The National Dropout Data Collection System: Assessing Consistency

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Introduction

One measure of the success of a country's educational system is the level of education achieved by its young adults. In this country, the primary standard of educational level has been high school graduation. Indeed, one of the oldest series of data collected by the Federal government is the proportion of the population that has completed high school. These data show that there has been remarkable progress in the last half-century in high school completion rates. Rates increased from 38 percent of all 25 to 29 year olds in 1940 to around 86 percent in the early 1980s and have remained constant since (U.S. Department of Education, 2000). As a consequence of this progress, during the last half century, high school completion became an expectation for young people in this country (Dorn, 1996).

However, the current enthusiasm for high school exit exams has prompted concerns about the adverse effects that these exams might have on high school completion (Hebert and Hauser, 1999). Some have thought that the implementation of such tests will make it more likely that students will drop out of school rather than face the consequences of failure on these exams. For example, Bonsteel and Rumberger warn that the twin horns of the end of social promotion and the beginning of high school exit exams will greatly increase the number of high school dropouts (Bonsteel and Rumberger, 1999).

Obviously, measuring the impact of exit exams requires reliable statistics on recent trends in high school completion and dropout. Unfortunately, despite decades of collecting data on completers and dropouts, this still remains no easy task. The relatively limited resources that go into the collection of high school completion and dropout data at the federal level produce data that provide more heat than light on some rather basic questions on high school completion—how many students drop out in any given year and how many students complete high school.

Completion and dropout rates can vary dramatically depending on the data source. As I will show below, these differences in rates arise because:

- Different rates are based on different populations;
- Different rates are derived from different methods; and
- Rates based on survey methods generally have large sampling errors.

Because of these factors, reported rates differ significantly from one anther and are not easily "translatable" into one another. This may lead to the appearance that they give different answers and make it difficult to policy makers to sort out the magnitude of the dropout "problem". In this paper I will describe the difficulties we currently face in providing high school dropout and completion data on a consistent and timely basis. I

will review the data that are currently being collected on high school completion and dropout and attempt to explain why different sources provide different answers to the basic questions about high school completion in this country. After briefly describing the national data and the state-by-state breakouts of the national data, I will compare the different rates derived from these different data sources and attempt to reconcile some of the differences in reported rates.

In the discussion, I have two specific recommendations to improve data collection on high school completion. My first recommendation is to support the development of the new American Community Survey—a new household survey that has the potential to give much more accurate estimates of high school dropouts and completers at the state and local level. As these estimates will be derived from the same survey instrument, they will provide comparisons across states (and within states) based on common definitions of dropout and completion.

My second recommendation is to supplement existing data systems with longitudinal surveys of students. As I will argue below, not only do longitudinal data have the potential of providing more accurate estimates of dropouts and completers, but they also provide the context in which one can understand the changes in the process of dropping out (perhaps due to changes in graduation policies).

Data Sources and Definitions

Currently, the federal government relies on three sources of data on high school dropouts and completers: the October supplement to the Current Population Survey (CPS) collected by the Bureau of the Census, the Common Core of Data compiled by the National Center for Education Statistics, and data from the National Center for Education Statistic's Longitudinal Studies Program. I will first describe the data from the Current Population Survey.

Data from the Current Population Survey

The great advantage of the CPS data is that it has been collected in a reasonably uniform manner every year for several decades. It is the only source of long-term trends in dropout and completion rates. It is thus the backbone of the annual dropout report that has been published by NCES every year since 1988 (Kaufman et al., 2000).

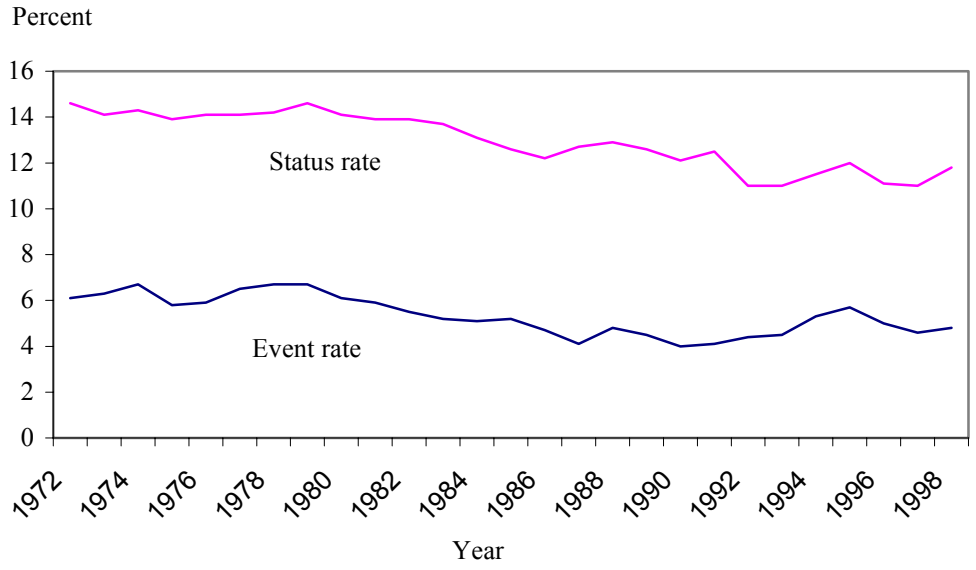
Dropout rates

A variety of dropout rates can be calculated from the CPS data. NCES uses the October Supplement to CPS to calculate two basic dropout rates (Kaufman, et al., 2000). These are the *event* dropout rate and the *status* dropout rate. They measure slightly different phenomenon. Event rates describe the proportion of students aged 15 to 24 who leave school each year without completing a high school program. This is an annual measure of high school dropouts. Status rates provide cumulative data on dropouts among all young adults within a specified age range. Status rates are higher than event rates because they include all dropouts ages 16 through 24, regardless of when they last attended school.

Trends in Event and Status Rates

The CPS data have been collected for well over three decades. In this section I briefly present some of the historical data in event and status rates. Figure 1 shows the event and status dropout rates from 1972 to 1998.

Figure 1—Percentage of 15- through 24-year-olds who dropped out of grades 10–12, and percentage of 16- through 24-year-olds who were dropouts: October 1972 through October 1998



SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey, October (various years).

The figure shows a general decline in the status and event rates from the early 1970s to around 1990. Since 1990, while there is an appearance of a slight upward trend in both rates, the trend is not statistically significant and this may be due simply to sampling error. Our best guess based on the data is that the rates have been flat during the 1990s.

