLMENT BY EDUCATIONAL ATTAINMENT BY EMPLOYMENT STATUS FOR THE POPULATION 16 TO 19 YEARS

Percentage of Individuals Living Below Poverty Level with Less than High School Education



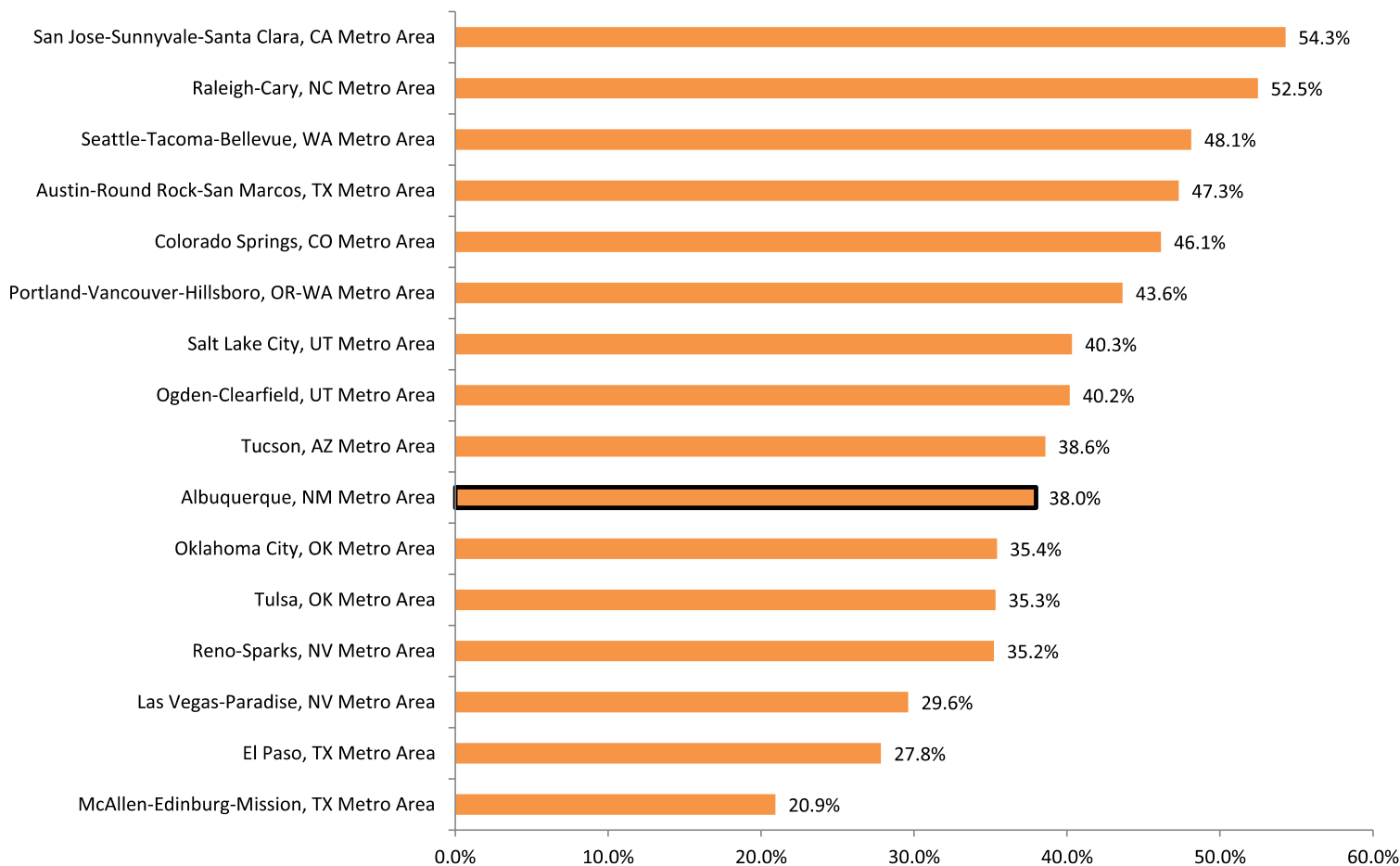
Educational Attainment In Central New Mexico

Adults 25 And Over, With An Associate's Bachelor's Or Graduate Degree, 2011



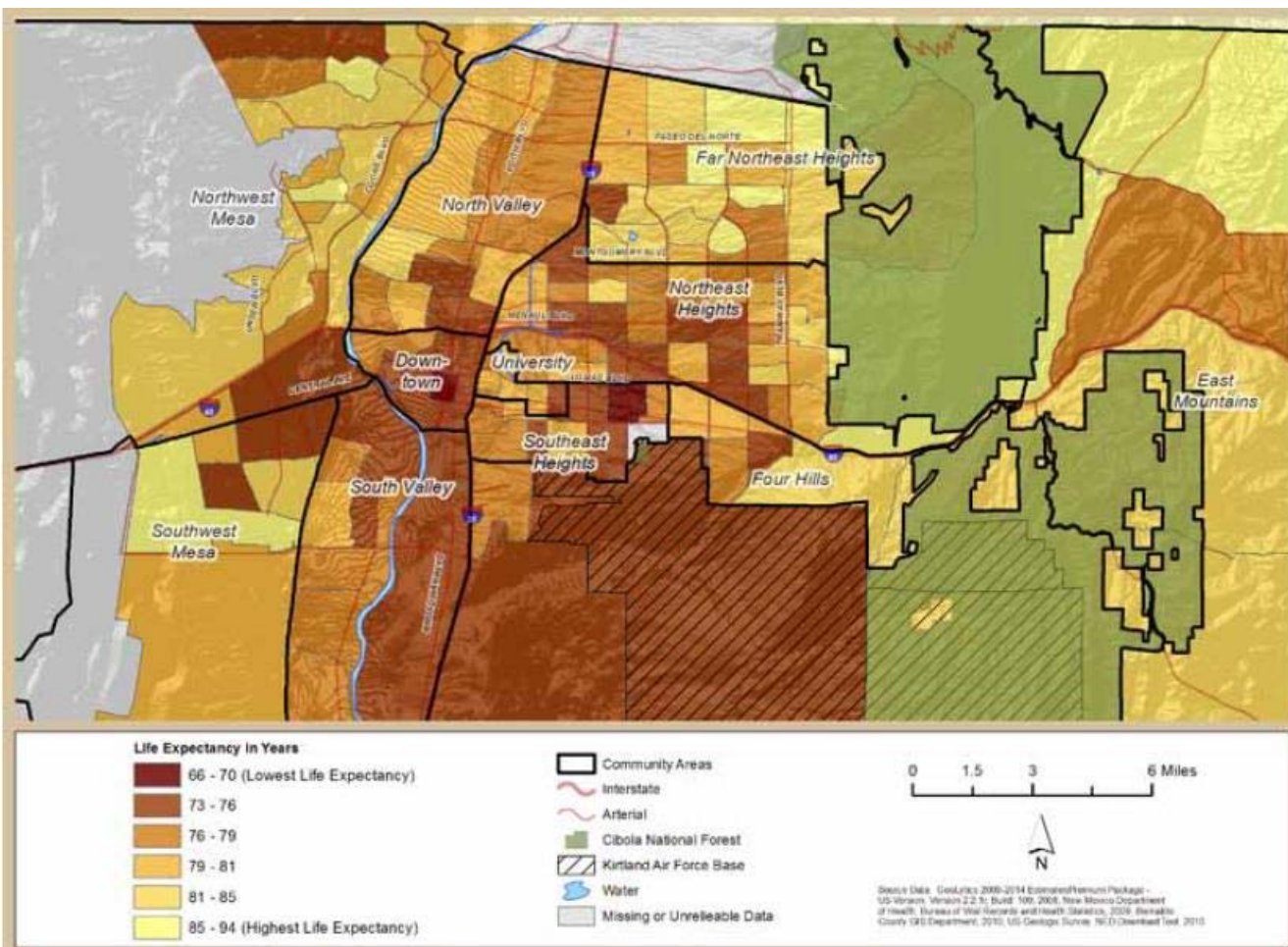
How Does Albuquerque Compare to Other Communities?

Percentage of the Population, 25-64 Years of Age, With an Associate's Degree or Higher



Source: U.S. Census, American Community Survey 2010, 5-Year Estimates.

Life Expectancy By Census Tract, Bernalillo County, NM (2001-2005)

