Counting Virginia's High School Dropouts:

Understanding the New Methods & The Bigger Numbers

By Michael A. Spar

March 2009

NUMBERS COUNT

Analysis of Virginia Population

In March 2009, the Virginia Department of Education (VDOE) will report new high school dropout statistics for the state overall and for each school division. The state report will identify, for the first time, the number of dropouts over four years from a cohort (in this case, the class of students who entered high school for the first time in 2004), rather than the total number of students dropping out in one year. The new way of calculating the dropout rate, when compared with results of the prior approach, will make the rate appear more than four times higher in 2008 than in years past – and that is not the case. The new dropout rates will provide a picture of how many students from a single class of students drop out before graduating.

To promote understanding of the new data, and why Virginia is changing the way it calculates dropout rates, this report describes:

1. Pertinent national and state trends in promoting education accountability;
2. The new cohort dropout rate, what it is, and how it differs from the single-year dropout measure;
3. Sample results using the two approaches; and
4. Issues about cohort dropout rates and on-time graduation rates.

WHY CHANGE THE WAY WE CALCULATE DROPOUT RATES?

The primary reasons Virginia is changing the method for calculating dropout rates are:

1. To measure dropout rates in a way consistent with the public perception of a dropout, that is, a student who enters high school as a freshman and is not enrolled consistently until completing the requirements for graduation (unless under specially approved circumstances);
2. To employ methods that tell the story of a group of students over four years of high school rather than taking a snapshot of several grades of students in a single year;
3. To use a consistent approach to measuring both dropout and graduation rates;
4. To develop data that will allow comparisons between Virginia's performance and other states, and the nation.

NATIONAL AND STATE TRENDS IN EDUCATON ACCOUNTABILITY

State and national efforts to improve school effectiveness, as measured by graduation and dropout rates, have gained significant momentum in the past ten years.

2002 Introducing and defining adequate yearly progress – No Child Left Behind

In 2002, Congress enacted sweeping changes to K-12 education when it passed the No Child Left Behind Act of 2001. The Act required states to show adequate yearly progress in a number of different areas, including dropout and graduation rates. The Act specified that single-year dropout rates should be used as a basis for measuring dropouts, but defined graduation rates as "the percentage of students who graduate from secondary school with a regular diploma in the standard number of years"—a definition that required tracking students over time and strongly implied the use of a cohort graduation rate.

States made strategic decisions about how to implement these requirements. Dropout statistics, for example, were managed by using different definitions of a dropout. Students completing a GED (General Education Development) were considered dropouts by some states, but not by others.

The situation was far worse for measuring high school graduates, since no state could calculate a cohort graduation rate, lacking the basic student-level tracking system required for the job. States were forced to pick and choose between alternate methods for estimating on-time graduation rates, resulting in little comparability between the states on their most basic education measures—who counts as a graduate and who doesn't.

2005 Seeking consistency among the states – the National Governors Association

The issue of how to calculate graduation rates was taken up by the National Governors Association. In 2005, all fifty governors signed the association's Graduation Rate Compact. This committed the governors to establishing student-based data management systems within their states and implement-

ing a common and consistent method for measuring on-time high school graduates. Results from these actions are now beginning to come in, as some states, school divisions, and individual schools have accumulated the required four years worth of student tracking data to produce on-time graduation rates. The National Governors Association did not, however, specify the use of a cohort dropout rate.

2007 Proposing national data standards – Every Student Counts

In July 2007, Representative Bobby Scott of Virginia introduced H.R. 2955, a bill "to improve the calculation, reporting, and accountability for graduation rates." This Bill is also known as the Every Student Counts Act.[1] Language in the Act referred to the fact that, despite the National Governors Association Compact, only 16 states had the required longitudinal data system necessary to calculate the recommended on-time graduation rate. (Virginia published its first set of on-time high school graduation rates in the fall of 2008). A similar bill in the Senate, sponsored by Senator Harkin, has been under consideration as recently as fall 2008.

The Every Student Counts Act specified the critical elements of both a four– and five–year adjusted cohort graduation rate. It included definitions for the terms "transfers in," "transfers out," and "cohort removal." In addition, some special circumstances that require mathematical adjustments to the rates were noted, such as exceptions for students with significant cognitive disabilities.

2007 Virginia initiatives

The 2007 Virginia General Assembly directed the Board of Education to study high school dropout and graduation rates, and recommend appropriate policy, statutory, fiscal, or regulatory changes to increase the high school graduation rates of student populations with high dropout rates. The Board of Education and the Department of Education submitted their report in October, 2007,[2] noting that national experts have recommended that state departments of education report cohort dropout rates for each group of students who enter the ninth grade. This calculation requires four years of student-level data, available for Virginia's public school students for the first time in the fall of 2008.