Completion rates

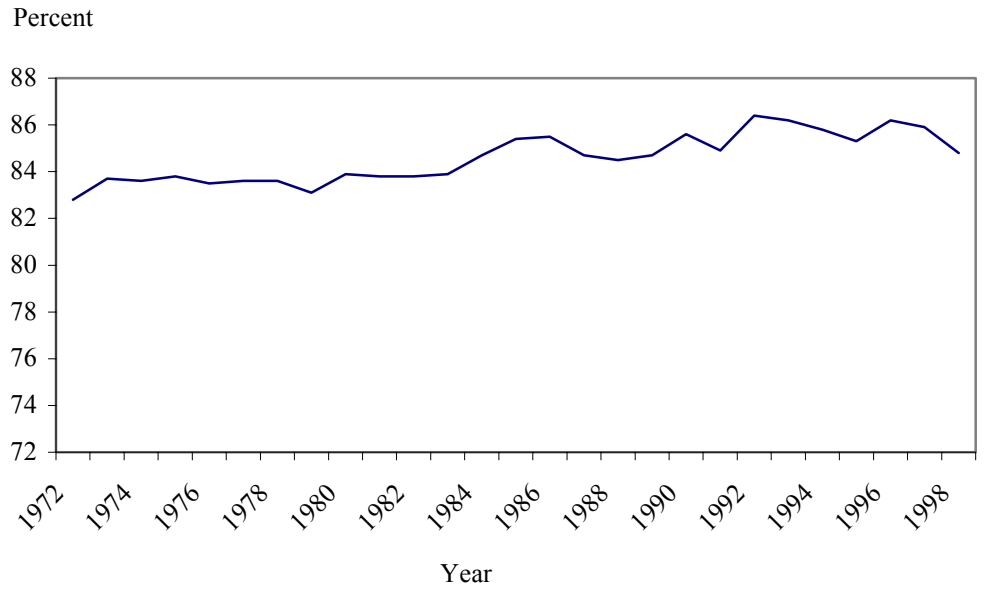
There are also a variety of completion rates that can be calculated with the CPS data. The major distinctions among these rates were 1) which age group was covered, and 2) who was in the denominator. For most Federal reports, the age group covered is 18 to 24-year olds. This age group is chosen because it provides a completion measure that gives the educational community an "early warning system" on the possible effect of current educational policies.[1] The main issue in the choice of a denominator is whether to include those still enrolled in high school. For most Federal reports, these students are not included. Since obviously those still enrolled in high school have not completed high school, including them would decrease the completion rate.

[1] See (Kaufman, 2000) more complete discussion of this issue.

Trends in completion rates

Figure 2 shows the trend in high school completion rates for 18- to 24-year-olds from 1972 to 1998 (as with the dropout rates, 1999 data on completion will soon become available). Mirroring the dropout rates, the completion rates seem to have increased until the 1990s and have remained steady at around 84 to 85 percent since then.

Figure 2—High school completion rates of 18- through 24-year-olds not currently enrolled in high school or below: October 1972 through October 1998



SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey, October (various years).

Stability of CPS Estimates Over Time

While the figures on high school dropout and completion rates look simple, they conceal a great deal of ambiguity in the data and make the trends look more clear-cut than they are in fact. Numerous changes over the years in the CPS questionnaire design make clear recent year-to-year comparisons difficult. The most important changes occurred in 1992 and 1994. Furthermore, completion and dropout statistics are complicated by how GED or equivalency credentials have been measured in CPS.

Changes Introduced in 1992

Before 1992, educational attainment was based on the control card questions on highest grade attended and completed. Identification as a high school graduate was based

on highest grade attended and whether or not that grade was completed. After 1992, educational attainment was measured directly by asking the respondent about actual degrees and diplomas awarded. Identification of a high school graduate was from an answer to one of the following categories:

- High school graduate—high school diploma or the equivalent (for example GED); and

- All categories indicating some postsecondary education, from some college, no degree, through doctorate degree.

The net effect of these changes resulted in an increase in the event dropout rate estimated event rate for 1992 was 4.0, compared with a rate of 4.4 percent in 1992 using the new educational attainment item. The status rate in 1992 rises to 11.4 percent rather than the 11.0 percent based on the new educational attainment item.

Changes Introduced in 1994

During the 1994 data collection and processing, two additional changes were implemented in the CPS. Computer-assisted personal interviewing (CAPI) was introduced, resulting in higher completion rates for each individual data item and thus less reliance on allocation of missing responses. If the allocation procedures yielded a distribution different from the 1994 reported patterns, there is the potential for a change in the distribution of the high school completion status.

In 1994, the benchmarking year for these survey estimates was changed from the 1980 Census to the 1990 Census. In addition, adjustments for undercounting in the Census were also included, which had not been done before. Thus, any age, sex, or racial–ethnic groups that were found to be under-represented in the 1990 Census were given increased weights. Analysis using 1993 data of the effect of the changes in the benchmarking year and adjustments for undercounting indicate that the change especially affected the weights assigned to Hispanic young adults. The change in the benchmark year had a larger impact on status rates than on event rates. Using the 1990-based weights increased the event rate by 1.3 percent, but raised the status rate by 3.2 percent.

Thus while it appears as though there may be an increase in dropout rates in the mid- to late 1990s, these increases may be just an artifact of changes in the way in which data are collected. While it is almost certain that these changes were needed and that we are getting more accurate numbers now than in the past, it does make comparisons across time more difficult.

The Role of the GED

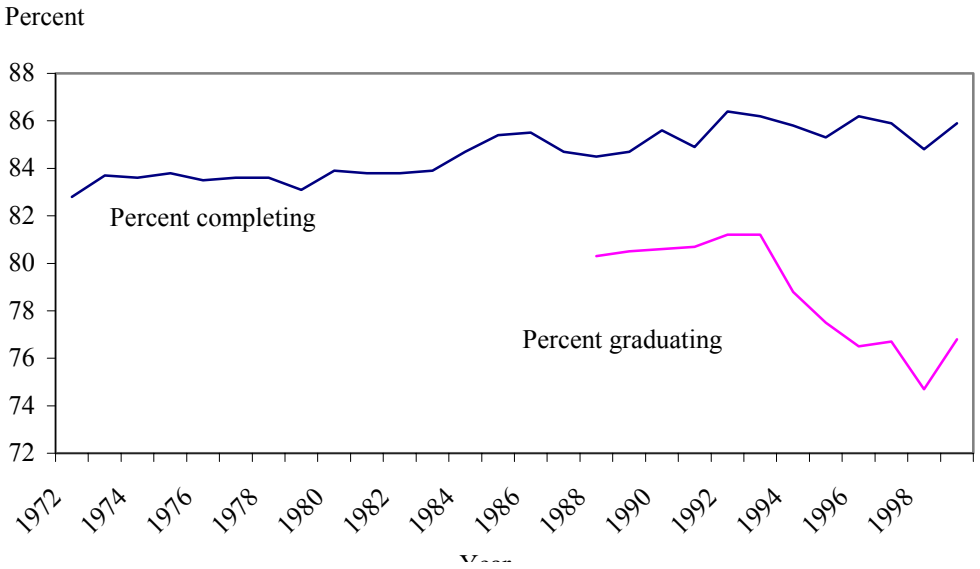
The latest high school completion rates are very close to the goal of 90 percent set by the National Goals Panel in 1988. However, the goal 2 actually states that:

*By the year 2000, the high school **graduation rate** will increase to at least 90 percent. (Emphasis added.)*

The dropout and completion rates above report on the proportion of young people who have or have not completed high school regardless of *how* they completed. That is, some portion of completers did not receive a diploma, but received an equivalency certificate of some kind (most likely awarded by their state after they passed the GED). Those who complete high school with a GED are not considered dropouts.

Graduation from high school usually connotes receiving a diploma and not an equivalency certificate. Unfortunately, at the time that the national goal was set, the CPS did not collect data on equivalency certificates. If a person was reported to have finished 12 years of school, they were considered to have completed high school—distinctions over how they completed were not made. Since then, the CPS has added an item that tries to disentangle diplomas from certificates. Specifically, in 1988 the Census Bureau added an item explicitly asking if the person finished high school by way of a GED.[2] Figure 3 below reproduces figure 2 but adds for the years 1988 through 1998 the percentage of 18- through 24-year-olds who graduated high school with a diploma.

Figure 3—High school completion and graduation rates of 18- through 24-year-olds not currently enrolled in high school or below: October 1972 through October 1999



SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey, October (various years).

