

NCLB's Graduation Rate Formula, An Unfolding Problem

The US Department of Education's NCLB web site now has some of the *Consolidated State Application Accountability Workbook* responses from the five states that have won initial approval for their programs to comply with this new education law. Critical to this discussion is each state's response to question 7.1 in the Workbook: "What is the State definition for the public high school graduation rate?"

Using real data from the State of Kentucky, I was dismayed to discover a huge variation in the four state formulas that were clearly described. The fifth description, for Colorado, was not discussed in enough detail in the Workbook to confidently create a calculation.

My conclusion after reviewing the five posted states' responses: no standard what-so-ever is being applied to the approval of state graduation rate formulas! As will be shown, the results of this uncontrolled situation will be totally incompatible graduation rates from state to state. The law, which is actually fairly detailed on this point, is being virtually ignored.

Perhaps of the greatest importance, it is clear that some of the calculations create implausibly high graduation rates. Based on the real conditions in Kentucky, no-one would claim a graduation rate of much more than 70 percent, but some of the results shown below return rates for Kentucky, using real Kentucky data for the Class of 2001, that are over 10 points higher. And, one of the calculations would return a rate below 64 percent. That is an incredibly large, and absolutely unacceptable variation.

Text From The Five States' Approved Workbooks

Here are the five states' Workbook answers, cut and pasted directly from the NCLB web site:

Note: Basic Web Site URL is <http://www.ed.gov/offices/OESE/esea/>

Massachusetts' Proposed Formula:

Graduates (with regular diploma) who completed high school in four years

Divided by

[# Graduates (same as above) + # of 9th grade dropouts/retentions + # 10th grade dropouts/retentions + # 11th grade dropouts/retentions + # 12th grade dropouts/retentions + # students who complete 12th grade without a regular diploma]

http://www.ed.gov/offices/OESE/CFP/csas/macsa.doc - 866304 bytes - Fri Jan 10 09:40:01 EST 2003

Ohio's Proposed Formula:

$$\text{Graduation Rate} = \frac{\text{\# of FY2002 Graduates + Summer 2002 Graduates (Reported in FY2003K)}}{\text{(\# of FY2002 Graduates + \# of Grade 9 dropouts in FY1999 + \# of Grade 10 Dropouts in FY2000 + \# of Grade 11 Dropouts in FY2001 + \# of Grade 12 Dropouts in FY2002 + Summer 2002 Graduates (Reported in FY2003K))}} \times 100$$

http://www.ed.gov/offices/OESE/CFP/csas/ohcsa.doc - 980480 bytes - Fri Jan 10 09:40:01 EST 2003

Indiana Comments (Assumed Formula Discussed in Next Section):

The current state definition is prescribed by State Board of Education rule 511 IAC 6.1-1-1. It is an NCES “survival model” that defines graduation rate as the product of the survival rates (1 minus the dropout rate) for each of the four grades in a high school. Indiana awards only a standard diploma. Special education students who are not working toward a diploma may receive a certificate if they complete the program specified in their IEP. Students who complete course requirements but do not complete the Graduation Qualifying Examination requirement may receive a different certificate. Neither of these certificates constitutes a diploma. Students who receive these certificates are not counted as graduates.

The Indiana Department of Education is pilot testing a new definition as required by House Enrolled Act 1971 of 2001. The definition includes a four-year completion rate, with GED recipients not included as graduates. Use of this definition is possible because of the implementation of the Student Test Number system.

http://www.ed.gov/offices/OESE/CFP/csas/incsa.doc - 349184 bytes - Fri Jan 10 09:40:01 EST 2003

New York

New York’s graduation rate adheres to the requirements of Section 200.19 of the regulations and is based upon the percentage of students, measured from the beginning of high school, who graduate from high school with a regular diploma within four years. (See below for an exception related to schools that offer a high school diploma and additional certification.) In addition, New York also holds schools accountable for students who transfer into a school after the beginning of high school.

