ChalleNGe: Documentation of Recent Analyses on Cadets, Dropouts, Travel Distance, and Potential Program Sites

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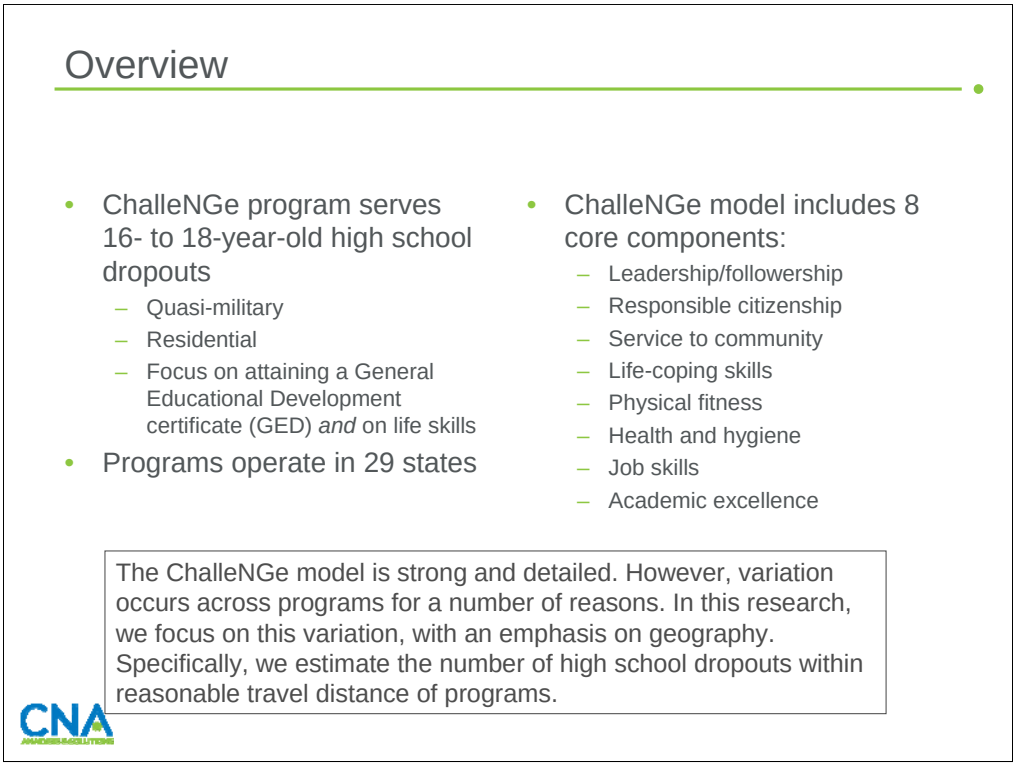
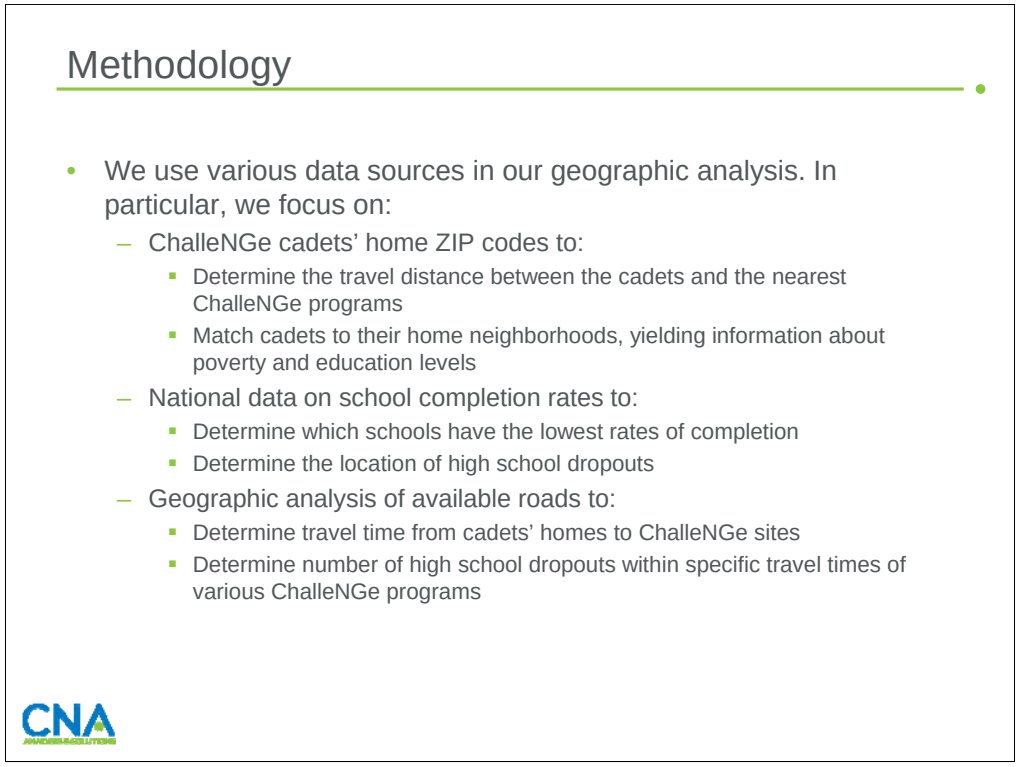


The National Guard Youth Challenge (ChalleNGe) program is a quasi-military, residential program designed to serve 16- to 18-year-old high school dropouts. It is funded jointly by DoD, the states, and state National Guard units. At present, there are 34 programs in 29 states and the territory of Puerto Rico.

The ChalleNGe model is detailed and complete, providing a great deal of guidance to programs. Every program emphasizes each of the model's eight core components (leadership/followership, responsible citizenship, service to community, life-coping skills, physical fitness, health and hygiene, job skills, and academic excellence). For a number of reasons, however, the programs vary in how the model is implemented. Some variation is within the control of the program; for example, programs determine the exact protocol in cases of cadets who wish to leave ChalleNGe. Some of our past research has explored such policies in detail (see Cathleen M. McHugh and Jennie W. Wenger, *ChalleNGe: Variation in Participants and Policies Across Programs, Subpopulations and Geographic Analyses*, CNA Annotated Briefing D0019577.A2, March 2009). Other variation, however, is outside the control of the program. For example, programs have a variety of facilities, often not of their own design or choosing. Also, program location is likely to have a large impact on ease of recruiting. In particular, some programs are located near populous areas with many high school dropouts, whereas other program locations are far from most dropouts. In some cases, many of the nearby dropouts are located in different states.