[2] The exact wording is "Did … complete high school by means of an equivalency test, such as the GED?"

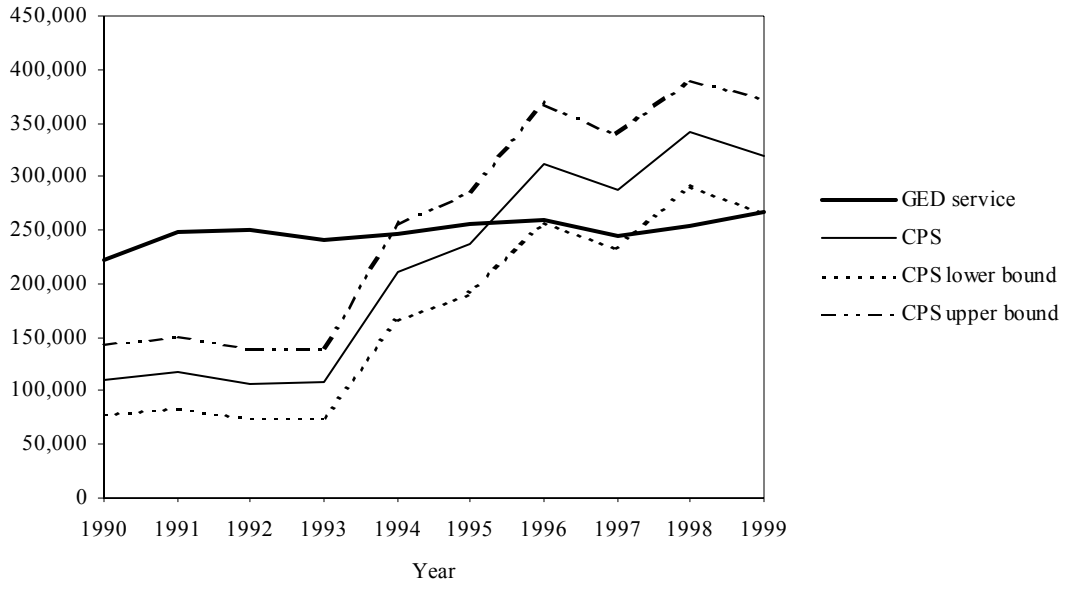
The difference between the completion rate (which looks steady), and the graduation rate (which looks like it has dropped dramatically over the last decade), is the estimated percentage of young people getting alternative credentials. From these data, it appears as though there has been a remarkable increase in the last few years in the proportion of young people getting a GED. The alternative completion rate was 4.9 percent in 1993; it rose to 7.0 percent in 1994 and to 9.8 percent in 1996, then reached 10.1 in 1998, and fell back to 9.2 in 1999. Although the standard errors on these estimates are fairly large, the absolute change is also quite large.

There is other evidence that there has indeed been an increase in the number of persons getting GED based credentials. The GED Testing Service reports that during the late 1990s, over 500,000 adults had earned a high school credential based on passing the GED tests (GED Testing Service, 2000). This was about an 18 percent increase over the number of credentials awarded in 1990. Furthermore, other researchers have commented on the increased function of the GED in high school completion (Murnane and Tyler, 2000).

However, as with dropout rates, the changes that have occurred in the CPS data collection methodology makes it difficult to come to any unambiguous conclusions about any increase in the percentage of young people getting GEDs. For example, the largest increase in the GED rate (between 1993 and 1994) came in 1994 at the time when CPS instituted computer-assisted personal interviewing (CAPI). It is possible that some, if not all, of this increase was due to more accurate reporting of high school completion due to the use of CAPI.

Furthermore, the American Council on Education (ACE), which administers the GED, produces annual reports on the number of persons taking the GED and the number of persons who were issued a GED credential. From these reports, it is possible to calculate the number of 18- through 24-year-olds who received a GED in the past year for 1990 through 1998. It is also possible to estimate the same quantity from the CPS data for 1990 through 1998 by looking at only those who were reported to have completed a GED last year and using this to calculate how many 18- through 24-year-olds obtained GEDs each year. The CPS estimates of the number of GED recipients in the years 1990 through 1993 were lower than the ACE estimates in each of these years. For 1994 through 1999, the CPS estimates are much closer to the estimates from the ACE and generally are not statistically different from the estimates for the ACE in these years. (figure 4).

Figure 4—Number of 18- through 24-year-olds who received a GED in given year: 1990 through 1998*



*These numbers represent the total number of GED credentials earned by 18- through 24-year-olds in the United States only. Credentials earned by adults in Insular Areas and Freely Associated States (IAFAS), Canada, the military, and internationals are not included in these numbers.
SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey (various years); and American Council on Education, GED Testing Service, *GED Statistical Report,* 1990 to 1999.

Thus, while the GED Testing Service shows a rise in the number of GED recipients, the increase is nowhere near the increases implied in figure 3. While it is possible that there has been some increase in the proportion of 18- to 24-year-olds getting an equivalency credential, it is unlikely that the increase is as large as is shown in figure 3. It seems more likely to me that the CPS is now recording a more accurate graduation rate. Rather than witnessing a decrease in graduation rates over the last few years (as figure 3 would suggest) I think that it is more likely that the graduation rate has always been as low as we are now seeing. Errors in the measurement of the number of GED recipients in the past have masked the "true" graduation rate.

Accuracy of Rates from CPS

Data from surveys like the CPS are subject to two broad sources of variability or error—sampling and non-sampling error. Sampling errors occur because the data are collected from a sample of a population rather than from the entire population. Estimates based on a sample will differ somewhat from the values that would have been obtained