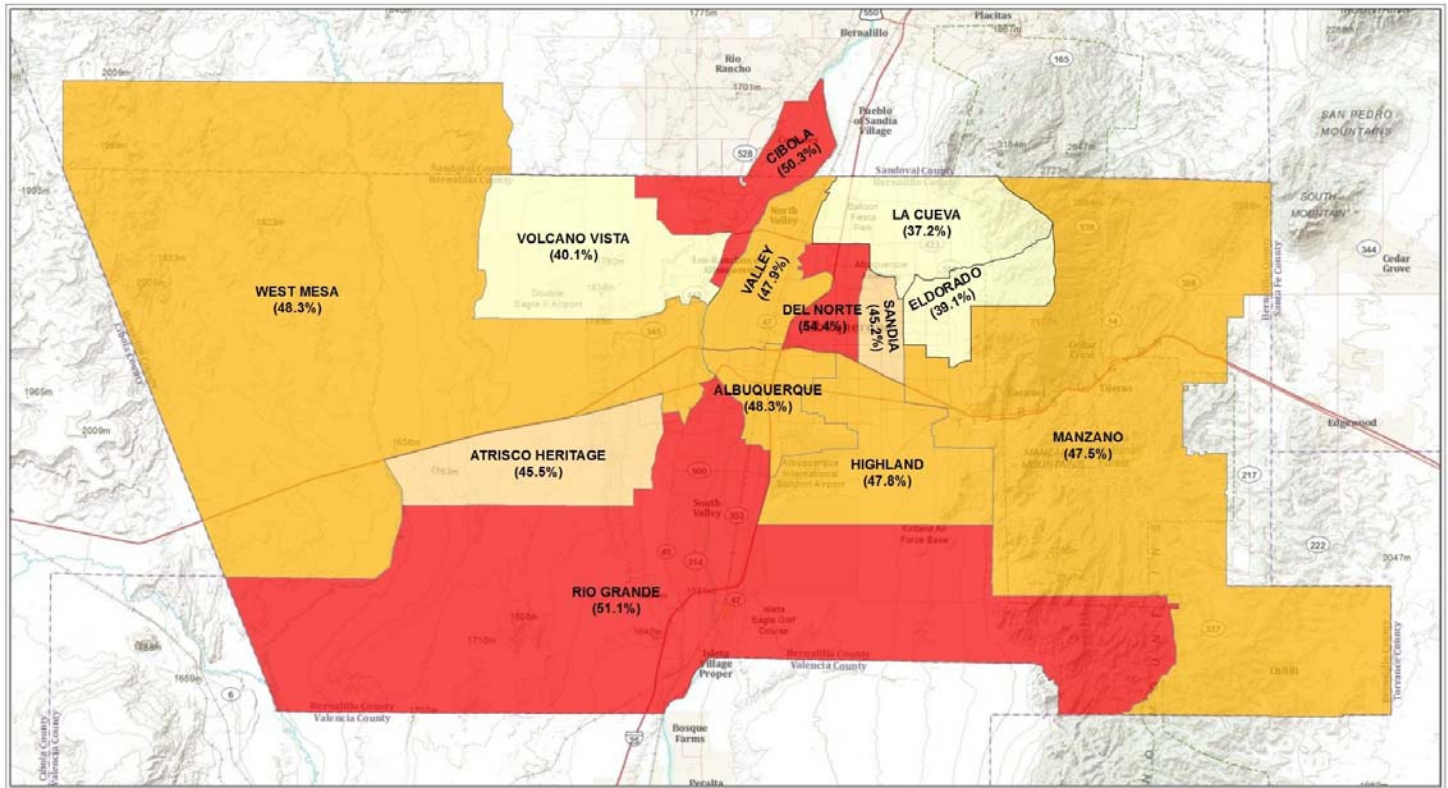


This powerful map by the Joint Center For Political and Economic Studies shows that life expectancy can vary by 28 years depending on where one lives in Bernalillo County.

Source: Map produced by Joint Center For Political and Economic Studies (September, 2012) Place Matters For Health In Bernalillo County: Ensuring Opportunities For Good Health For All.

Identifying Gaps In Resources

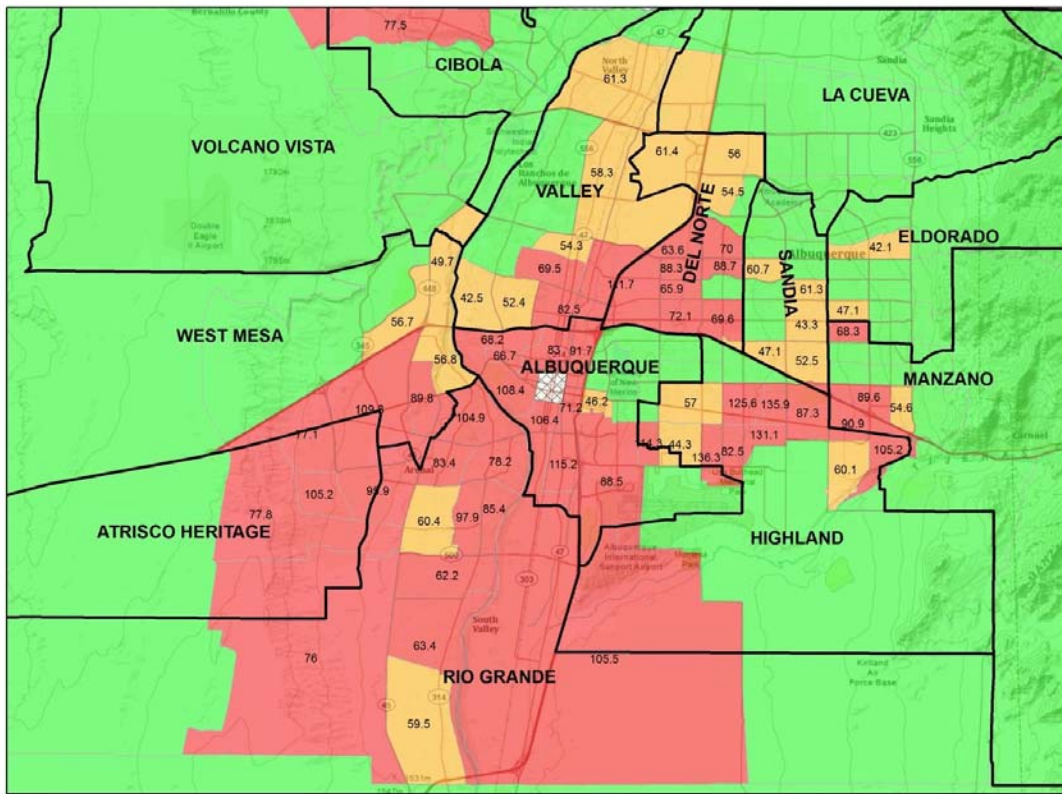
Percentage Of Albuquerque High School Students Who Have Had Sexual Intercourse



37.2 - 40.1% 40.1 - 45.5% 45.5 - 48.3% 48.3% - 54.4%

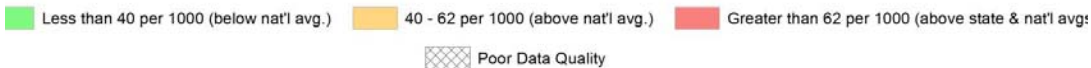
Source: New Mexico Youth Risk and Resiliency Survey, 2009, New Mexico Departments of Health and Public Education and U.S. Centers for Disease Control and Prevention (CDC). Students were asked, "During your life, with how many people have you had sexual intercourse?" The percentage reported here reflects respondents who answered one or more people.

Teen Birth Rate In Albuquerque, Ages 15-19



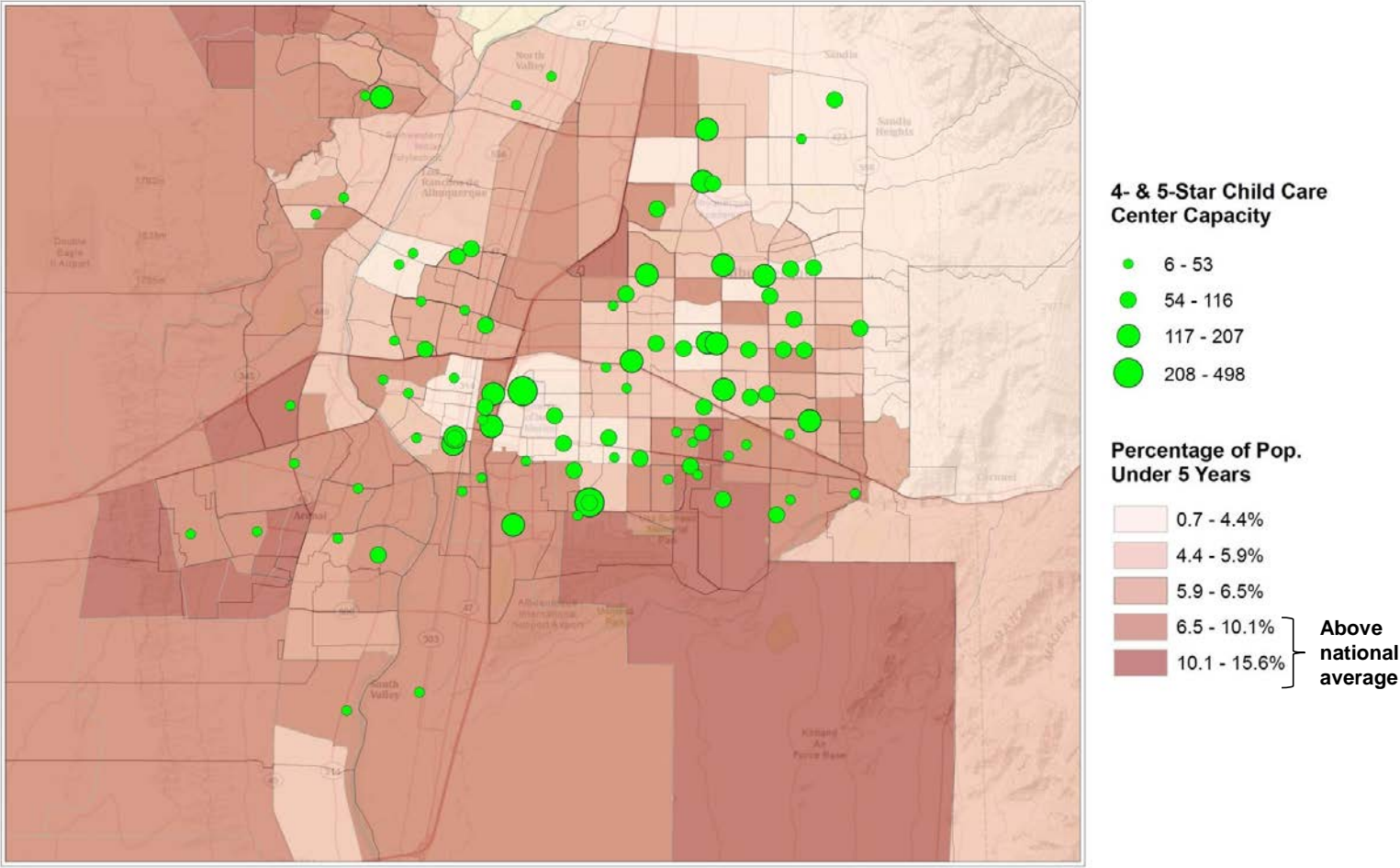
The data point in each census tract represents the number of live births to teen women per 1000 teen women, over the period 2001-2005.