The Virginia Department of Education released the first set of on-time cohort graduation rates in late 2008. This is consistent with the final regulations for Title I of the No Child Left Behind Act. The regulations, released in October 2008, required all states to use the same method to calculate a cohort graduation rate. In addition, in Virginia, the initial set of cohort dropout rates will be released in early 2009.

COHORT AND SINGLE-YEAR DROPOUT RATES

Before demonstrating the difference between the single-year and cohort dropout rates, two basic concepts must be defined: dropouts, and cohorts.

Definition: dropout

The Virginia Department of Education defines a dropout as a student who:

1. Was enrolled in school at some time during the previous school year; and
2. Was not enrolled at the beginning of the current school year; and
3. Did not graduate from high school or complete a state or division–approved education program; and,
4. Does not meet any of the following exclusionary conditions:
   a. Transferred to another public school division, private school, or state/division–approved education program; or
   b. Left the country; or
   c. Is temporarily absent due to illness, suspension, or enrollment in a school–approved alternate education program; or
   d. Died.

This definition conforms to guidelines from the National Center for Education Statistics and is used throughout the United States. Both single-year and cohort dropout rates use this definition of a dropout.

Definition: cohort

A cohort is a group of individuals (students, in this case) who "experience the same significant demographic event (such as beginning the ninth grade) during a specified brief period of time ... and who may be identified as a group at successive later dates (graduation day) on the basis of this common demographic experience."[3]

Ninth Grade Cohorts

Grade	School Year				
	2002-03	**2003-04**	**2004-05**	**2005-06**	**2006-07**
9th	C02-03	C03-04			
10th		C02-03	C03-04		
11th			C02-03	C03-04	
12th				C02-03	C03-04

The figure above tracks two different ninth grade cohorts. The earlier cohort starts in September 2002 and finishes

high school in May 2006. The second cohort begins the ninth grade a year later, in Fall 2003, and graduates in four years at the end of the 2006-07 school year.

Taking these definitions, dropout rates can be calculated as defined and demonstrated in the panel to the right.

COMPARING THE TWO APPROACHES

Why do the methods produce such different numbers?

Both rates measure dropouts, but in different ways:

1. The single-year rate is cross-sectional, measuring all dropouts (from all four grades) in one year. The cohort dropout rate is longitudinal, following one class from the ninth grade through the end of high school.
2. To calculate either dropout rate, the total number of students dropping out is divided by the total number of students in that population – and this produces the large differences in the results. The denominator for the single-year dropout rate is the total membership of four grades, while the denominator for the cohort rate is the membership of one grade—the ninth grade—with adjustments for transfers and deaths. The single-year rate's larger denominator produces a smaller dropout rate while the cohort rate's numerically smaller denominator produces a larger dropout rate.

Both measures are legitimate. The single-year rate takes a snapshot at one point in time (that is, in a given year) of the number of dropouts among high school students in all four grades, while the cohort rate focus is on the dropout story over four years for a single entering ninth grade class.

COMPARING RESULTS FOR THE TWO METHODS

Cohort dropout rates for the class graduating in 2005-06[4] can be compared to single-year dropout rates for 2005-06 in order to illustrate differences between the two methods. Note that:

- Due to the lack of access to individual-level student data, these cohort dropout rates are based on published aggregate data. VDOE's cohort rates are based on individual-level student data, which will produce more accurate results.
- The estimated cohort dropout rates in this example are for the class graduating in 2005-06, whereas the rates VDOE will be releasing soon will be for the class graduating in 2007-08.
- These estimates are illustrative only. For official cohort dropout rates, please refer to VDOE's numbers.

UNDERSTANDING THE NEW MATH

How to calculate the single-year dropout rate

This rate is defined as the total number of dropouts (adding up the dropouts from grades 9-12) in the school year (here 2005-06), divided by total student membership in grades 9-12 in the same year, as shown below.

Single-year dropout rate = [(number of dropouts in grades 9-12 during year)/ (total membership in grades 9-12 for the same year)]*100

or mathematically as:

$$SYDR^{2005-06} = \left[\frac{D_9^{2005-06} + D_{10}^{2005-06} + D_{11}^{2005-06} + D_{12}^{2005-06}}{M_9^{2005-06} + M_{10}^{2005-06} + M_{11}^{2005-06} + M_{12}^{2005-06}}\right] * 100$$

where:

SYDR = single-year dropout rate,

D = the number of students dropping out from each grade in a given year, and

M = total membership in each grade in a given year.