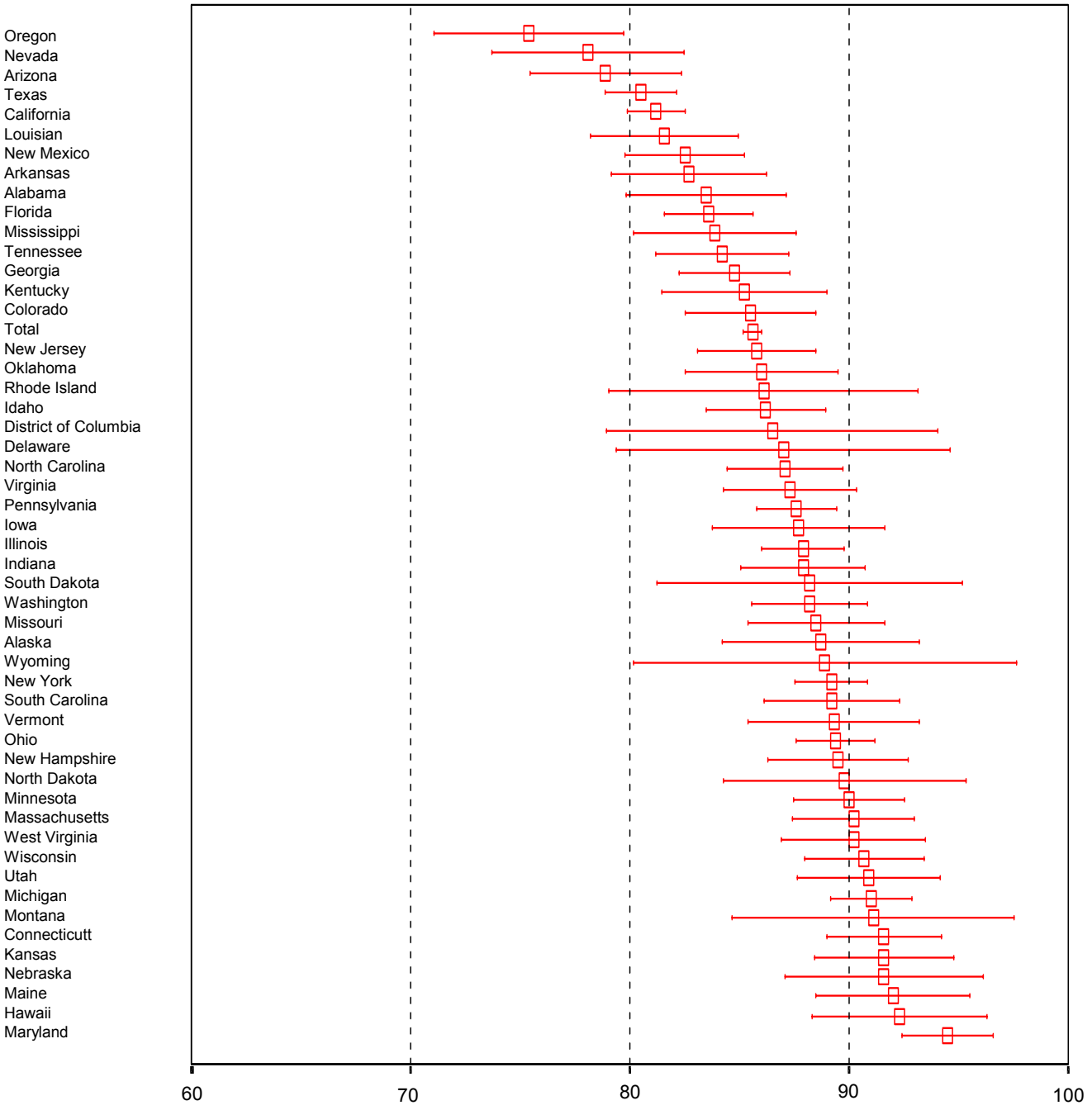
from a universe survey using the same instruments, instructions, and procedures. Nonsampling errors come from a variety of sources and affect all types of surveys, universe as well as sample surveys. Both types of error have an impact on the CPS estimates of dropout and completion.

Sampling error

The sampling errors for national estimates in the CPS are generally within accepted range for large surveys. However, the CPS was not designed to provide estimates of small subpopulations and the sampling errors for subgroups can become rather large. For example, due to the data needs of the National Education Goals Panel, the CPS completion rates have been reported by state. Recognizing that the CPS is not designed to specifically produce reliable state estimates and thus the sample sizes for some states are quite small, NCES and the National Education Goals Panel have reported three-year averages by state (figure 5). (The *Kids Count Data Book* uses a variation on these data by reporting three-year average status dropout rates per state.) However, even with aggregating across three years of data the standard errors on the state estimates are quite large; so large that state-to-state comparisons are difficult. I have presented error bars (representing the 95 percent confidence level) along with point estimates for the state completion rates in shown in figure 5. As one can see from this figure, the confidence intervals for most states' completion rates overlap, making any distinctions among states' completion rates unreliable. For example, the difference between Mississippi's completion rate (82 percent) and Nebraska's rate (93 percent) is not statistically significant.[3]

[3] Beyond the question of statistical reliability, there is a question of the validity of these rates for evaluating states' educational systems. Because the rate uses 18- to 24-year-olds as the base, some of these young people may not have been to school in the state in which they currently reside. For example, states with a large number of out-of state college students will have a high completion rate that may have little to do with their secondary educational system. Likewise states with large numbers of migrant workers who never attended school in that state (or even this country) may have low completion rates also partially unrelated to the performance of their secondary educational system.

Figure 5—High school completion rates of 18- through 24-year-olds not currently enrolled in high school or below by state: October 1998:



SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey, October (various years).

Non-sampling error

Non-sampling error can occur when members of the target population are excluded from the sampling frame or when sampled members of the population fail to participate in the survey or some part thereof. One of the most important types of error for the discussion here is coverage error.

Coverage errors in CPS can occur for a variety of reasons. For example, CPS is based on a sample of households in which a person within the household (the reference person) is asked to provide information on other members of the household. If the list of households is incomplete (and the separate area frame also misses units) whole households can be missed. If for some reason the reference person does not give a full enumeration of their household members, or misses whole household units within their housing unit, individuals can be omitted from the survey. It is estimated that the CPS survey misses about 7 persons out of 100 because of such coverage errors (U.S. Department of Commerce, 2000). That is, the coverage ratio is about 93 percent. However, for some subgroups this ratio is much lower. Historically, black and Hispanic males have had low coverage ratios. In 1996 the coverage ratio for black males age 20 to 29 was about 66 percent—one in three were missed in the survey.

CPS uses independently derived population estimates to modify the sampling weights to adjust for the undercounting of various subpopulations. These adjustments are made within weighting cells based on age, race, and gender. To oversimplify, if black males age 20 to 29 are undercovered by 50 percent, then the first stage sampling weights for black males age 20 to 29 are doubled to properly sum to known population totals. However, this weighting will introduce bias into the estimates of dropout rates if those persons missed by CPS drop out at higher rates than do those not missed by CPS; for example, if black males age 20 to 29 drop out missed in the survey drop out at higher rates than those not missed.

While the size of this bias will never be known (you cannot interview people who are not in your survey), it is possible to make some assumptions and estimate what the *potential* bias may be. I have tried to do this in table 1 below. Using the age, gender, and race specific coverage ratios provided by the Census Bureau, I have calculated what the status and completion rates might be under different assumptions about the dropout status of those persons missed by the CPS sampling frame.

The second column of table 1 shows the status and completion rates calculated directly form the 1999 CPS. For the data in the third and fourth columns, I start with the assumption that those undercovered by the survey regardless of their age, race, and gender, are more likely to be dropouts than are others. Undercovered white males are more likely to be dropouts than covered white males etc. I do not claim to be any expert on this aspect of CPS, but from what I have read about who is likely to be undercovered, this seems like a reasonable assumption. The third column shows the status and completion rates assuming that 50 percent of those undercovered dropped out. In the fourth column, I have assumed a "worst case scenario" in which all of those

undercovered dropped out. I know that this assumption is almost certainly wrong, but it does give an upper bound to the effect of undercoverage on these rates.

Using these assumptions, adjusting for the undercoverage raises the status rate from 11 percent to 12 percent for the 50 percent scenario. The black rate rises from 13 percent to 17 percent under the worse case scenario. The undercoverage has the potential to have more of an effect on the completion rate, lowering the overall rate from 85 percent to 80 percent (using the 50 percent dropout assumption). The black rate falls from 82 percent to 73 percent. I must emphasize again however, that the assumption that 50 percent of those missed by CPS are dropouts may not be true. The truth lies somewhere between the extremes of not accounting for bias due to undercoverage and the extreme of assuming all of the undercounted dropped out.

Table 1—Status and completion rates adjusted for undercoverage: October 1999

		Assuming undercoverage[1] population has:	
	Rate	50% dropout	100% dropout
		Status rates	
Total	11.2	12.1	13.0
White, non-Hispanic	11.1	11.8	12.5
Black, non-Hispanic	13.2	15.1	17.0
Hispanic	23.7	25.9	28.1
Other	4.4	4.7	5.0
		Completion rates	
Total	85.8	80.4	74.9
White, non-Hispanic	86.2	81.4	76.7
Black, non-Hispanic	82.4	73.3	64.2
Hispanic	68.2	62.4	56.6
Other	93.6	88.2	82.8

[1]Based on undercoverage ratios by age, sex and race 1996
SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey, October 1999.