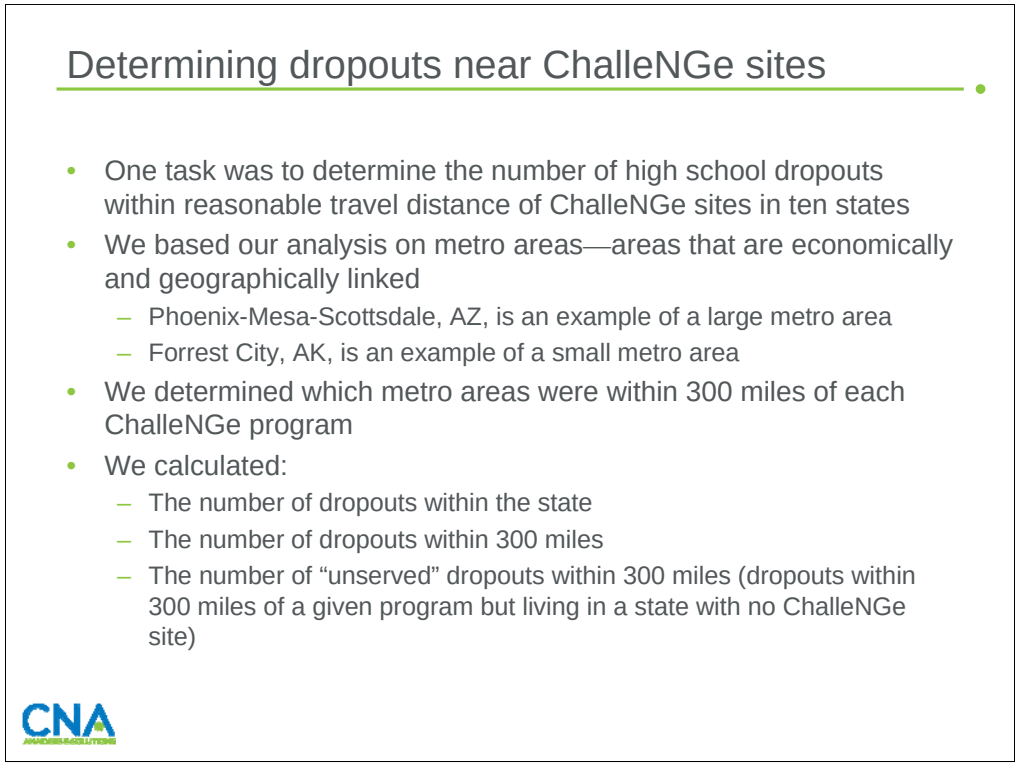
In this annotated briefing, we document our most recent ChalleNGe research, much of which originally appeared in memos. We focus on various geographic elements that affect ChalleNGe programs. We estimate the number of dropouts within reasonable travel distances of ChalleNGe programs and the extent to which various programs reach dropouts; we also provide additional details about cadets' backgrounds. Much, but not all, of this analysis focuses on Appalachian states because the area has been considered for a regional ChalleNGe site.



Our research utilizes data from several sources. First, we use the ChalleNGe program data, provided by AOC Solutions, to determine the home ZIP code of each ChalleNGe cadet. We use this ZIP code information to calculate the distance between the cadet's home and the nearest ChalleNGe program, and also to match cadets to statistics on their home neighborhoods, yielding such information as the poverty rate and overall education rate.

We also use national data on high school enrollments to determine the average completion rate at each high school in the United States. Based on this figure, we calculate the number of dropouts in each district. Our calculation focuses on the high school completion rate, which is the ratio of high school diplomas awarded to the number of 10th graders 2 years prior. This measure is not perfect—in particular, it misses those who drop out of school before reaching 10th grade—but it is generally similar to measures that "reach back" to 8th grade (as opposed to 10th) and can be calculated with fewer years of data and without using data from elementary schools. This measure is preferable to measures that use 9th grade enrollment because many students fail to complete 9th grade in a timely manner. (For more information, see Jing Miao and Walt Haney, *High School Graduation Rates: Alternative Methods and Implications*, Education Policy Analysis Archives 12(55), 2004; as well as James J. Heckman and Paul A. LaFontaine, *The American High School Graduation Rate: Trends and Levels*, 2007, IZA Discussion Paper No. 3216.)

Finally, we utilize MapQuest to determine the driving distance between various ZIP codes and ChalleNGe sites. First, however, we discuss analysis that covers 10 ChalleNGe sites in 9 states, and we estimate the number of dropouts within 300 miles of each site.



One of our tasks was to determine the number of high school dropouts within reasonable travel distance of ChalleNGe sites in ten states (Arizona, Arkansas, California, Georgia, Kentucky, Maryland, Montana, West Virginia, Wisconsin, and Wyoming). Within each state, we conducted our analysis by metro area. To do so, we divide counties into two groups: (1) those that are economically linked to a population center (metro areas) and (2) those that are not (nonmetro areas). In general, this economic linkage means that people live in one county and commute into nearby counties for work, shopping, or entertainment. Technically, areas that are economically linked to population centers of at least 50,000 people are "metropolitan areas," whereas areas linked to population centers of 10,000 to 50,000 people are "micropolitan areas." For simplicity, we refer to all as metro areas. Metro areas were previously referred to as Core Based Statistical Areas, or CBSAs; see http://www.census.gov/population/www/metroareas/aboutmetro.html.

While we have the capacity to examine the data at a more detailed level, the metro delineation offers the advantage of allowing us to aggregate the data in a way that is likely to be meaningful. We include all dropouts in our analysis, but we indicate the numbers of dropouts in specific metro areas to assist the ChalleNGe program with recruiting and program placement.

We use data from several sources in this analysis. We calculate the number of ChalleNGe cadets in each program from the data provided by AOC Solutions. Using the ZIP code from the program data, we aggregate the cadets by metro area. We match these data with high school completion rates (see slide 3); we aggregate these data to the metro area as well. Finally, we compare the distribution of cadets with the distribution of high school dropouts across metro areas and states.

Dropouts near ChalleNGe sites

	ChalleNGe site				
	Arizona	Arkansas	California-Los Alamitos	California-San Luis Obispo	Kentucky
Dropouts in state	24,000	7,600	115,400	115,400	10,400
Dropouts within 300 miles	58,300	75,400	112,900	120,115	141,900
Unserved dropouts within 300 miles	5,300	28,500	5,300	6,700	51,000
Largest unserved metro areas	Las Vegas, NV (5,129) St. George, UT (171)	St. Louis, MO (6,580) Memphis, TN (5,211) Birmingham, AL (5,143) Kansas City, KS (4,142)	Las Vegas, NV (5,129) Pahrump, NV (98)	Las Vegas, NV (5,129) Reno, NV (1,209) Carson City, NV (196) Gardnerville, NV (165)	St. Louis, MO (6,580) Cincinnati, OH (5,565) Memphis, TN (5,210) Birmingham, AL (5,142)

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In analyzing the distribution of nearby dropouts, we first use geographic data to determine which metro areas are within 300 miles of each ChalleNGe program. Our analysis defines the distance between two ZIP codes based on the latitude and longitude at the center of each ZIP code. Thus, our distances are measured "as the crow flies" (i.e., the shortest straight line between two points), and actual driving distance is likely to be greater in many cases (we extend our analysis to estimate driving time below).