How to calculate the cohort dropout rate

This rate is defined as the number of dropouts from a single cohort of students over the four years they are in high school. The number of dropouts from this cohort as it moves from the 9th through the 12th grade is added together (and becomes the numerator of the equation). The total number of dropouts from this group over four years is divided by the total number of students starting in the ninth grade, after adding in the number of students who transfer into the cohort after the ninth grade, and subtracting the number of students who transfer out of the cohort or die.

Cohort dropout rate = [(number of dropouts in 4 years for a given cohort) / (number of 9th grade students at the beginning of the cohort + in-transfers in 4 years – out-transfers in 4 years – deaths in 4 years)] * 100

or mathematically as:

$$CDR^{2005-06} = \left[\frac{D_9^{2002-03} + D_{10}^{2003-04} + D_{11}^{2004-05} + D_{12}^{2005-06}}{FTM_9^{2002-03} + IT - (OT + DTH)}\right] * 100$$

where:

CDR = cohort dropout rate,

D = the number of students dropping out in each grade,

FTM = the number of first-time ninth grade students,

IT = number of students transferring into the cohort between the beginning of the ninth grade and the end of the twelfth grade,

OT = number of students transferring out of the cohort between the beginning of the ninth grade and the end of the twelfth grade,

DTH = the number of students dying between the beginning of the ninth grade and the end of the twelfth grade.

The statewide cohort dropout rate was 11.9 percent, which means that for every 100 students starting the 9th grade, 12 dropped out before the end of high school. The single-year rate (2.7 percent) means that about 3 out of every 100 students in grades 9-12 dropped out during the 2005-06 school year.

The following table shows cohort and single-year dropout rates for the state and for several large school divisions, as an example to illustrate the different values of the two rates. Individual student data required for calculating the cohort dropout rates were not available when these numbers were calculated. Instead, aggregate student data were used in calculating the cohort dropout rates. While this is less than ideal, the aggregate data should generate similar results.

Estimated Cohort and Single-Year Dropout Rates, Virginia and Selected Large School Divisions, 2005-06

School Division	Estimated-Cohort Dropout Rate (%)	Single-Year Dropout Rate (%)
State of Virginia	11.9	2.7
Chesapeake	12.1	2.8
Chesterfield	9.5	2.6
Fairfax	13.8	2.3
Hampton	10.1	3.6
Henrico	13.3	4.3
Loudoun	5.5	1.3
Norfolk	11.7	2.5
Prince William	13.8	4.2
Virginia Beach	9.7	1.8

COHORT DROPOUT AND COHORT GRADUATION RATES

Cohort dropout and graduation rates are similar, in that they both involve tracking a group of high school students for four years. Even though they measure opposite educational results—graduation and dropping out—the two rates have the same denominator, which represents the initial class of ninth grade students. There is a widespread misconception that adding the cohort dropout and on-time graduation rates together equals one-hundred percent of all students. There are a number of reasons why this is not true; and the two rates, when added together, will not equal 100 percent:

- The cohort graduation rate measures "on-time" graduation, and only includes students who graduate in four or fewer years. Students who take longer than four years are excluded from the calculation; however, these students are not considered dropouts.
- The on-time graduation rate only includes students receiving a diploma. Students who earn a certificate of completion or receive a GED are excluded from the calculation; however, they are not considered dropouts.

CONCLUSION

Virginia's new cohort dropout rate has several advantages over the single-year rate:

1. The cohort dropout rate more accurately monitors students' event history (in or out of school) by tracking individual data throughout the four year period;
2. The cohort dropout rate is a more intuitive measure and more closely matches public understanding of the term "dropouts;" and
3. The cohort dropout rate is consistent with the now established on-time cohort graduation rate.

NOTES:

1 See H. R. 2955, the Every Student Counts Act, at: http://www.opencongress.org/bill/110-h2955/show

2 "Study of High School Dropout and Graduation Rates in the Commonwealth" (SJR329), submitted by the Virginia Board of Education to Governor Timothy M. Kaine and the Virginia General Assembly, October 18, 2007.

3 Shryock, Henry S., Jacob S. Siegel and Associates, "The Methods and Materials of Demography." U.S. Government Printing Office, Washington, D.C., 1973, page 712.

4 Spar, Michael and Qian Cai, "A Preliminary Analysis of Cohort Dropout Rates For Virginia School Divisions," at: http://www.coopercenter.org/demographics/site-files/documents/pdfs/techpapers/coopercenter_dropouts_2008.pd

For more information, please contact Michael A. Spar, Demographics & Workforce Group, Weldon Cooper Center for Public Service, University of Virginia at 804-371-0202 or by email at mspar@virginia.edu.