Data from the Longitudinal Studies Program

NCES' Longitudinal Studies Program has periodically surveyed high school students in an attempt to understand the dynamics of high school. Data from studies within this program, such as High School and Beyond (HS&B) and the National Education Longitudinal Study (NELS) can be used to look at dropout and completion rates by following students over time (Kaufman, McMillen, & Sweet, 1996). Rather than surveying students and asking them (or a household respondent) about their current and past enrollment patterns, the longitudinal studies survey students in one year and then follow them up at a later time to determine their actual enrollment and completion status.

NELS:88 began with an 8th-grade cohort in 1988. The surveys were administered to an average of 23 students within each of a national probability sample of 1,052 schools. The first follow-up to NELS:88 was conducted in 1990 when most of the 8th-grade cohort were enrolled in 10th grade. Questionnaires and cognitive tests were administered to each student in the first follow-up, and a separate questionnaire was administered to dropouts, one that included items specifically designed to examine the students' decision to leave school. Also, complete transcripts for each student in the sample are available.

Cohort Dropout Rates in 1990-92

Dropouts from school between the 8th and 12th grade can be defined as those students who were enrolled in the spring of their sophomore year who were not enrolled in school and had not completed school four years later. With the longitudinal data one can also calculate the proportion of 8th graders who dropped out of school *at any time* during the next four years, regardless of whether they were enrolled at the time of the survey.

About 12 percent of the 8th grade class of 1988 were dropouts in the spring of 1992 when most of their classmates were graduating from high school. About 18 percent of Hispanic and 15 percent of black 8th graders were dropouts at that time. In addition, by 1992 almost a quarter of all black and Hispanic 8th graders had dropped out at some time during the 4 years between their eighth grade and the spring of 1992.

Table 2—NELS:88 8th- to 12th-grade cohort dropout rates, by sex and race-ethnicity: 1992

Characteristics	Dropout in spring 1992	Ever dropped out 1988 to 1992
Total	11.6	17.6
Sex		
Male	11.6	17.7
Female	11.6	17.5
Race ethnicity		
Asian/Pacific Islander	7.0	7.4
Hispanic	18.3	25.8
Black, non-Hispanic	14.5	23.3
White, non-Hispanic	9.4	15.1
Native American	25.4	42.4

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of Second Follow-up Survey, 1992, unpublished data.

While table 2 above shows dropout rates by only basic demographic variables, the rich data from the longitudinal studies also allow for the examination of other characteristics of students who drop out of school—the wide range of other psychological, sociological, and economic factors that effect students' educational attainment. (McMillen & Kaufman, 1996) One can also follow-up dropouts with longitudinal data to measure the consequences of dropping out. For example, Rumberger in a paper for this conference uses NELS data to examine who drops out of school and why they drop out.

The weaknesses of the longitudinal data are that they are designed to provide national estimates of dropout and completion rates and, except for very large states, cannot provide statistically reliable state estimates. They also are very expensive and labor-intensive. Therefore they are not done very often. We have been lucky that NCES has been able to afford to support one high school longitudinal study every 10 years. Unfortunately, I do not think that the public can afford to wait ten years to see evidence of the results of educational policy.

Accuracy of Rates from NELS

Since NELS is a sample survey, it is subject to the same potential for bias due to non-response and undercoverage that CPS has. NELS is a two-stage sample survey in which schools are sampled at the first stage and students are then sampled at the second stage. Coverage and response bias in NELS can be introduced when units are excluded at either stage of the sample design. For example, at the first stage bias can occur if the list of schools that is used to make up the sample frame of NELS is incomplete. Presumably

students within schools not on the list are different in some way from those in schools on the list. (Students that are exclusively home schooled are excluded altogether). This undercoverage may affect dropout rates. The second source of error may occur when schools that are selected in the sample refuse to cooperate with the survey. While these schools are replaced in the sample with schools that are similar to them in terms of basic demographic characteristics of their students, schools that choose not to participate in the survey may be different in unknown ways with schools that participate. For example, a large public urban school with 90 percent minority enrollment that refuses to participate may be different from another large public urban school with 90 percent minority enrollment that agrees to participate. This may bias dropout rates in some unknown manner.

At the second stage of sampling, bias may be introduced due to non-response or exclusion of students *within* schools. In NELS, some students were in fact excluded from the survey by design. Students who were judged unable to complete the questionnaires due to some sort of disability or due to their limited English ability were excused from the survey (Ingels & Quinn, 1996). Assuming that these students were more likely to drop out than others, this introduces some bias into the core sample. However, NCES conducted a follow-up of the excluded students in the base year to determine their dropout status and basic demographic information. (The rates shown in table 2 above include these excluded students). Indeed, rates for excluded students were higher than other students. The 8th to 10th grade rate rose from 6.0 percent for the core sample to 6.8 percent for the sample including those originally excluded.

Common Core of Data [4]

As seen above, while the CPS and the longitudinal datasets provide national and regional estimates of dropout and completion, the sample sizes for most states are not large enough to reliably report on rates for most state education agencies. The Common Core of Data (CCD), as a universe survey has the potential to be used to provide such local estimates. The CCD, also administered by the NCES, is an annual survey of the state-level education agencies in the 50 states, the District of Columbia, and the outlying areas. Through this survey, statistical information is collected on public schools, staff, students, and finance.

There are a variety of rates that can be calculated using the CCD data (Bose and Hoffman, 1997; Winglee et al., 2000). I will talk about only a few of the more commonly used: the event dropout rate and two measures of the on-time graduation rate.

Event Dropout Rates

For the past 5 years, CCD universe collection at NCES has included a dropout component in the agency-level nonfiscal data collection. Currently, NCES, through the National Cooperative for Elementary and Secondary Statistics and the CCD collection, is working with states and school districts to develop this national database of public school dropout rates.

In the 1997-98 school year collection, 50 states, the District of Columbia, and outlying areas were asked to submit dropout data to the CCD from the 1996-97 school year. Data from 38 of these states and the District of Columbia met the quality and comparability levels necessary for publishing state-level estimates that support valid cross-state comparisons (table 2).[5] Event dropout rates among these states ranged from 2.7 percent in North Dakota and South Carolina to 11.6 percent in Louisiana.

[4] Much of the following discussion is based on text from Kaufman et al (2000) and was written in part by Lee Hoffman and Marilyn M. McMillen of the National Center for Education Statistics.

[5] Among the 38 states and District of Columbia that reported dropouts in 1996-97, 26 said that they adhered exactly to the standard definition and collection procedures (states were asked to report on an October through September cycle). However, 12 states reported on an alternative July through June cycle.