We are interested in determining the number of dropouts within specific distances of ChalleNGe programs because it may be possible to "regionalize" some sites; this would involve admitting dropouts from one state into a ChalleNGe program in another state. Of course, regionalization would be easier to manage if the dropouts lived near the ChalleNGe program; this would make recruiting and travel to the program less time-consuming.

The table that begins on this slide lists the results of our analysis. We estimated the total number of dropouts in each state, as well as the number of dropouts within 300 miles of each ChalleNGe site, and finally the number of dropouts within 300 miles of each site who live in a state with no ChalleNGe program. Thus, Arizona has about 24,000 dropouts, but there are more than twice as many dropouts within 300 miles of the site if we do not consider Arizona dropouts only. Many of those dropouts, however, live in states with ChalleNGe sites (Arizona or California, in this case); there are only 5,300 unserved dropouts within 300 miles of the Arizona ChalleNGe site. This suggests that the potential for regionalization of this site may be limited; regionalization may not create access for very many unserved dropouts within a reasonable travel distance. Regionalization, however, could create a site to serve additional dropouts in California (note that California has over 115,000 dropouts, more than the total number in the other nine states listed in this table).

Dropouts near ChalleNGe sites, continued

	ChalleNGe site				
	Maryland	Montana	West Virginia	Wisconsin	Wyoming
Dropouts in state	10,500	2,200	4,600	21,500	1,800
Dropouts within 300 miles	180,000	12,400	211,400	70,400	12,800
Unserved dropouts within 300 miles	145,000	7,800	138,000	16,600	10,000
Largest unserved metro areas	New York, NY (68,478) Philadelphia, PA (9,808) Buffalo, NY (4,537) Rochester, NY (4,389)	Salt Lake City, UT (2,908) Ogden, UT (1,246) Boise City, ID (1,196) Idaho Falls, ID (324)	New York, NY (68,478) Philadelphia, PA, (9,808) Cincinnati, OH (5,565) Buffalo, NY (4,537)	Minneapolis-St. Paul, MN (7,391) Omaha-Council Bluffs, NE (1,615) Des Moines, IA (977) Davenport, IA (971)	Denver, CO (5,931) CO Springs, CO (1,434) Boulder, CO (674) Ft. Collins, CO (522)

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In several cases, the majority of nearby dropouts are unserved; the numbers are highest for programs near major population centers, such as Maryland and West Virginia. Such programs have many potential dropouts to serve in nearby states. Finally, some sites have relatively few dropouts in their own state, but nearby states have more unserved dropouts; such is the case for Montana and Wyoming. This suggests a potential for regionalization.

Some additional information and useful definitions follow:

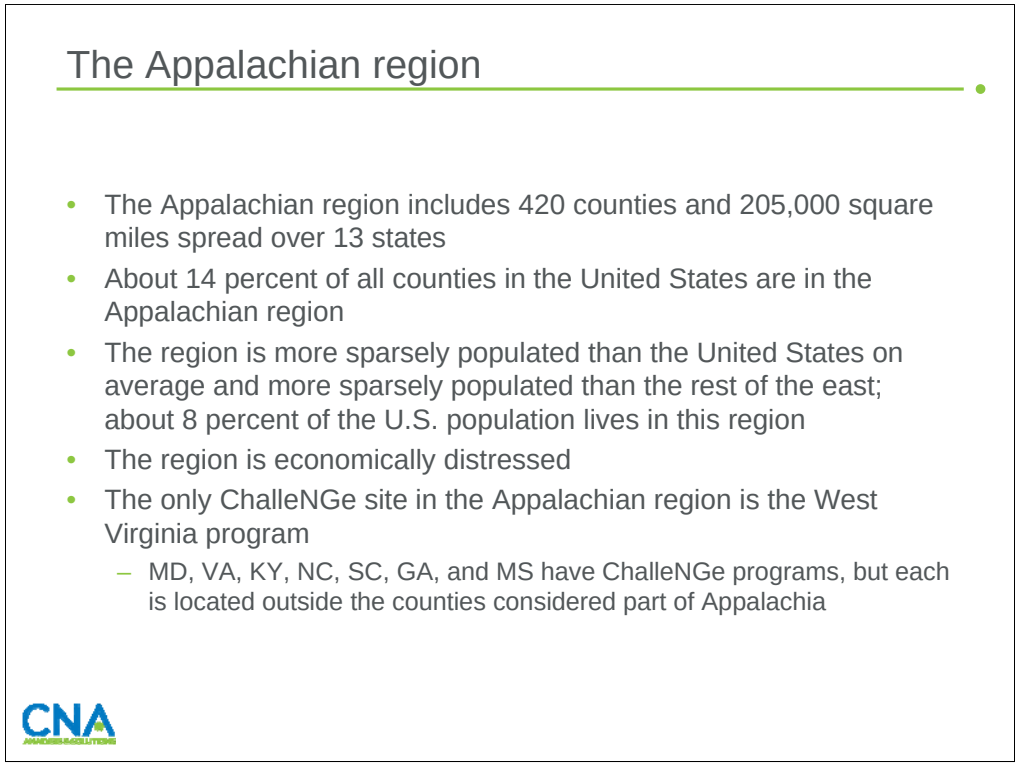
We first determine which of the roughly 42,000 ZIP codes in the United States are within 300 miles of each site. Because our data on dropouts come from school districts as opposed to ZIP codes, and to make our regional findings comparable with our within-state analyses, we next use the ZIP code data to determine which metro areas are within 300 miles of each ChalleNGe site. Thus, some parts of each metro area indicated are within 300 miles of the ChalleNGe sites. Other parts of the metro areas may be somewhat farther away; the average metro area includes about 2,500 square miles, suggesting that parts of some areas are likely to be 350 to 400 miles from the ChalleNGe sites.

“Dropouts in ChalleNGe state” includes ALL dropouts within the ChalleNGe state, regardless of distance from ChalleNGe program.

“Dropouts within 300 miles” includes both dropouts in the ChalleNGe state and those in other states, who live within 300 miles of the ChalleNGe site.

“Unserved dropouts within 300 miles” includes all dropouts within 300 miles of the ChalleNGe site who live in a state with no ChalleNGe program.

We selected 300 miles as a travel distance likely to represent 5 to 6 hours of travel time; staff members at various programs indicated the willingness of families to travel this distance.