For example, the census tract in the center with a teen birth rate of 106.4 means that there were 106 live births to teen women for every 1000 teen women who live in the census tract.



Source: New Mexico Community Data Collaborative. The rates shown here reflects the average number of children per 1000 women born to teen mothers (ages 15-19) between 2001 and 2005. Rates are reported by census tract; high school boundaries are overlaid to provide perspective. In 2005, the statewide teen birth rate was 62 per 1000, and the nationwide rate was 40 per 1000 (Kids Count Data Center, <http://datacenter.kidscount.org>).

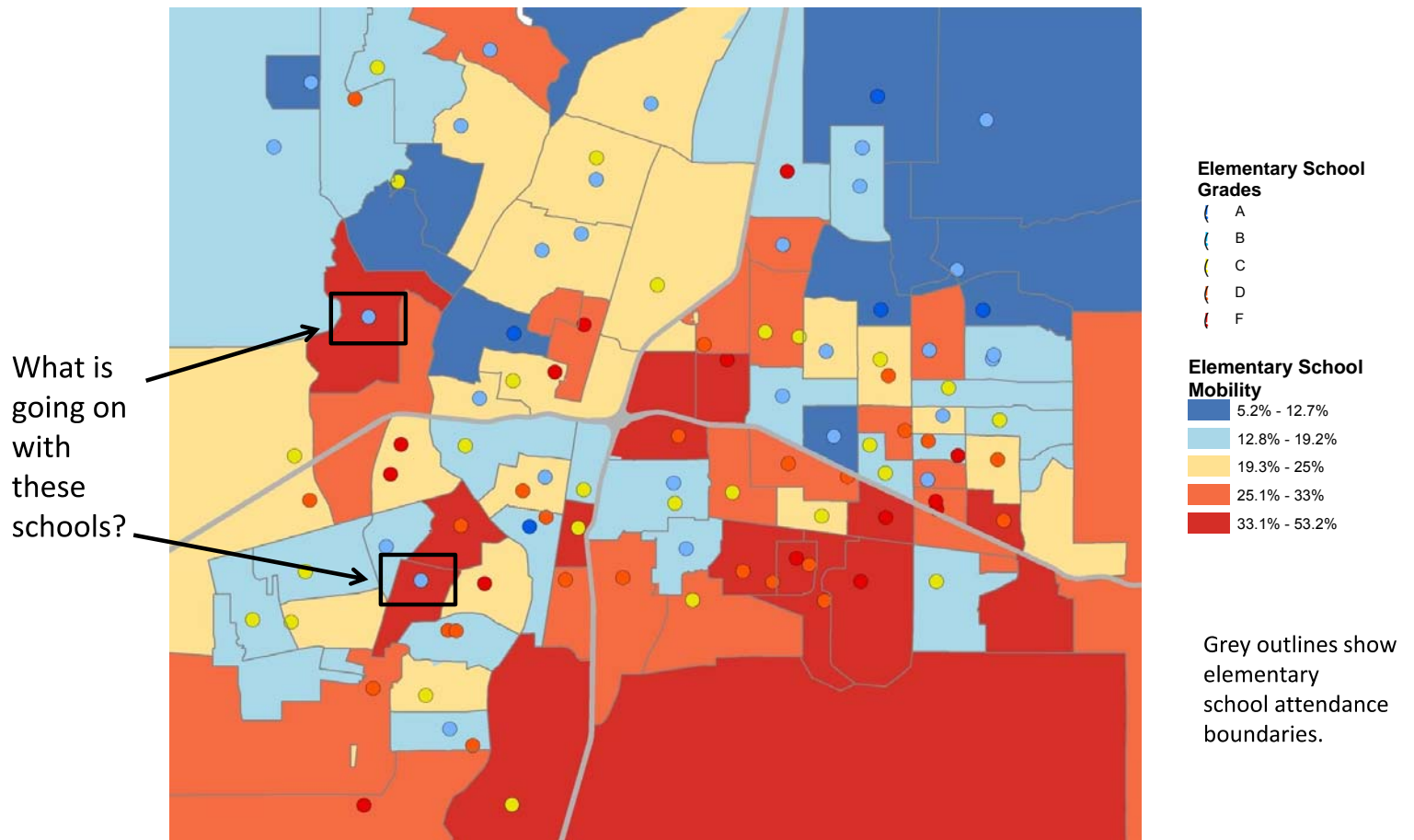
Capacity Of 4- And 5-Star Licensed Child Care Centers In Albuquerque



Source: New Mexico Community Data Collaborative, December 2010. Enrollment data are reported by program site. Elementary school boundaries are overlaid to provide perspective.

Exploring Visual Correlations

Relationship Between Elementary Grades And Elementary Student Mobility



Source: School grades from New Mexico Public Education Department website
<http://webapp2.ped.state.nm.us/SchoolData/SchoolGrading.aspx>.

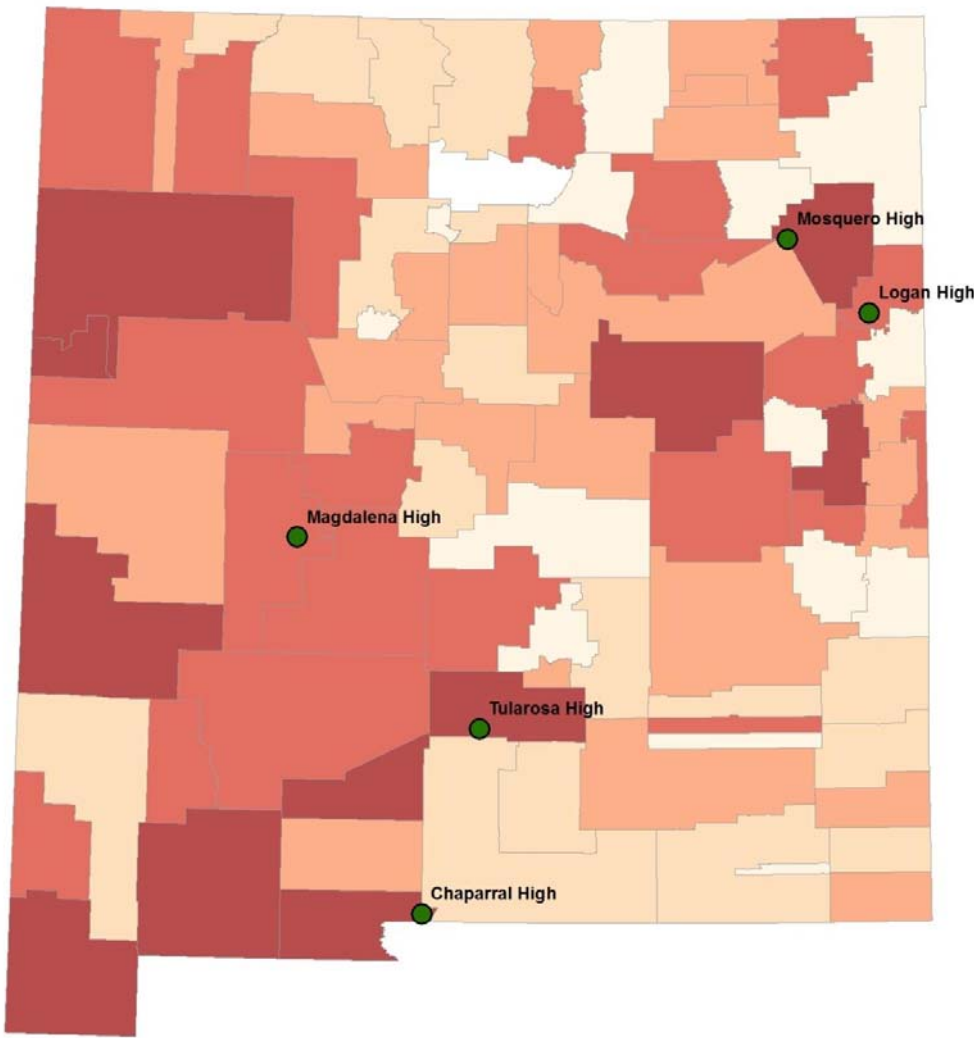
Are These Schools Beating the Odds?

**Graduation Rate > 70%,
Remediation Rate At UNM < 30%,
Child Poverty > 30%**

High School	Total School Enrollment (2011-2012)	Graduation Rate	Remediation Rate
Chaparral High	1,080	77.8%	25.0%
Logan High	127	86.6%	16.7%
Magdalena High	127	72.9%	28.6%
Mosquero High	27	98.0%	0.0%
Tularosa High	273	86.5%	14.3%

Percent of Children in Poverty in District

- 0% - 10%
- 11% - 21%
- 22% - 30%
- 31% - 39%
- 40% - 51%



Setting Priorities

Child Maltreatment Risk Factors And Opportunity Mapping In Bernalillo County

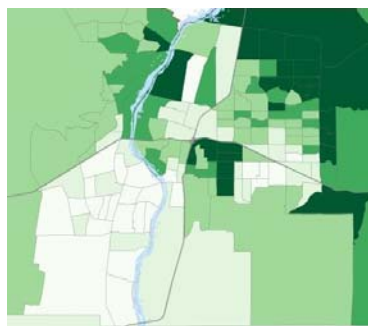
The CDC has identified several factors related to high risk for child maltreatment. The following maps show areas where risks for these factors are lower and higher in Bernalillo County. The goal is to introduce a possible technique for identifying neighborhoods that may benefit from resources.

- The best opportunity for children to grow up without becoming victims of maltreatment include:
 - Having parents with higher education levels;
 - Living in a household with 2 parents;
 - Living in a household with income above poverty level;
 - Living in a household with fewer dependent children;
 - Living in neighborhoods with low unemployment;
 - Living in neighborhoods where people have lived at least a year in the same house;
 - Living in neighborhoods with a lower density of alcohol outlets.