Table 2—Event dropout rates for grades 9–12, by state: 1993–94 to 1996–97

State	Event dropout rate (percent)			
	1993–94	1994–95	1995–96	1996–97
Alabama[1]	—	—	—	5.3
Alaska	—	—	—	4.9
Arizona[1]	—	—	—	10.0
Arkansas	5.3	4.9	4.1	5.0
Colorado[1]	—	—	—	6.0
Connecticut	4.9	5.0	4.8	3.9
Delaware	4.6	4.6	4.5	4.5
District of Columbia	9.6	10.6	—	—
Georgia	8.7	9.0	8.5	8.2
Idaho[1]	—	—	—	7.2
Illinois[1]	—	—	—	8.8
Iowa	3.2	3.5	3.1	2.9
Kansas	5.0	5.1	4.7	4.6
Louisiana	4.7	3.5	11.6*	11.6*
Maine	3.1	3.4	3.1	3.2
Maryland[1]	—	—	—	4.9
Massachusetts	3.7	3.6	3.3	3.4
Minnesota	5.1	5.2	5.3	5.5
Mississippi	6.1	6.4	6.2	6.0
Missouri	7.1	7.1	6.6	5.8
Montana	—	—	5.6	5.1
Nebraska	4.6	4.5	4.5	4.3
Nevada	9.8	10.3	9.6	10.2
New Jersey[1]	—	—	—	3.7
New Mexico	8.1	8.5	—	7.5
New York	4.0	4.1	3.7	3.4
North Dakota	2.7	2.5	2.5	2.7
Ohio	—	5.3	5.4	5.2
Pennsylvania	3.8	4.1	4.0	3.9
Rhode Island	4.9	4.6	4.6	4.7
South Dakota[1]	—	—	—	4.5
Tennessee[1]	—	—	—	5.1
Texas	3.7	2.7	—	3.6
Utah	—	3.6	4.4	4.5
Vermont[1]	—	—	—	5.0
Virginia[1]	—	—	—	4.6
West Virginia	—	4.2	3.8	4.1
Wisconsin[1]	—	—	—	2.7
Wyoming	—	6.7	5.7	6.2

—Data not available.

[1]For the 1996-1997 Common Core Data (CCD) collection, states were asked to report on an October through September cycle. However, this state reported on an alternative July through June cycle.

*Effective in the 1995–96 school year, Louisiana changed its dropout data collection from school-level aggregate counts reported to districts to an individual student-record system. The apparent increase in the dropout rate is partly due to the increased ability to track students.

NOTE: Among the 38 states and District of Columbia that reported dropouts in 1996-97, 26 said that they adhered exactly to the standard NCES definition and collection procedures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data, "Local Education Agency Universe Survey" (various years).

Completion and Graduation Rates

One can also calculate several completion rates with the CCD. One that has been used in the past has been the "on time" graduation rate. This rate is calculated by taking the ratio of the high school graduates in a state to the number of ninth graders three year earlier. Some states also report to NCES the number of alternative credentials that are granted each year in their jurisdiction. This allows one to calculate an on-time completion rate similar to the on-time graduation rate that includes all completers.

These ratios can be calculated by state from numbers submitted to NCES by each state. The on-time graduation rate was routinely reported in the 1970s and 1980s by the U.S. Department of Education and was a central part of Secretary Bell's "Wall Chart." This rate has also recently been reported in the annual *Kids Count Data Book* from the Annie E. Casey Foundation (NCES, 1975; Annie E. Casey Foundation, 1995).

Accuracy of rates from CCD

While the CCD is based on administrative records and is essentially a Census of public schools, it is still subject to the potential for undercoverage and non-response bias that exist in sample surveys.

Event rates

Reporting dropout statistics accurately can pose challenges for many school districts. This is not to say that education officials in the states do not make efforts to ensure that schools accurately report their students. However, resources are such that many schools cannot track all of their dropouts. While some schools may indeed engage in the "shell game" that their detractors accuse them of—moving dropouts to alternative programs and letting them slip away—many schools just did not know what happened to all of their "no shows". For example, the principal at Oak Ridge High School in California was as mystified as others were by the discrepancies in the graduation and dropout rates (79.5 percent and 2 percent respectively) (Kollers, 1998). The principal asked the school psychologist to do further research into what happened to the "missing" students. After some research they found that 388 students had left the school between the 9th grade and the 12th grade. These students broke down into:

- alternative school, 147
- district outside El Dorado County, 109
- other regular high school in the district, 61
- adult education, 43
- private school, 13
- non-graduates (students who came within a few credits of graduating), 8
- dropout, 4

- expelled, 2
- deceased, 1

Many of these students may have graduated later, many may have not (especially those that transferred into the alternative programs); however except for the identified 4 dropouts, none of these students were counted in the official dropout statistics for the school. As the principal said, "Schools are more willing to claim graduates, but nobody wants to claim dropouts'" (Kollars, 1998).

Transfer students pose a particularly difficult problem for local school districts. For example if a students is transferred to an alternative program (such as an adult or continuation high school) and the student drops out before they actually enroll in that program, it is unclear whether the LEA will report that student as a dropout or ever really know that that student is a dropout. Furthermore, with some states using local dropout rates in accountability measures, some commentators have speculated that schools and LEAs have an incentive to minimize the number of dropouts in their schools.

In recognition of how hard it is for schools to accurately transfer students and therefore accurately report on dropouts in the state, California is instituting an electronic tracking system for their high school students. The California School Information Services program (CISI) will allow for the electronic transfer of student records within the state. The hope is that dropout statistics generated from CISI will be more accurate than current statistics.

Several states have such systems to track students using individual identification numbers. Florida, Texas, and Louisiana are three such states. However, most of these systems are not sophisticated enough to track students who leave the state, let alone leave the country. Furthermore, while the most sophisticated systems can locate up to 90 percent of all students in a state, this is about the same coverage rate as the CPS and we have seen above that such undercoverage has the potential for large bias in estimates. Also, these administrative record systems do not weight for undercoverage as so sample surveys.

Completion rates

While not as reliant on tracking students as is event rates, both the on-time graduation and on-time completion rates also have some well-documented flaws (Pallas, 1990). The problems involve:

- How to count students in ungraded or special education programs, who might be counted by the state as graduates or completers, but not as 9th graders; and

- How to account for out-migration or immigration in a state over the three years.

While attempts were made to adjust the denominator of the on-time graduation rate for ungraded and special education students, this adjustment was imperfect, especially

when attempting to create a time series that would allow for state-by state comparisons over time. No good adjustments were available to adjust for net out-migration in the numerator or the denominator.

Due to these problems and the potential for misinterpreting the data, NCES no longer publishes this rate—although some of the components to the rate are published in CCD reports (NCES, 2000).[6]

[6] A recent publication from NCES recommends yet another graduation rate based on the CCD (Winglee et al, 2000). This rate is based on estimates of dropouts reported above in table 2. However, this rate has not been widely adopted and will not be discussed here.

Comparison of Rates

As mentioned above, one of the problems with discussing high school and completion dropout rates is the seemingly inconsistent and often conflicting rates reported. Indeed, each of the various sources of data that have been considered in this paper has yielded different estimates of "the" dropout and completion rate. Part of these discrepancies is due to differences in the target populations and the data collection methods of the various data sources. To summarize these differences, table 5 below shows each of the major data sources of national considered above.

Table 5—Comparison of data sources for national dropout statistics

Data source	Collection method	Target population	Data type
Current population Survey	Household sample survey	Civilian non-institutionalized population	Age cohort; 16 to 24 for status rate; 15 to 24 for event rate
National Education Longitudinal Study	School-based individual survey	Public and private school students	Grade cohort: 8th grade cohort of 1988; 10th grade cohort of 1990
Common Core of Data	Census of administrative records	Public schools and districts	Artificial grade cohort

There are some noteworthy differences in dropout collection procedures between CCD, CPS and the NELS. The CCD dropout rate represents the number of students who have dropped out over the total number of students enrolled in the state. This differs from the CPS and NELS dropout counts in a few ways. First, the CCD represents a state's public school dropout counts. The CPS and NELS counts include students who were enrolled in either public or private schools. The second difference between CPS, NELS, and CCD dropout collection procedures is that the CCD collection includes dropouts in grades 7 through 12 versus only grades 10 through 12 in the CPS (although CCD event rates are reported for grades 9 through 12) and 8th through 12th for NELS. One other difference in the CCD collection is that it counts anyone receiving a GED outside of a

regular (approved) secondary education program as a dropout. This is different from CPS and NELS.