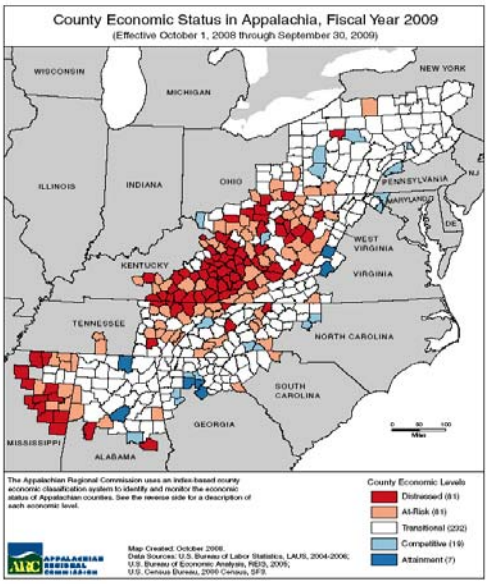
The Appalachian region includes 420 counties and 205,000 square miles of 13 states: all of West Virginia and parts of New York, Pennsylvania, Ohio, Virginia, Maryland, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Alabama, and Mississippi. Thus, the region includes about 14 percent of all counties in the United States (nearly 1 in 7) but only about 8 percent of the country's population (roughly 1 in 12 people). Thus, the Appalachian region is more sparsely populated than the United States as a whole and is substantially less populated than other parts of the east.

Over 40 percent of Appalachians live in rural areas, making residents of the Appalachian region twice as likely as others in the United States to live in a rural area. Overall, the region is economically distressed. For example, per capita income in the Appalachian counties was 24 percent lower than in the rest of the United States in 2005. Unemployment and poverty rates consistently are higher in the Appalachian region than in other parts of the country. (For more background information, see the Appalachian Regional Commission, www.arc.gov.)

Although Maryland, Virginia, Kentucky, North Carolina, South Carolina, Georgia, and Mississippi all have at least one ChalleNGe program, none of these programs are located in the Appalachian region. The West Virginia program is in the Appalachian region, as is the entire state. New York, Pennsylvania, Ohio, Tennessee, and Alabama do not have ChalleNGe programs. This suggests that the young people of Appalachia have uneven access to ChalleNGe.

The next slide shows a map of the region.

Economic status of the Appalachian region, by county



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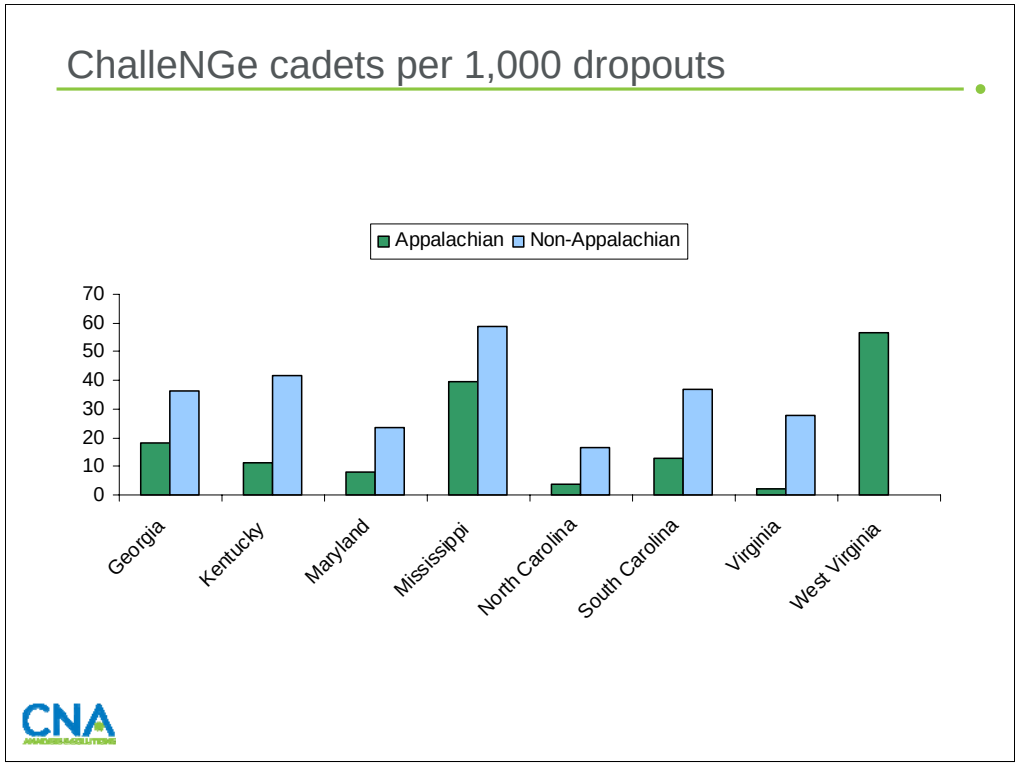
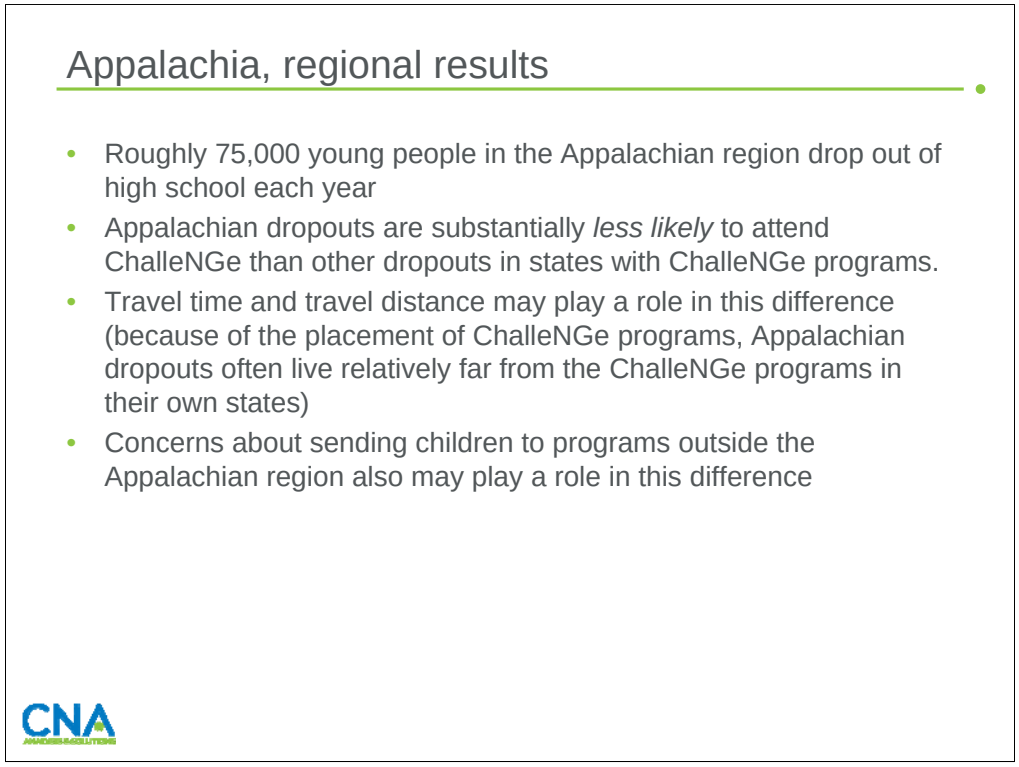
The map above includes each county that is part of the Appalachian region and demonstrates the economic status of each county during fiscal year 2009. Many counties in the Appalachian region are "economically distressed," which indicates that these counties rank among the worst 10 percent in the country in terms of unemployment, poverty, and per capita income. Economically distressed counties in the Appalachian region appear in dark red on the map. The pink counties are classified as "at risk," meaning they rank between the 10th and the 25th percentile among the Nation's counties. Thus, many of the counties in the Appalachian region rank very poorly in terms of unemployment, poverty, and income. For source data and more information, see www.arc.gov.