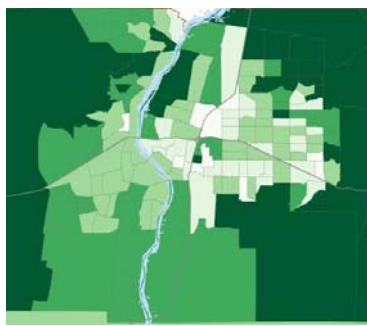
Where are these areas in Bernalillo County?

Source: <http://www.cdc.gov/violenceprevention/childmaltreatment/riskprotectivefactors.html>

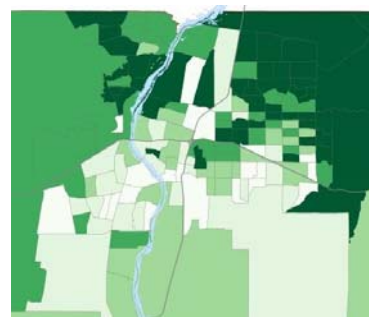
Individual Child Maltreatment Risk Mitigation Factors



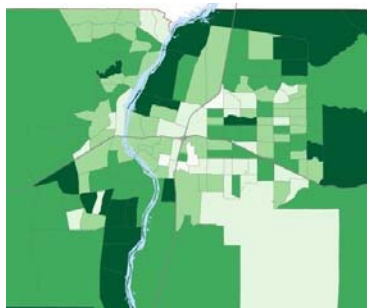
Education Greater Than AA Degree



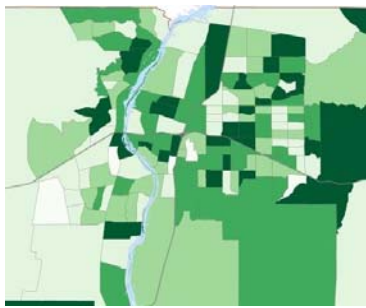
Few Single Parent Households



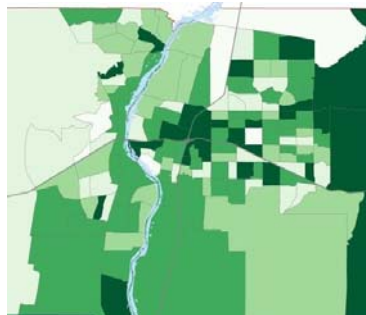
Few Families Living Under Poverty Level



Low Residential Mobility



Low Unemployment

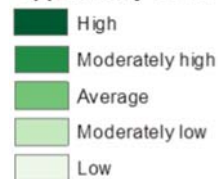


Smaller Family Size



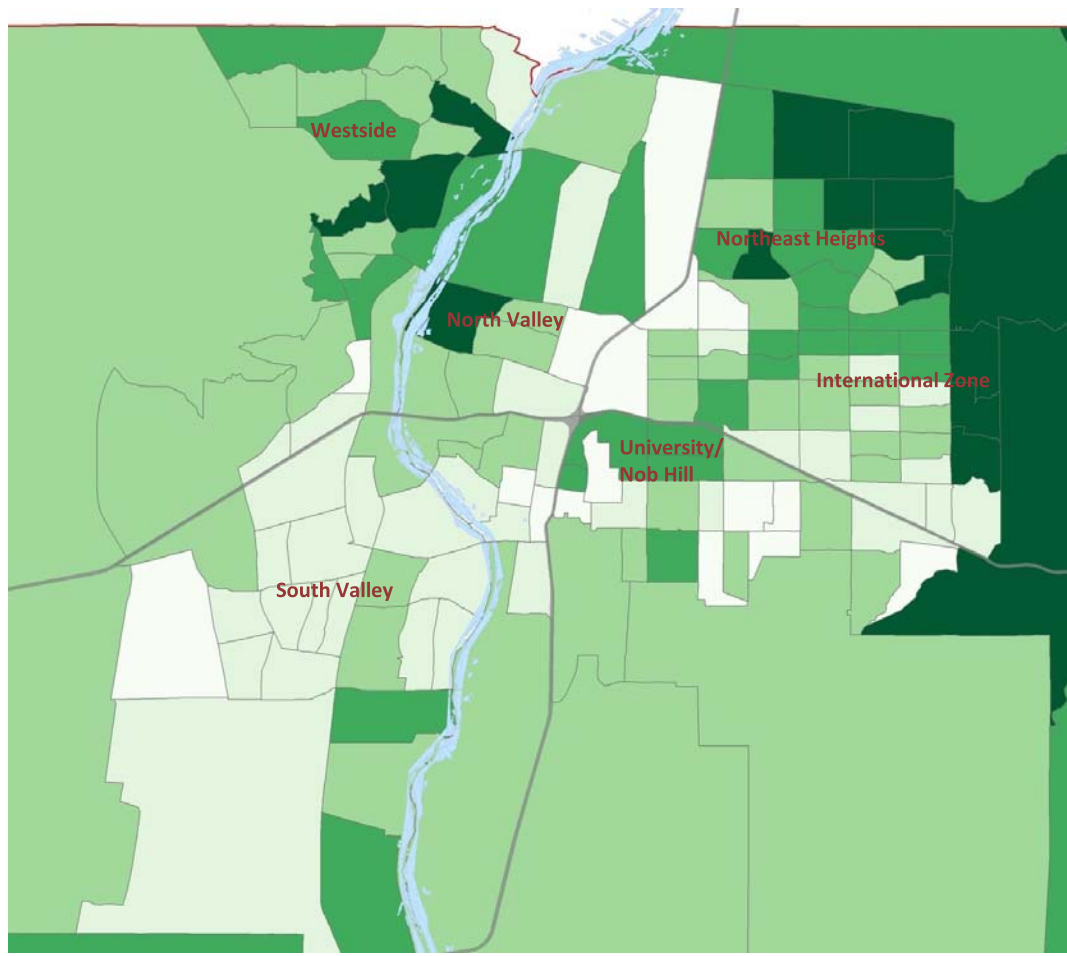
Few Alcohol Licenses

Opportunity Score



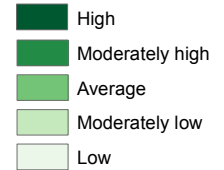
Source: Unemployment, family size, single parent household, household mobility, family poverty model input layers from the U.S. Census Bureau, 2010 Decennial Census, census tract level. Alcohol license data from New Mexico Community Data Collaborative, compiled by New Mexico Department of Health.

Opportunity For A Safe Childhood



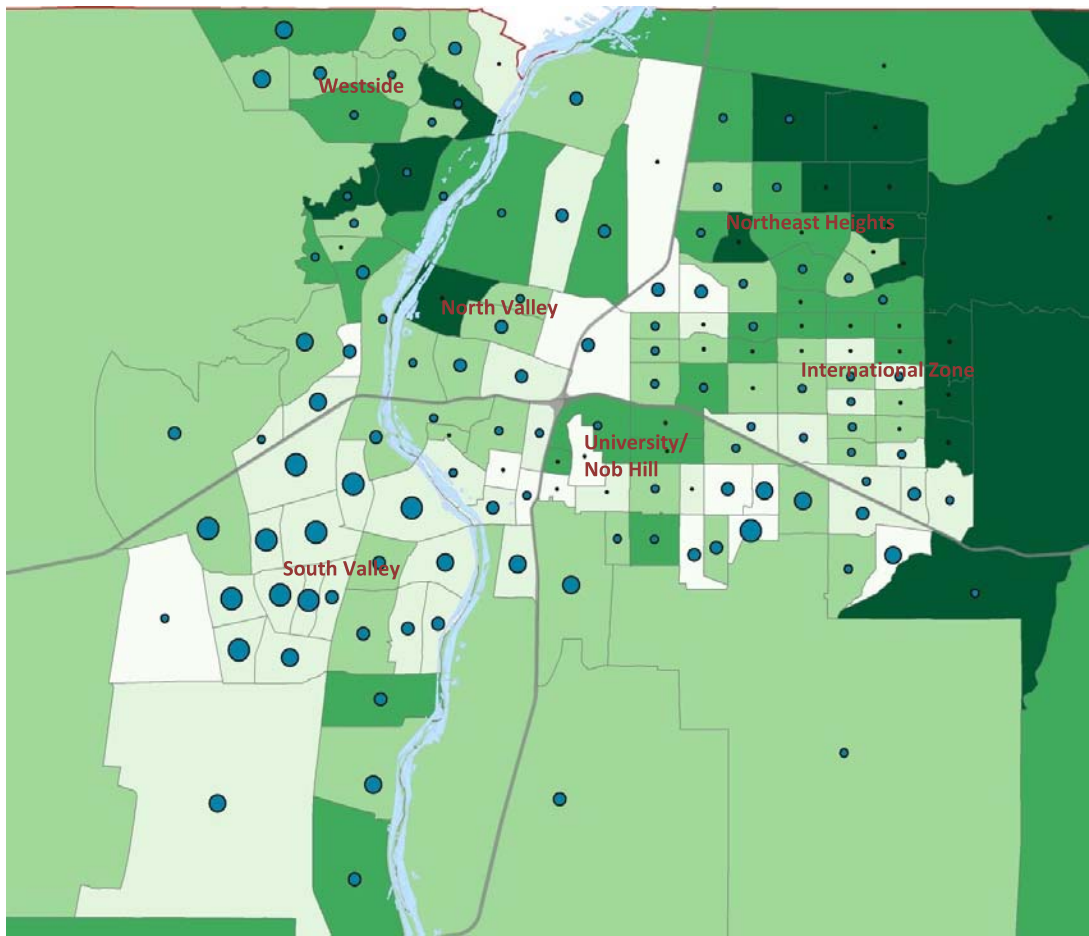
Based on the CDC factors, tracts with a higher score have fewer child maltreatment indicators.

Opportunity Score



Source: Unemployment, family size, single parent household, household mobility, family poverty model input layers from the U.S. Census Bureau, 2010 Decennial Census, census tract level. Alcohol license data from New Mexico Community Data Collaborative, compiled by New Mexico Department of Health.