Given these and other differences in methods and target populations, it is not surprising that these data sources should produce different estimates of high school dropout rates. Different methods with different populations produce different results. However, it is possible to adjust the CPS rates to approximate the age range and time span of the other data sources. Thus, rather than using the standard 16 to 24, or 15 to 24 year olds groups, one can restrict the data to a age group that mimics the grade cohort in NELS and CCD. That is, assuming that most 9th graders are 14 or 15 years old and most 8th graders are 13 or 14 years old, one can restrict the CPS samples to these age groups and the compare the rates across data sets. What one loses is, of course, statistical reliability. The sample sizes in CPS are so small that the estimates based on only two years of age would be too unstable for regular publication. However, in the present context they allow us to make reasonable comparisons of rates across data sources.

Such rates from the three data sources are shown in table 6 below. For comparison purposes I have shown the data from each data source that comes closest to 1992. For the CPS data, I have used a three-year average to increase the statistical reliability of the estimates. Therefore, the time period for CPS is the three year average from October 1992 to October 1994. NELS rates are for the spring of 1992. CCD rates are for the 1993-94 school year (the first year that I have dropout data from the CCD). I have also shown not only the national estimates, but also the estimates for one large state (Texas). I use Texas because it is has a relatively large population and it is in every one of the data sources cited here (California, another large state, is not in the CCD dropout collection).

The first line in table shows the status rate for those 17 through 19 years old in 1994. This rate represents the proportion of those in that age group that were dropouts in October of 1993. This rate corresponds very roughly with the NELS 8th to 12th grade dropout rate. The NELS rate represents the proportion of 8th graders in 1988 that were dropouts in the spring of 1994 (when most were 17 to 19 years old). Again, these rates are only roughly comparable and the alert reader should be able to develop a long list of differences in these two estimates. (One significant difference is that the CPS estimate includes all young adults regardless of whether they were ever enrolled in U.S. schools.) However, despite these potential biases, it is noteworthy that both data sources result in similar rates—for both the nation and for Texas. About 12 percent of all 17 through 19 year olds were dropouts in 1993 according to CPS and about the same percentage of the 8th grade class of 1988 were dropouts in the spring of 1992.

The second line in table 6 presents the event rate for 15 to 19 year olds for the nation and Texas. This rate represents the proportion of persons in this age group who dropped out of grade 10 though 12 between October 1992 and October 1994. Conceptually this rate is closest to the CCD dropout rate which purports to measure the proportion of 9th though 12th graders who dropped out in the 1993-94 school year. While there is no national rate from CCD, the rate for Texas from CCD is substantially lower than the estimate from CPS (the CCD estimate is also beyond the 95 percent confidence bands for the CPS estimate).

The third line in table 6 represent an approximation of a cohort rate for dropping out of school between the 10th and 12th grades. Since the CPS data does not supply the data to do an actual cohort rate, I use estimates of dropouts and returnees from 1993, 1994 and 1995 to estimate this rate. It uses the following formula:

$$CPS(cohort) = \frac{\#dropouts_{y1} - \#returnees_{y2} + \#dropouts_{y2} - \#returnees_{y3} + \#dropouts_{y1}}{average(\#enrolled_{y1+y2+y3})}$$

This is a very rough estimate of a cohort rate from CPS and I use it here purely for illustrative purposes. One can see from table 6 though, that even given the coarseness of the CPS rate, the CPS cohort measure and the NELS measure give similar estimates of the national 10th to 12th grade dropout rate in 1992 but the NELS rate for Texas is lower than the rate from CPS. However, given the ad hoc nature of how the CPS cohort rate was calculated, this may be just a statistical fluke. Estimating the cohort rate CPS in a different manner (there are a variety of ways one may have chosen to do this) may have produced different results.

The 4th line of data shows an estimate from CPS of the proportion of 19- to 20-year olds that have graduated high school with a diploma. I have also restricted the sample to just native born young people. I did this to approximate the sample of students in NELS and the CCD. The 8th line of data shows the on-time graduation rate for the 8th grade class of 1988 from NELS. (Graduation defined as receiving a diploma, not a GED based equivalency certificate). The estimate of 76 percent is within the confidence bands of the CPS estimate of 74 percent. Furthermore, both the NELS measure and the CPS measure is roughly analogous to the "on-time" graduation statistic calculated from the CCD (71 percent). Again, the three estimates give similar results, although the rate based on CPS and NELS is slightly greater. This difference may reflect simple sampling error, or it may reflect that fact that the NELS survey followed students across time—even if they moved out of state and the CPS captures 19 and 20 year olds in their current residence.

The 9th line of table 6 shows the graduation rate for the 8th grade class of 1988 in 1994—two years after their "normal" graduation. An additional 5 percent had graduated with a diploma in those two years. Line 5 in table 6 uses the CPS data to try and replicate this later graduation rate. I use 20 to 22 year olds as a surrogate sample of high school cohort 2 years after their "normal" graduation date. Again, the estimate from CPS is lower than the rate from NELS.

Table 6—Comparison of dropout and completion rates from CPS, NELS, and CCD: 1992

	National		Texas	
	Rate	SE	Rate	SE
CPS (3-year average 1992-94)				
Status *(17 through 19 year olds)*	12.1	0.29	15.3	0.99
Event *(10th through 12th; 15 through 19 year olds)*	4.8	0.21	6.7	0.89
Cohort rate				
10th to 12th	6.9	0.50	10.4	0.19
On time graduation (native-born 19 to 20 year olds)	73.5	0.55	64.8	2.17
Graduation rate (native-born 20 to 22 year olds)	76.9	0.55	73.5	1.89
NELS (1992)				
10th to 12th	6.8	0.35	7.7	1.21
8th to 12th	11.6	0.47	15.1	2.25
On time graduation	76.2	0.77	68.7	2.94
Graduation rate (1994)	81.5	0.71	75.1	3.05
CCD (1993-94)				
On-time graduation (9th to 12th)	70.6	†	59.7	†
100 minus on-time graduation	29.4	†	40.3	†
Dropout (9th through 12th)	‡		4.3	†

† Not applicable.

‡ Not available.

Discussion

What can one draw from these comparisons? One conclusion is that the various datasets give approximately similar answers when asked similar questions. That is, differences in published dropout and completion rates from these data sources are due more to differences in definitions and target populations than to differences in their methods. This does not mean that all of these sources do not have serious flaws in their methods. For example, NELS and CPS may both have serious coverage problems in their realized samples. Minority students and schools may be so seriously under-represented in their sampling frames that it leads to large systematic bias in both surveys. Nevertheless, they do yield similar results—or at least results that are gerneally within sampling error of one another.

The exception to this general rule of correspondence among data sources is the dropout data generated by the CCD. In terms of Texas rates, compared to the CPS estimates, the CCD dropout numbers appear to underestimate the proportion of students dropping out in 1994. While it may be that the CPS data are overestimates and the CCD data are closer to reality, the fact that other CPS estimates appear to be consistent with NELS estimates argue in favor of the CPS estimates.

Another lesson one can draw from table 6, is that no matter how one measures dropout and completion rates, with present survey data, there is a great deal of sampling error associated with the estimates. Error is fairly large at the national level and very large at the state level (even after using three year averages). Large apparent differences are not statistically reliable.