This slide shows the small number of cadets from the Appalachian region. Consider Georgia as an example. We first determined the number of cadets from recent classes, and then divided them into two groups: those from Appalachian counties in Georgia and those from non-Appalachian counties in Georgia. Next, we determined the number of dropouts in Appalachian and non-Appalachian counties in Georgia (see slide 3). Finally, we divided the number of cadets by the number of dropouts in thousands. We did this to norm our results, to correct for the fact that Appalachian counties are less populated than other areas and that, in many states, Appalachian counties make up a small fraction of all counties. Thus, the graph indicates the number of ChalleNGe cadets per 1,000 dropouts in each region of each state; in Georgia, there are about 37 cadets for every 1,000 dropouts from non-Appalachian counties but only about 18 cadets for every 1,000 dropouts from Appalachian counties. To express these results another way, Appalachian dropouts in Georgia are about half as likely to attend ChalleNGe as non-Appalachian dropouts in Georgia (if the two groups were equally likely to attend, the blue and green bars would be the same height). A similar pattern holds for each state in the region.

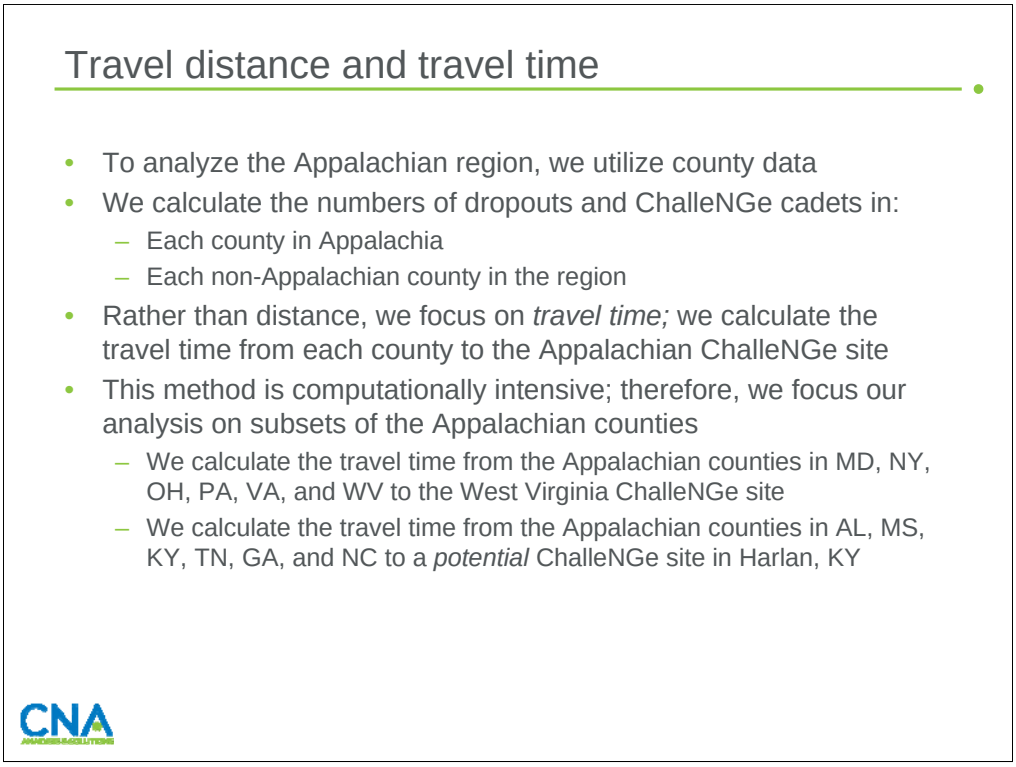
The entire state of West Virginia is in the Appalachian region, and dropouts from West Virginia attend ChalleNGe at fairly high rates; this suggests that Appalachian dropouts will take advantage of ChalleNGe programs in some circumstances. Again, this difference is *not* due to differences in populations or dropout probabilities. However, Appalachian dropouts outside West Virginia are less likely than other dropouts in the same states to attend ChalleNGe. This could be a function of travel time, cultural factors, or both.



This slide summarizes our Appalachian findings to this point.

We believe that concerns about sending children to programs outside the Appalachian region are important for two reasons: our analysis indicates that Appalachian dropouts attend the West Virginia program at a relatively high rate but attend the other (non-Appalachian) programs in the region at lower rates. Also, staff members in the region have told us that these concerns exist among families of potential cadets.

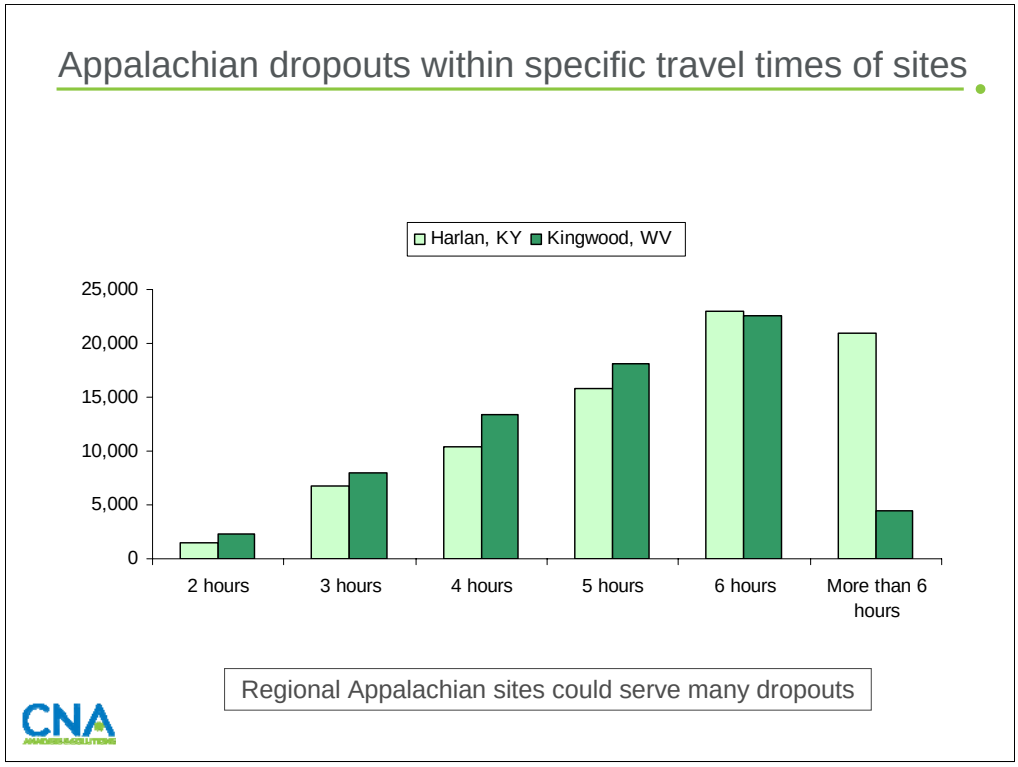
Next, we calculate travel time for Appalachian cadets to ChalleNGe sites in the region.