To determine the percentage of students in a school or LEA who have graduated with a regular diploma in the standard number of years, we will use as the denominator (beginning with the students who first entered ninth grade in the 2003–04 school year, July 31–June 30) the count of students who meet Condition 1 and either Condition 2 or Condition 3 below:

1. enrolled in ninth grade (anywhere) for the first time in a particular year (year 1) or, for ungraded students with disabilities, attained age 17 during that school year, AND
2. were enrolled in the school or LEA on the first Wednesday of October* in year 1 and did not transfer to another program leading to a high school diploma, OR

3. transferred into the school or LEA after the first Wednesday of October* in year 1 and were continuously enrolled in the school or district for a period of five months (excluding July and August), except that students who first enrolled in the school after the first Wednesday in October of year 4 will not be included in the denominator.

The graduation rate will be the percentage of these students who earned a regular high school diploma no later than the end of year 4. An exception will be made for high schools where a majority of students participate in a State-approved five-year program that results in the receipt of certification in a career or technology field in addition to a high school diploma. For those schools, the graduation rate will be the percentage of those students defined in Conditions 1 and 2 who earned a regular high school diploma no later than the end of year 5. The public high school graduation rate will be used pursuant to §1111(b)(2)(1) of the No Child Left Behind Act.

<http://www.ed.gov/offices/OESE/CFP/csas/nycsa.doc> - 387072 bytes - Fri Jan 10 09:40:01 EST 2003

Colorado

Graduation rates are calculated based upon high school graduates only. A graduate is a student who completes locally developed graduation requirements. If a student is not considered a graduate by the local board of education, then that student is not included in the graduation rate calculation.

Colorado's definition of graduation rate includes only those students who receive diplomas within the standard number of years. The graduation rate is a cumulative or longitudinal rate that calculates the number of students who actually graduate as a percent of those who were in membership and could have graduated over a four-year period from grades 9-12.

The definition does not allow for the inclusion of dropouts and does not allow the use of transfer to avoid counting a student as a dropout.

In addition, one of the accreditation indicators is dropout rate. Therefore, Colorado's accountability system holds schools and districts strictly accountable for the proper reporting of graduates and dropouts.

Evidence of compliance was submitted to the Peer Reviewers on December 17, 2002.

<http://www.ed.gov/offices/OESE/CFP/csas/cocsa.doc>

(end cut and paste quotes)

Here is what NCLB says (GPO on-line version in the section (2) ACCOUNTABILITY):

“(vi) in accordance with subparagraph (D), **includes graduation rates for public secondary school students (defined as the percentage of students who graduate from secondary school with a regular diploma in the standard number of years)** and at least one other academic indicator, as determined by the State for all public elementary school students;

Brief comments on these very different formulas.

On the Massachusetts Proposal:

Massachusetts will attempt to construct a quasi-9th grade fall first time enrollment with a denominator that adds back both dropouts and retentions for each of the various years a class was in public high school. The Massachusetts numerator is clearly corrected for the proportion of students that do not graduate in the “standard amount of time.” This might be a fairly decent approach.

On the Ohio Proposal:

Ohio is proposing to do essentially the same thing that Kentucky will do. Ohio ignores completely any of the retentions in grade, and it fails to correct the numerator for the proportion of graduations that take more than the standard amount of time. This formula, in my opinion, is highly noncompliant with NCLB.

On the Indiana Proposal:

The description appears to rely totally on dropout figures. As dropout figures are of often doubtful accuracy in many states. Also, it is unclear if this formula makes the required correction for students who do not graduate on time. Not being a dropout is not sufficient to become an on-time graduate. I suspect this formula is not compliant with NCLB. See the example calculation below for a possible interpretation of the way Indiana computes their graduation rate.

On the New York Formula:

This appears to roughly follow the classical graduation rate calculation, except that only the first time 9th grade entrants are included in the denominator. That means students held back in 9th grade from the previous year are not counted. The numerator is corrected for students who take more than the standard time to graduate. This is a simple approach that all states should be able to easily duplicate. It can suffer some errors at the local school level when high migration rates are present. The Massachusetts formula is probably superior in this regard. Also, the New York calculation appears to eliminate counting of retained students in the denominator. That might or might not comply fully with NCLB.

On the Colorado Proposal

The Colorado graduation rate comments in their workbook are insufficient to understand what formula the state will actually apply. The “Evidence of compliance” mentioned in the Colorado workbook does not appear to be publicly available.