Using The Maps To Address Issues Of Community Equity: Where Are The Hispanic Children In Relation To Opportunity?



This map clearly shows the concentration of Hispanic children under the age of 5 in lower opportunity areas.

Opportunity Score

- High
- Moderately high
- Average
- Moderately low
- Low

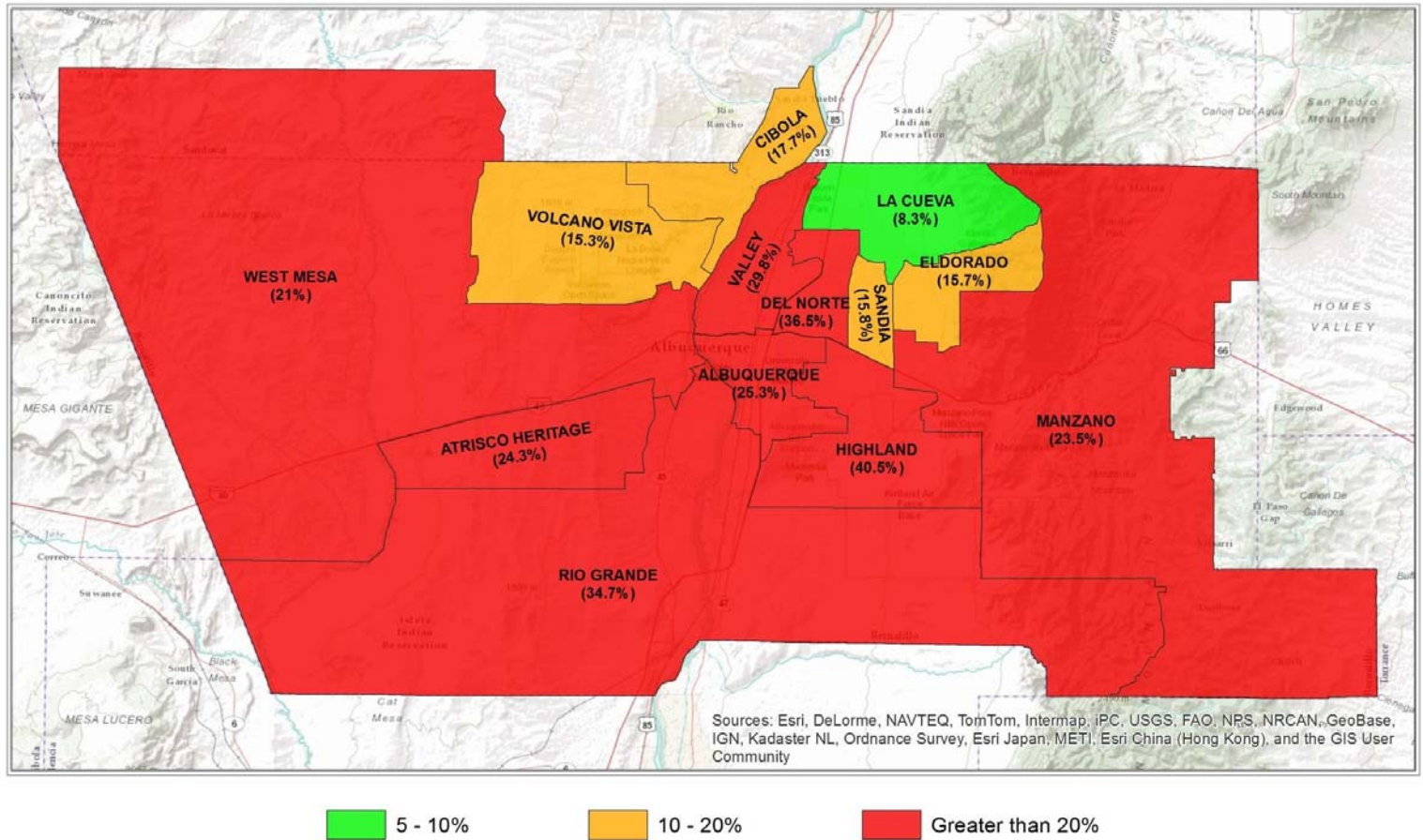
Number of Hispanic Children Under Age 5

- 4 - 85
- 86 - 185
- 186 - 325
- 326 - 525
- 526 - 761

Source: Unemployment, family size, single parent household, household mobility, family poverty model input layers from the U.S. Census Bureau, 2010 Decennial Census, census tract level. Alcohol license data from New Mexico Community Data Collaborative, compiled by New Mexico Department of Health.

Measuring Impact

Percentage Of APS High School Students Who Were Habitually Truant In 2011-2012

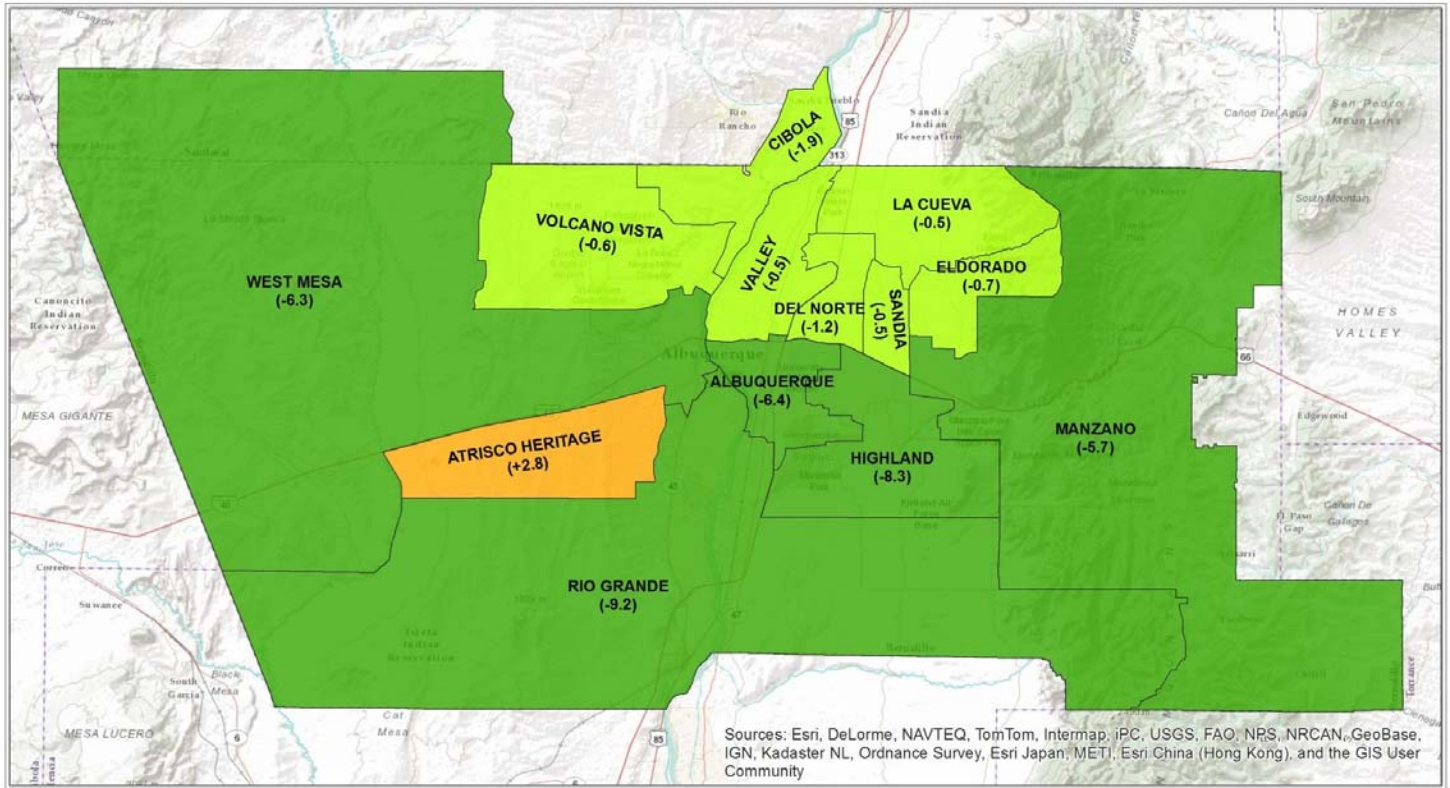


5 - 10%

10 - 20%

Greater than 20%

Change In Percentage Of APS High School Students Who Were Habitually Truant 2010-2011 To 2011-2012