In past memos, we have presented analysis by metro area. Here, we are interested in the largely nonmetro areas of the Appalachian region, so we examine the data at the county level. For each county in the region, as well as for non-Appalachian counties in the same states, we calculate the number of dropouts and the number of cadets from recent ChalleNGe classes.

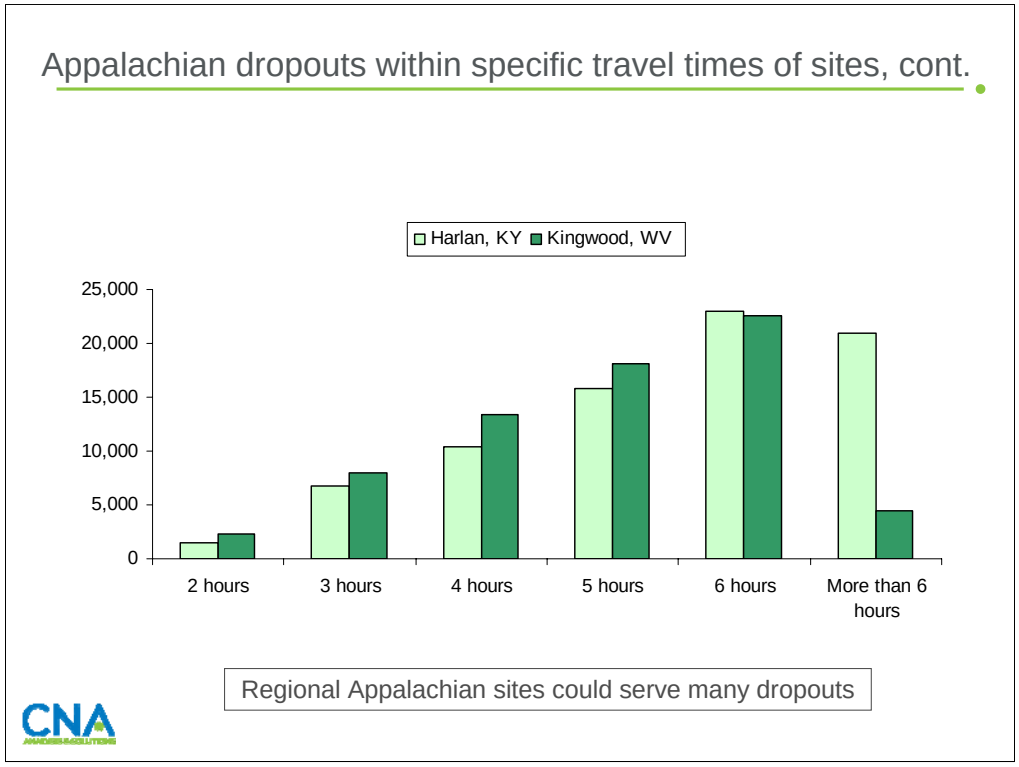
In earlier work, we calculated the number of dropouts within a given *radius* of each program, usually 150 to 300 miles (e.g., see slides 5 and 6). Our radius is calculated as the crow flies, so this *radial distance* is sure to be an underestimate of actual travel distance—particularly in the Appalachian region because of the topography. Therefore, in this portion of our research, we employ a new method to calculate the number of dropouts within given *travel times* of ChalleNGe sites. We use a program that downloads MapQuest driving directions between ZIP codes in the Appalachian region and ChalleNGe sites, from which we extract travel time. We calculate travel time from each ZIP code in each county to the ChalleNGe site, and then combine the results to calculate median travel time from the county to the ChalleNGe site. This method involves substantial computing, so we limit our analysis to two groups of counties:

- For Appalachian counties in Maryland, New York, Ohio, Pennsylvania, Virginia, and West Virginia, we calculate the travel time between these counties and the ChalleNGe site at Kingwood, WV.
- For Appalachian counties in Alabama, Mississippi, Kentucky, Tennessee, Georgia, and North Carolina, we calculate the travel time between these counties and the potential ChalleNGe site in Harlan, KY. (We exclude the six counties in South Carolina because of the distance between them and the Harlan site. However, we include the SC data in our calculations of the numbers of dropouts and cadets.) We use the tentative site in Harlan, KY, and the current site in Kingwood, WV, because both have potential to serve as regional ChalleNGe sites.



This slide indicates the number of dropouts within various travel times of the Harlan, KY, and Kingwood, WV, sites. Overall, we find that travel distance is substantially larger than radial distance and that travel *time* varies significantly among locations with the same travel *distance*. For example, for the West Virginia site, the travel distance from Appalachian counties to Kingwood is, on average, about 60 miles farther than the radial distance, and the travel time varies by more than 80 minutes between sites with travel distances of 170 to 190 miles. This indicates that, as we expected, radial distance is not an optimal measure of access in the Appalachian region. (We have not tested the difference between radial distance and travel distance in other regions.) Therefore, we categorize potential cadets by travel time in this section.