Therefore while most of the datasets point in a single direction, none of them can reliably give precise answers to some rather basic questions about school dropouts and completers beyond rather broad "ballpark" answers. Certainly, none give the kind of detail that policy-maker need to track the impact of current reforms on high school completion rates. For example, using the CPS one would have to have an increase of 2 percentage points at the national level to conclude that there was a statistically significant change in graduation rates from one year to the next.[7] Even for relatively large states like Texas, it would take almost a 10 percentage point change in the graduation rate from year to year to conclude that this change was "real" and not just due to sampling error.

[7] The standard errors for single year rates are about double the size of the standard errors for the three year averages shown in table 6.

Conclusions and Recommendations

The relatively limited resources that go into the collection of high school completion and dropout data at the federal level produce data provide more heat than light on some rather basic questions on high school completion—how many students drop out in any given year and how many students complete high school.

As shown above, completion and dropout rates can vary dramatically depending on the data source. Because of these factors, reported rates differ significantly from one anther and are not easily "translatable" into one another. This may lead to the appearance that they give different answers and make it difficult to policy makers to sort out the magnitude of the dropout "problem".

The confusion of policy makers is even more acute when people misinterpret the data by failing to acknowledge the underlying assumptions of each statistic. For example, as seen above, NELS and CCD give approximately the same answers to the question of what proportion of young people graduate "on-time". However, as we have also seen, reporting that 70 percent of 9th graders graduated "on time" does not mean that 30 percent dropped out. Too often, the 30 percent number is what seeps into the political discourse.

Clearly more accurate and timely data on high school completion are needed. I have several recommendations along these lines.

The American Community Survey

The Census Bureau is in the process of field-testing a new sample survey that may overcome some of the weaknesses of current federal data collection efforts. The American Community Survey (ACS) is based on the idea of continuous measurement of the U.S. population. When fully implemented in 2003, the ACS will survey a separate and independent sample of households in the United States each month. Using mail-back methods as well as Computer Assisted Telephone Interviewing (CATI) and Computer Assisted Personal Interviewing (CAPI) the ACS will provide information on an annual sample of three million housing units (CPS has a monthly sample of about 55 thousand households). Rolling up data over 12 months will allow statistically reliable estimates of the population characteristics of the nation, each state, and towns and cities of 65,000 or more.

Providing that the appropriate items are on the final version of the ACS, one could then get comparable data on high school completion and dropout from all of the states

and from most towns and cities.[8] The ACS may provide accurate and timely statistics on that we could use to monitor the success of our educational system.

However, like the CPS, the ACS would provide only simple statistics of the number of students who complete and drop out or school. Given that it is a household survey and not an individual interview, it is unrealistic to think that it will provide much detail on the school, community or family experiences that contributed to an individual's persistence and attainment in school. We may know how many students drop out of school in any one year, but will not know what led to their dropping out. We could try to infer from other educational or societal trends why drop out rates go up or down over time, but we will have no direct knowledge of why more kids are dropping out of school than were five year ago.

Longitudinal Studies

The best way to provide that kind of contextual information is with longitudinal studies—studies that follow an actual cohort of students for some period of time. As seen above, NELS provided a great deal of information on why students dropped out of school in the early 1990s. Besides merely asking dropouts why they dropped out of school, NELS also has a great deal of contextual data on the prior in-school experiences of dropouts. While cross-sectional surveys could ask individuals about their reasons for dropping out, retrospective responses in a cross-sectionals survey can be inaccurate or biases in some unknown way. For example, it would be difficult for cross sectional surveys to rely on retrospective answers to questions about prior achievement levels or attitudes about schools. These responses may be colored by the respondent's present situation or opinions about school.

Hence, longitudinal studies are the only way to provide the contextual information that begins to make sense of the reported dropout and completion rates from CPS or ACS. Fortunately, on the national level, a new longitudinal study has just begun which will provide information on the context of dropping out of school in the early 2000s. The Educational Longitudinal Study of 2002 (ELS:02) will start surveying a new 10^{th} grade cohort in 2002 and will follow-up them two years later in 2004. While ELS is a general-purpose survey and not targeted specifically at dropouts, in 2004 we will be able to compare the dropout rates of the 10^{th} grade classes of 1980, 1990, and 2002. We will also know a little about the antecedents of these students dropping out.

Unfortunately, these large national longitudinal studies are very expensive to conduct—several million dollars for one cohort followed for just two years. Because of the cost, they are only done every ten years or so. However, it may be possible to conduct smaller scale longitudinal studies that just target issues of high school completion and dropping out. That is, unlike the general purpose surveys like HS&B, NELS, and ELS one may be able to design a survey that would focus solely on this issue at a much lower overall cost—thus allowing one to do them more often. One possibility would be to

[8] The form of the final ACS questionnaire is still under review.

attach a longitudinal component to the National Assessment of Education Progress. That is, survey a subset of the sample of students assessed in the 4th, 8th and 12th grades and follow them up in a year or two. If this were done every couple of years, data would be available in a timely manner that would give context to the ongoing collection of dropout statistics from the ACS or CPS.

This approach could also be done within the states. Most states assess their students each year. It may be feasible to sample some portion of those students each year and follow them up the following year. Like the national longitudinal studies, these follow-ups would track individual students to wherever they may have moved during the year. For example, students who move out of state would still be part of this longitudinal follow-up.

Several states are now developing individual student record systems that purport to track students over time (some use social security numbers to merge the secondary school records with unemployment insurance data systems or college and university data systems.) These systems are seen as the "silver bullet" of dropout completion statistics—a way for states to once and for all be able to account for each of their students. However, even these systems will not be perfect and some students will still be "no show" and no one will be able to know for sure where they are. Until there is a national system to track students by a common identification number, students will still transfer from state to state—and highly mobile students will still be more likely to drop out and be more likely to be missed by official statistics.

Furthermore, not all students will have "good" social security numbers or student identification numbers. That is, some number of IDs will have been input incorrectly or will be wrong for any number of reasons. These numbers will result in poor or inaccurate matches with other data sources resulting in lost students. Even if states can match 80 to 90 percent of their students, a significant portion of students will be lost to the system. Those lost may be different in some way than those who are not, thus introducing some unknown bias into the remaining data. In survey research, such non-response would be partially addressed by adjusting the sample weights for non-response. I am not aware of any student data system that tries to adjust for this "non-response".

Conclusions

Unfortunately, while a great deal of time and resources are being devoted to measuring one educational outcome—the academic achievement of students in school—less is being devoted to measuring the complementary outcome—how many students complete high school. For example, the Federal government spends over $40 million on the National Assessment of Educational Progress. It probably spends less than $1 million on dropout statistics.[9] The states probably spend sums proportionate to the Federal dollars on their own dropout and assessment statistics.

[9] It is difficult to calculate exactly how much the Federal government spends on dropout statistics since the collection of these data are imbedded in other data collection efforts (like the CCD and the CPS).

This seems out of balance. If we as a nation are committed to providing a quality education to all of our students, we must assess how much students in our schools learn. However, it is important not only to understand how students are doing on a particular test, but also where specific improvements in achievement occur and where weaknesses still exist. Thus, most assessments provide sub-scale scores and even item analysis so that educators and parents can understand the raw test scores of their students. Through ongoing national and state efforts we as a nation are doing a great deal in the testing and assessment area.

However, as important as the measurement of academic achievement may be, we must make as much effort to measure how many students complete school. Without knowing how many students drop out of school we cannot properly interpret any assessment data. But, as with testing data, it is not enough to just report the raw number, but we must work to look behind the numbers. We must make as much effort to understand the raw completion numbers that we monitor.

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