Greater than 5 point decrease
 0 - 5 point decrease
 0 - 5 point increase

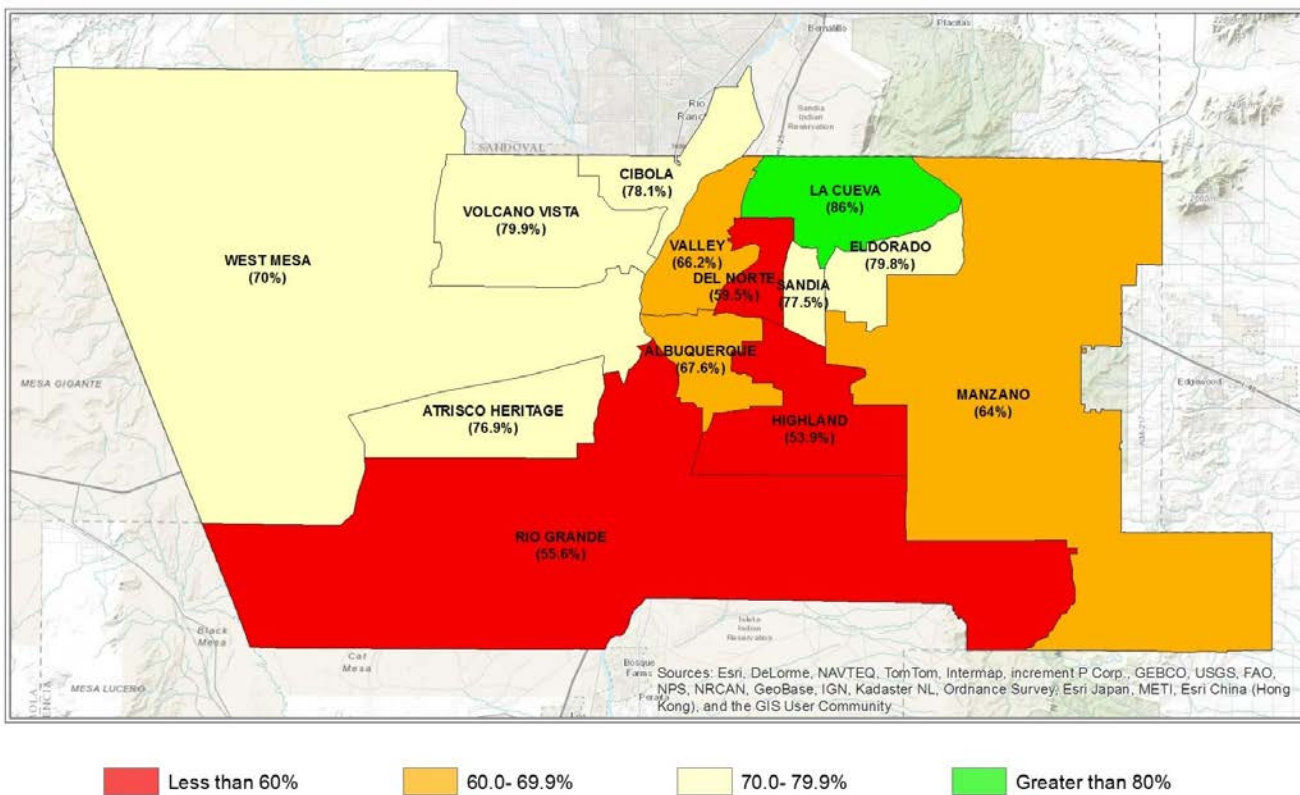
Source: Albuquerque Public Schools, RDA Department. A student is identified as a Habitual Truant when the student has accumulated 10 or more days of unexcused absences.

APS Four-Year High School Graduation Rate, All Students, Class Of 2012

According to the Alliance for Excellent Education, there are nearly 2000 high schools nationally that graduate less than 60% of their students within four years.

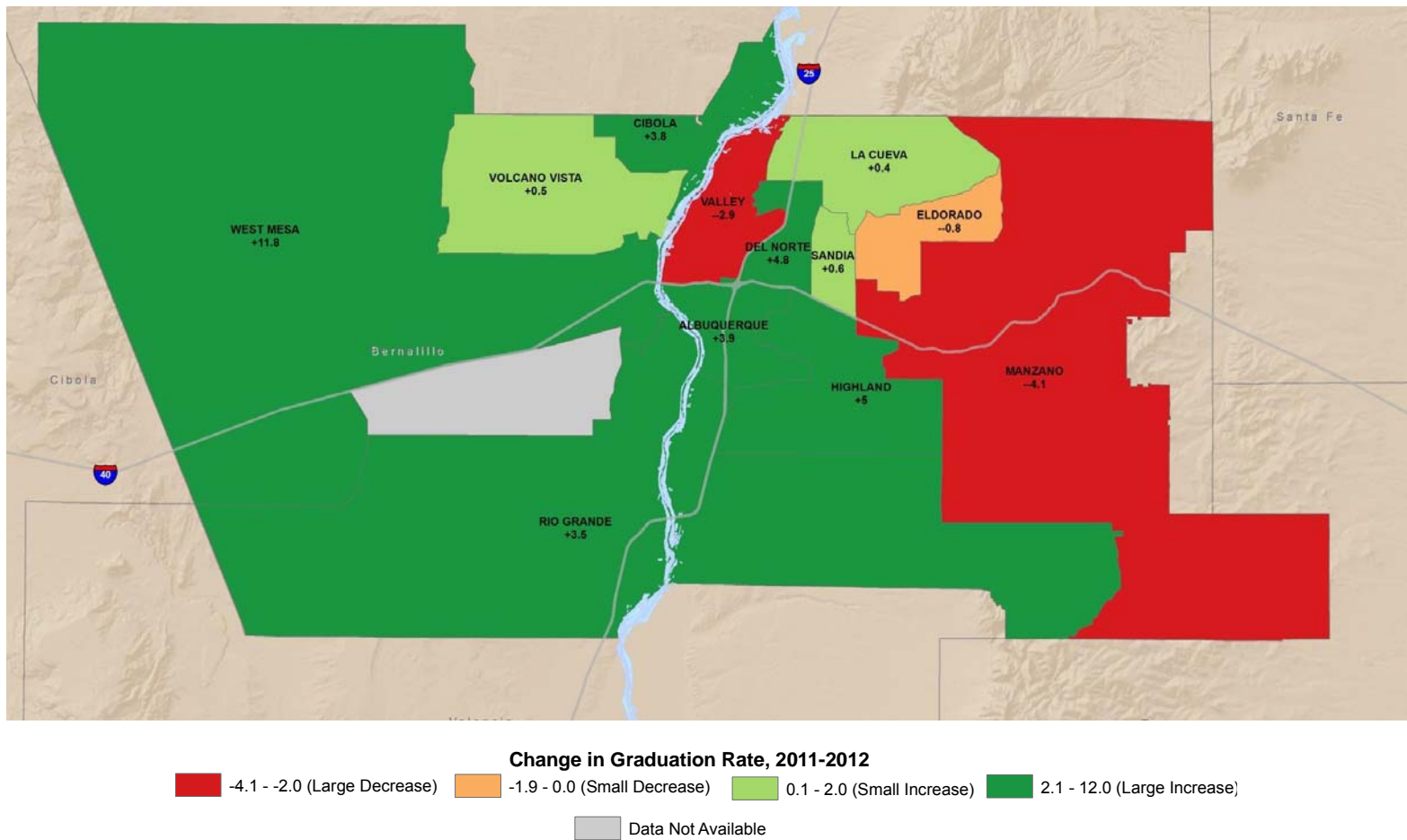
These schools disproportionately produce 51% of the nation's dropouts.

APS has four high schools with less than a 60% graduation rate.



Source: NM Public Education Department, 4-Year Cohort High School Graduation Rate, Class of 2012. Alliance for Excellent Education statistics taken from http://www.all4ed.org/about_the_crisis/schools/dropout.

Change In APS High School Graduation Rate 2010-2011 To 2011-2012



What Are The Bridges That Need
To Be Built Among Australians?

What Data Are Available?

What Data Could Be Used To
Build Those Bridges?

Location, Location, Location:
Implications of Geographic Situation on
Australian Student Performance in PISA 2000