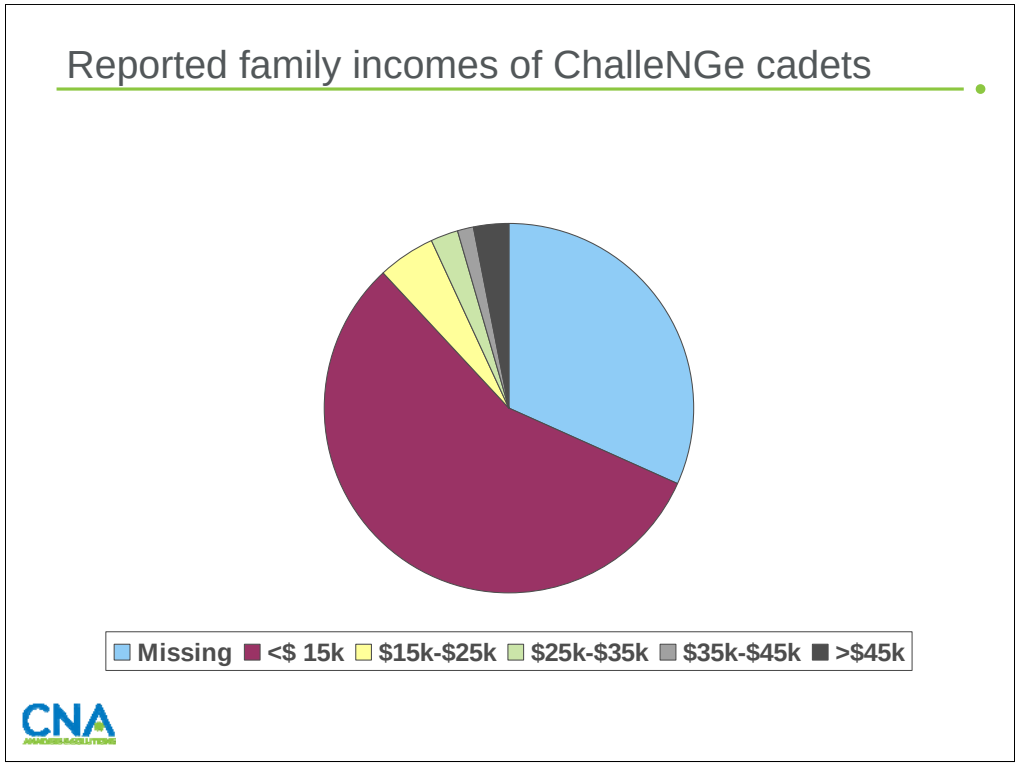
As shown above, we find that there are large numbers of dropouts within 4 to 6 hours of both programs. Indeed, in the case of Kingwood, most Appalachian dropouts are within 5 hours of the program; in the case of Harlan, many dropouts at least 6 hours from the site. However, Harlan is within reasonable travel time of dropouts in several states. Large numbers of dropouts in the Appalachian areas of Kentucky and Tennessee are about 3 hours away from the site. Some of the Appalachian counties of North Carolina are within 4 hours of Harlan; nearly all are within 5 hours. While most of the Appalachian counties of Georgia are within 6 hours, the Appalachian counties in Alabama generally are located more than 6 hours from Harlan.



In the case of Kingwood, some Ohio and Pennsylvania counties are within 3 hours, and most are within 5 hours. The few Appalachian counties located more than 6 hours from Kingwood are mostly in New York State.

To summarize, we find that many dropouts in the Appalachian region live within reasonable travel times of these sites. Especially when combined with our earlier analysis of West Virginia, these results suggest that the Kingwood ChalleNGe site could serve as a regional site either by focusing on dropouts in nearby metro areas or by focusing instead on dropouts in nearby Appalachian counties with no access to ChalleNGe. Our analysis also indicates that a substantial number of dropouts also live within a reasonable travel time of Harlan, KY. Many of these youth live in states with ChalleNGe programs, but they are unlikely to attend the current programs. Therefore, both of these sites have potential to serve the large number of dropouts in the Appalachian region. Many dropouts in Appalachia do not have access to a ChalleNGe program, and those dropouts who live in states with a program are quite unlikely to attend.

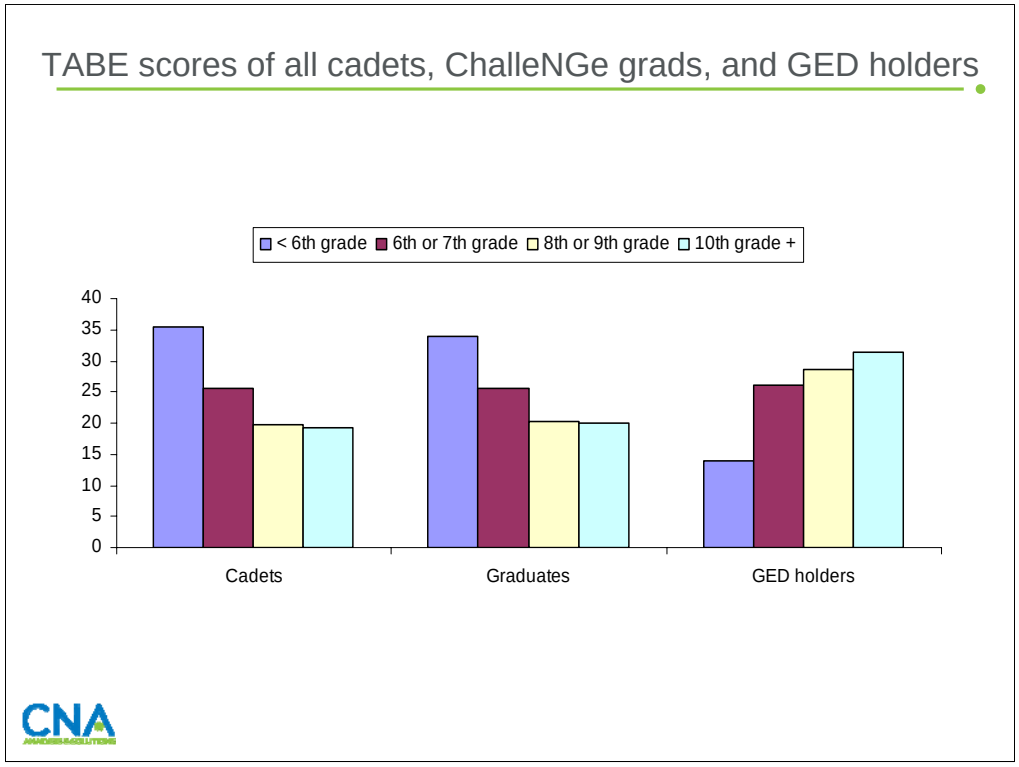
Next, we present some statistics describing the family incomes and initial test scores of ChalleNGe cadets.



We have only limited information on cadets' family incomes; many families choose not to report an income level. Moreover, the percentage of cadets/families declining to answer this question has increased over time. By 2006, more than 70 percent of cadets did not indicate a family income bracket (there is no penalty for declining to provide this information). Because the income data are not very detailed and often are missing, we have chosen to use Census data on neighborhood income levels in some of our analyses. But here we present the limited family income data.