John Cresswell
Catherine Underwood

April 2004

Australian Council for Educational Research



Remoteness Areas

- Major Cities
- Inner Regional
- Outer Regional
- Remote
- Very Remote

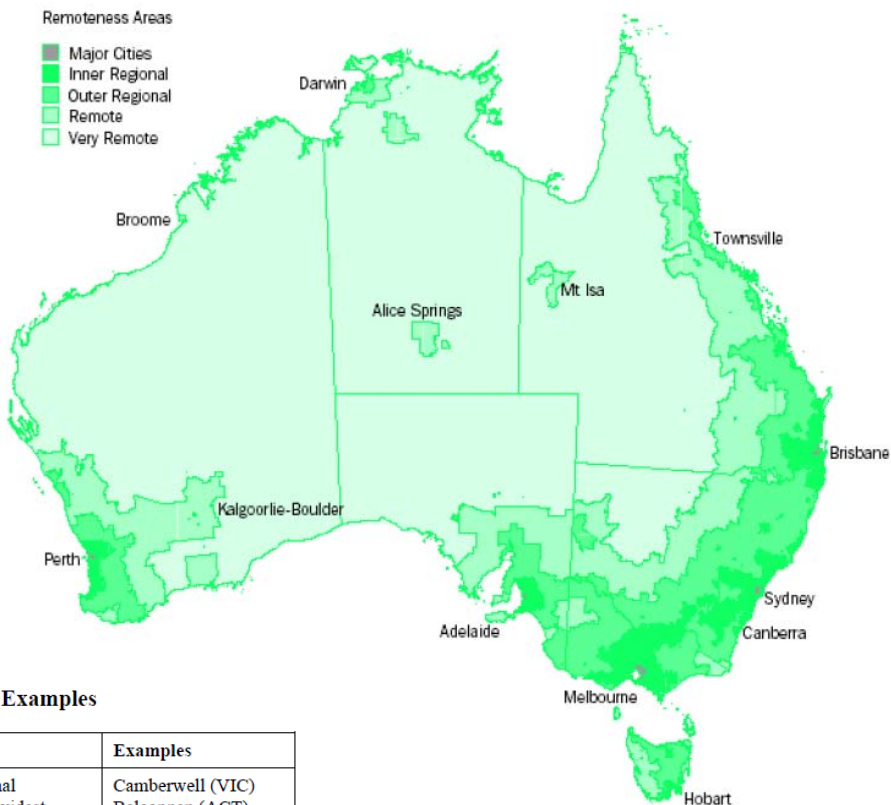
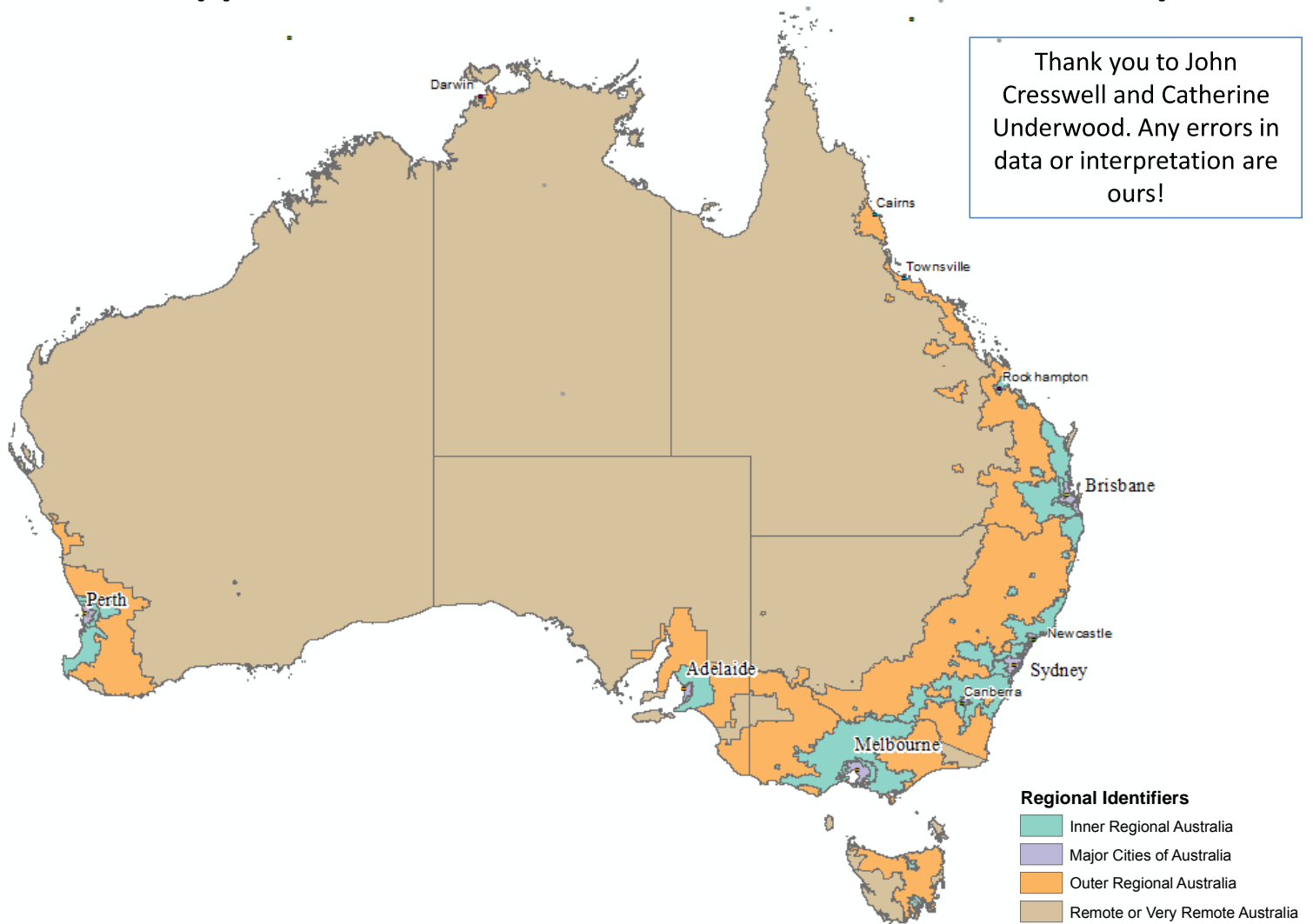


Table 1 Definition of ARIA Geographic Areas and Location Examples

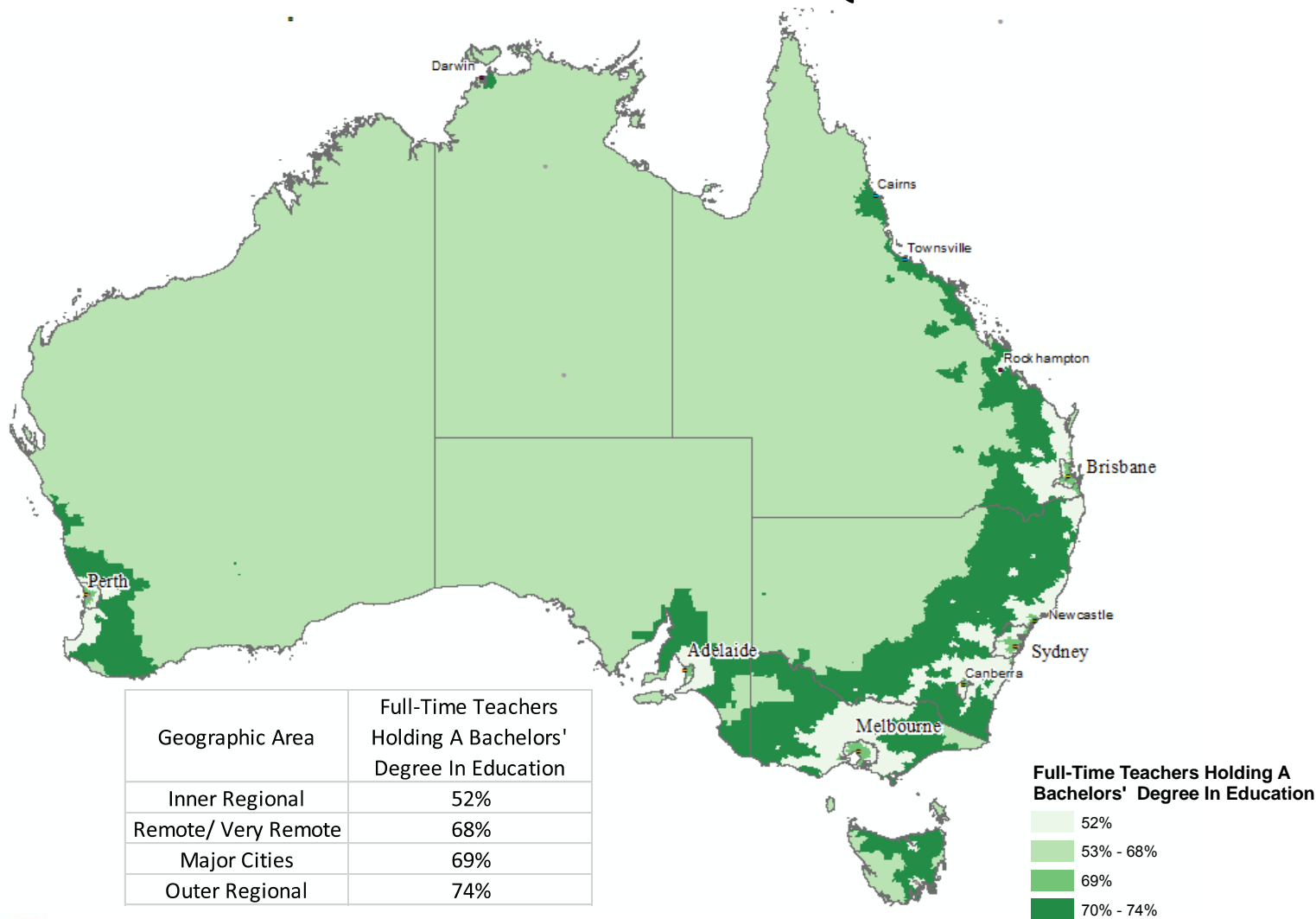
ARIA Classes	Geographic area	Definition of classification	Examples
Highly Accessible	Major Cities areas	Geographic distance imposes minimal restriction upon accessibility to the widest range of goods, services and opportunities for social interaction.	Camberwell (VIC) Belconnen (ACT) Launceston (TAS)
Accessible	Inner Regional areas	Geographic distance imposes some restriction upon accessibility	Coffs Harbour (NSW) Ruffy (VIC) Days Hill (SA)
Moderately Accessible	Outer Regional areas	Geographic distance imposes a moderate restriction upon accessibility	Quondong (NSW) Happy Valley (VIC) Bootoooloo (QLD)
Remote	Remote areas	Geographic distance imposes a high restriction upon accessibility	Buckleboo (SA) Pingaring (WA) Meeleebee (QLD)
Very Remote	Very Remote areas	Geographic distance imposes the highest restriction upon accessibility	Mimili (SA) Paraburdoo (WA) Nobles Nob (NT)

We Mapped The 2000 PISA Data From The 2004 ACER Report

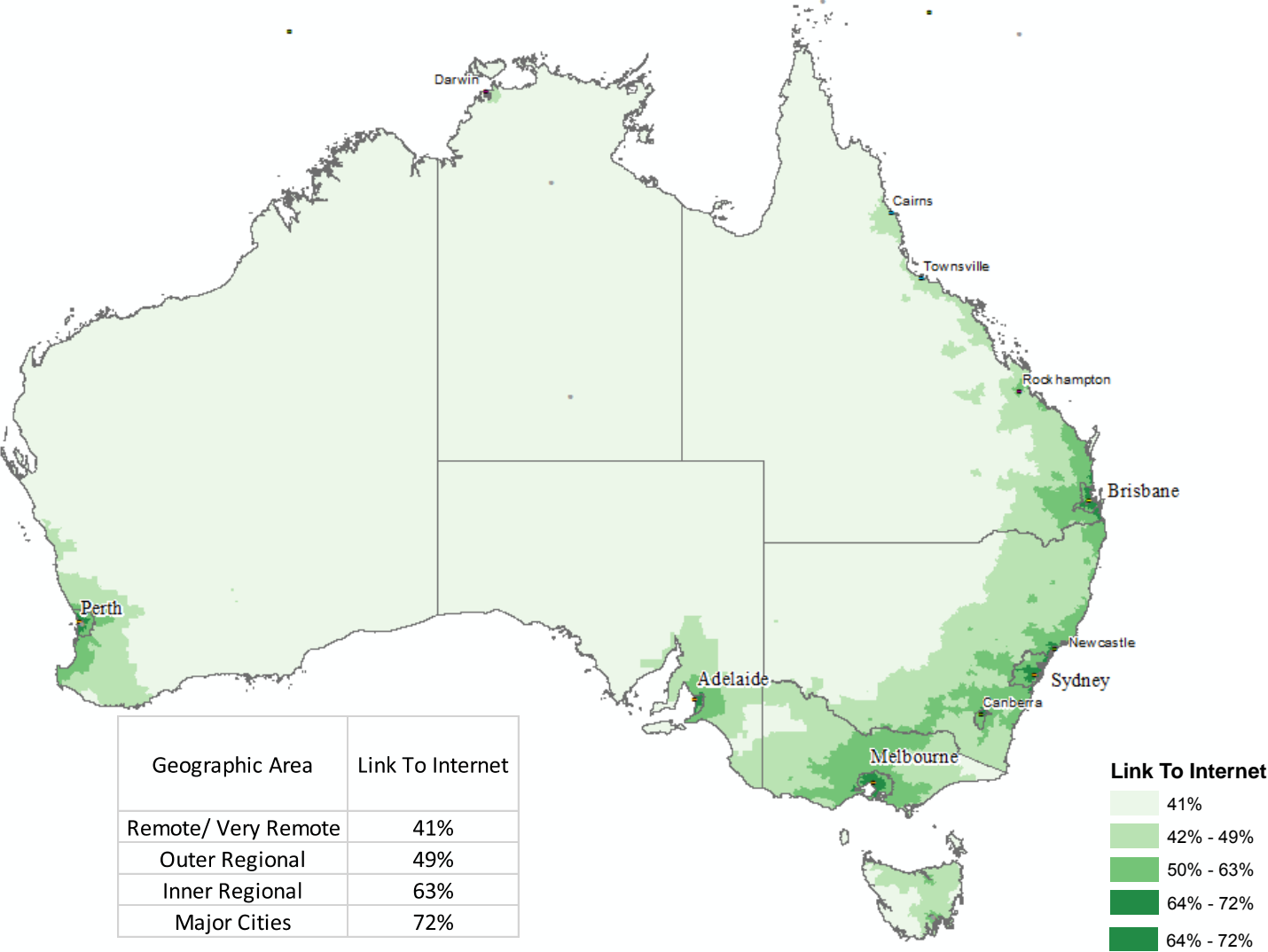
Thank you to John Cresswell and Catherine Underwood. Any errors in data or interpretation are ours!



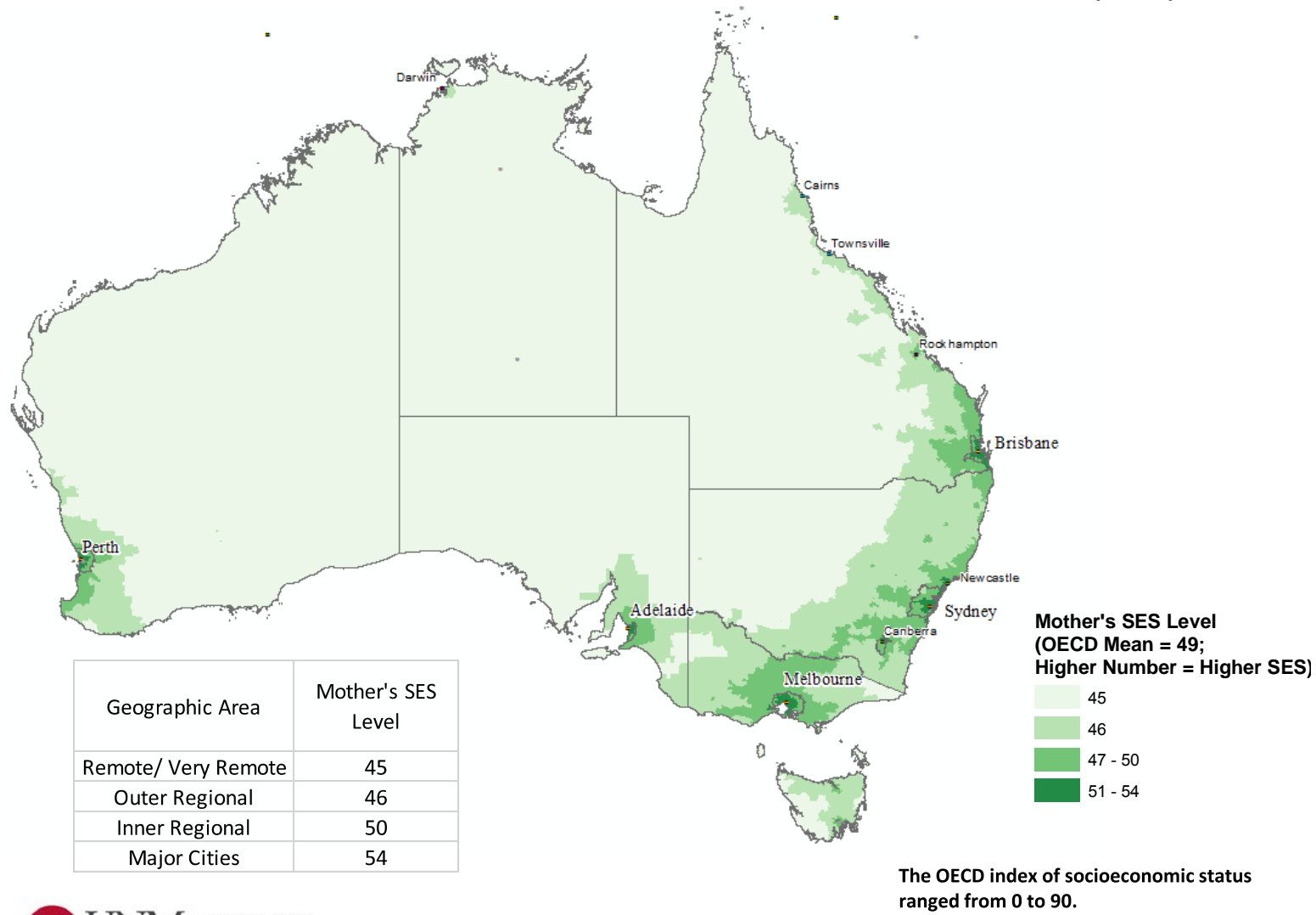
The 2000 PISA Data On Teacher Qualifications



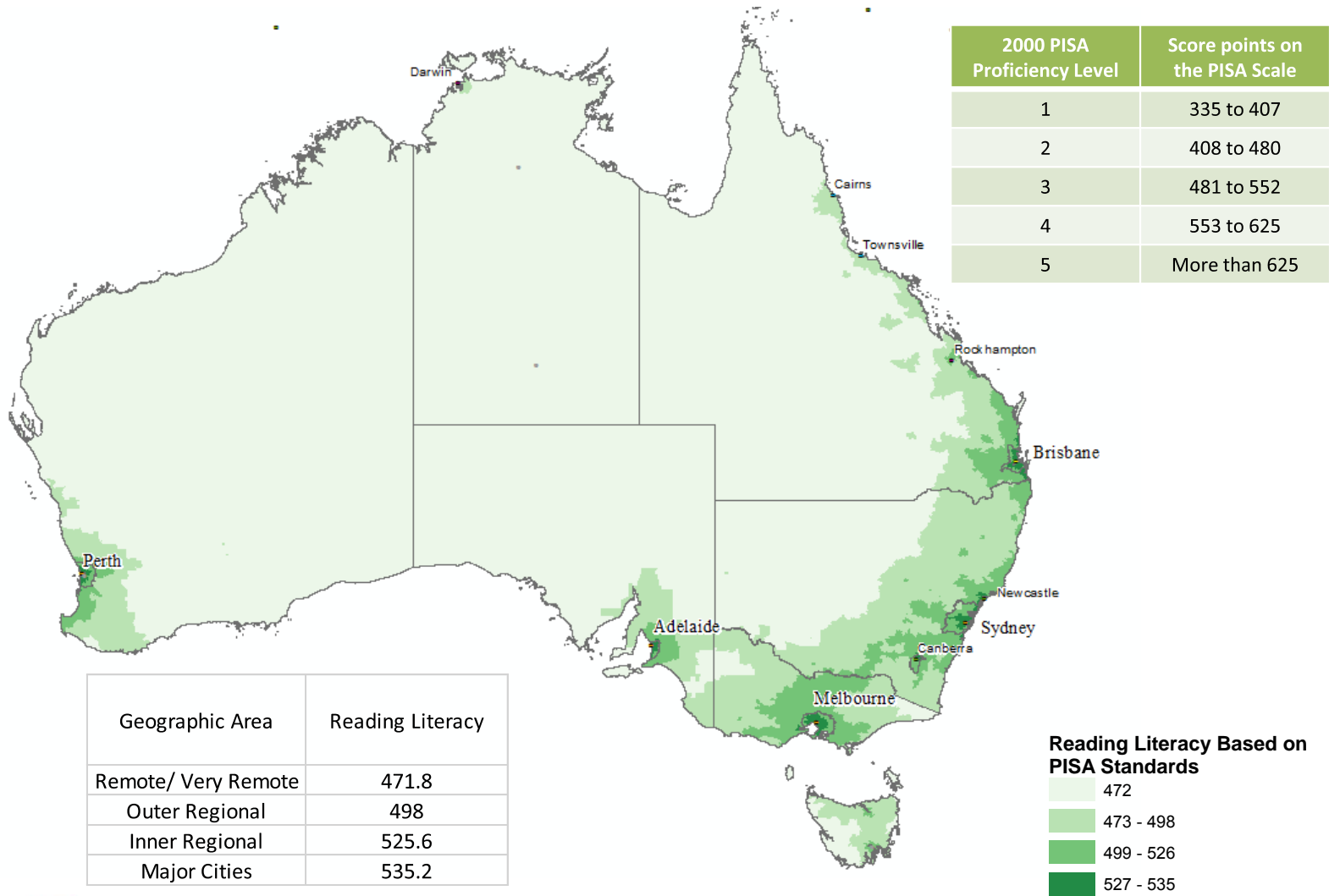
The 2000 PISA Data On Access To The Internet



The 2000 PISA Data On Mother's Socioeconomic Status (SES) Level



The 2000 PISA Data on Reading Literacy



Questions?

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