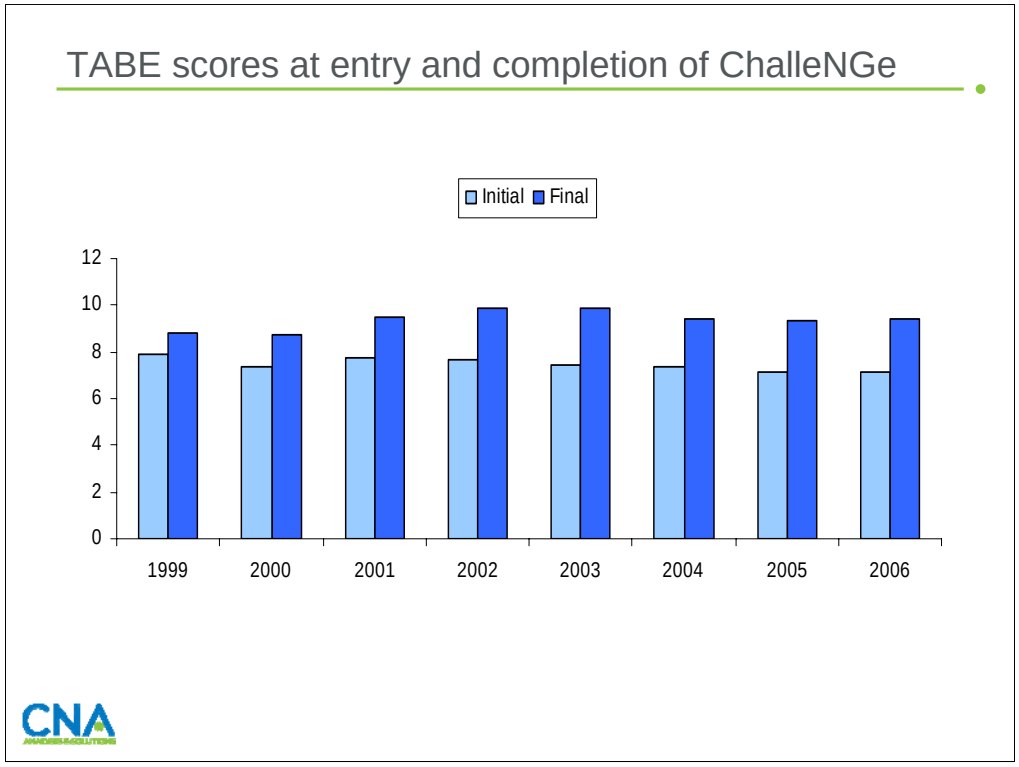
This chart shows the overall breakdown of reported family incomes for 1999 through 2006. Cadets/families who report family income are most likely to indicate an income level of less than $15,000 per year.

In recent years, there has been an increase in the proportion reporting incomes above $15,000. (We would expect incomes to increase somewhat over time; the figures reported here, based on indications of income bracket, are not adjusted for inflation.) Even in the most recent years' data, however, over 40 percent of cadets report family incomes of $25,000 or less, and about 60 percent report family incomes of $35,000 or less. Thus, based on the income data, the ChalleNGe cadets are a disadvantaged population.



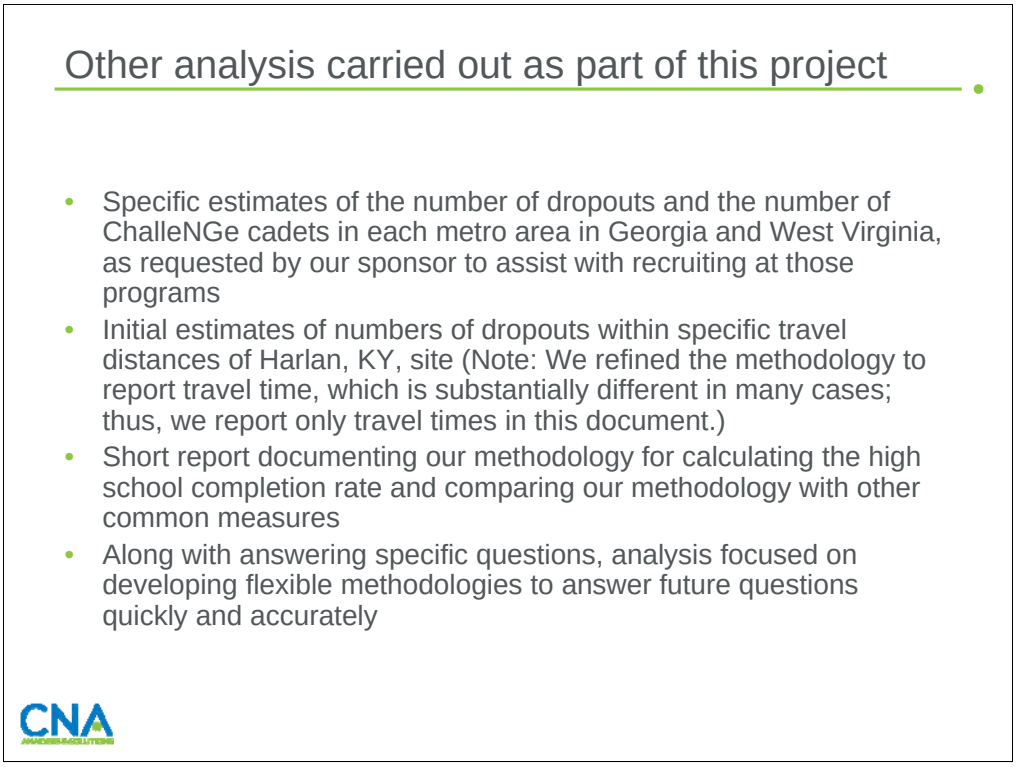
Applicants to the ChalleNGe program must take the Test of Adult Basic Education (TABE) before entering the program. Those who complete the program take the TABE again before graduation. The TABE score indicates the test-taker's grade level; for example, a score of 6.2 indicates that the test-taker is performing at the 2nd month of 6th grade. This slide indicates the initial TABE scores of all cadets who entered ChalleNGe, as well as the initial scores of all graduates and of those who complete a GED while at ChalleNGe. The largest group of cadets (and the largest group of graduates) enter ChalleNGe performing below the 6th grade level.

The distribution of GED-holders looks quite different from that of cadets; this is not surprising because those with very low TABE scores are much less likely to complete the GED successfully. However, the distribution of graduates is quite similar to that of all cadets. Thus, while low TABE scores serve as a barrier to completion of a GED, they do not prevent cadets from completing and benefiting from ChalleNGe.



This slide shows average initial and final TABE scores of ChalleNGe graduates, by year. In general, ChalleNGe cadets emerge from the program with substantially higher TABE scores than they had on entrance. Typically, cadets gain nearly 2 academic years while enrolled in ChalleNGe.

This slide also indicates that the TABE score *gains* have increased over time, although initial TABE scores have not. Thus, ChalleNGe continues to serve cadets who are quite disadvantaged in terms of their academic performance. Cadets in the program continue to make substantial academic gains during ChalleNGe despite the fact that many enter the program scoring well below grade level.



This slide summarizes additional analyses that we completed as part of this project. While we completed much of this work to answer specific questions (e.g., "How many dropouts live within 300 miles of location X?"), we stress that the analyses also focused on developing and refining methodologies that can be used repeatedly and modified as necessary to answer other questions about the geography of dropouts, cadets, and ChalleNGe sites in the future. Our investment in developing these methodologies has been relatively small, but we expect it to pay considerable dividends in the future by allowing us to answer a variety of questions quickly and accurately.