How These Formulas Work With Real Data From Kentucky’s Class of 2001

Here are some examples of how Kentucky’s graduation rate varies wildly depending upon which of these already approved definitions is used.

The New York Proposal, How Kentucky's Class of 2001 stacks up:

Denominator Factors

Fall 1997-98 9 th Grade Enrollment (From Kentucky SD-125R Report)	57,272
Students Retained (Held Back) From The 1996-97 9 th Grade Class	5,432
Difference, Equals First Time 9 th Graders in 1997-98	51,840

Numerator: Unable to calculate as Kentucky has no disaggregation of graduates by number of years to completion. I use the full number of graduations (36,957) just to establish an upper bound to the rate.

Upper bound to the New York Graduation Rate for Kentucky's Class of 2001 =

36,957 / 51,840 =

71.2 Percent (Upper Bound Only, Not Truly Comparable)

The Ohio Calculation (essentially identical to the Kentucky Proposal), How Kentucky's Class of 2001 stacks up:

Denominator factors:

(Data source: *Nonacademic Data, 1993 to 2001*, July 8, 2002, KY Department of Education web site)

Year/Element	Number of Students
2001 Graduations	36,957
2000-01 12 th grade dropouts	1,822
1999-00 11 th grade dropouts	2,447
1998-99 10th grade dropouts	2,502
1997-98 9th grade dropouts	2,638
Total Denominator	46,366

Numerator: Equal to the full number of graduations (36,957).

The Precise Ohio Graduation Rate for Kentucky's Class of 2001 = 36,957 / 46,366 =

79.7 Percent

The Massachusetts Calculation, How Kentucky's Class of 2001 stacks up:

Denominator factors:

(Data source: *Nonacademic Data, 1993 to 2001*, July 8, 2002, KDE)

Year/Element	Number of Students
2001 Graduations	36,957
2000-01 12 th grade dropouts	1,822

2000-01 12 th grade retentions	786
1999-00 11 th grade dropouts	2,447
1999-00 11 th grade retentions	1,759
1998-99 10 th grade dropouts	2,502
1998-99 10 th grade retentions	3,143
1997-98 9 th grade dropouts	2,638
1997-98 9 th grade retentions	5,496
Total Denominator = Quasi-9th grade enrollment	57,550

Numerator: Unable to calculate as Kentucky has no disaggregation of graduates by number of years to completion. I use the full number of graduations just to establish an upper bound to the rate.

Upper bound to the Massachusetts Graduation Rate for Kentucky's Class of 2001 =

36,957 / 57,550

= 64.2 Percent (Upper Bound Only, Not Truly Comparable)

As a note, the Kentucky SD-125R Fall Membership Report for 1997-98 shows 9th grade fall membership (enrollment) was 57,272 students. Thus, at least for this specific example, the Massachusetts formula comes very close to a perfect emulation of the classical formula's denominator. However, as noted above, this rate makes a correction for migration that the classical rate does not show. In this specific example the results are similar only because migration in Kentucky, at the state level for the Class of 2001, isn't significant.

The Indiana Calculation, How Kentucky's Class of 2001 stacks up:

Indiana's formula is computed as indicated below for the Class of 2001.

School Year	Grade	Dropout Rate As Decimal	1 Minus Dropout Rate
1997/98	9	0.0476	0.9524
1998/99	10	0.0519	0.9481
1999/00	11	0.0572	0.9428
2000/01	12	0.0477	0.9523

The product of the four numbers in the right-most column is then the reported graduation rate.

Indiana's Formula's Graduation Rate for Kentucky's Class of 2001 = 81.1 Percent

Overall Summation:

The graduation rates calculated from these already accepted formulas, using real Kentucky data, vary enormously, by more than 15 points!

Summary of Graduation Rates Calculated With Actual Data For Kentucky's Public High School Class of 2001

State Calculation Used	Resulting Graduation Rate, Percent
Indiana	81.1
Ohio (Kentucky's Proposal will match this rate)	79.7
New York	71.2 (Upper Bound, Actual Figure Would Be Lower)
Massachusetts	64.2 (Upper Bound, Actual Figure Would Be Lower)

Keep in mind that the Massachusetts calculation shown above provides a rate that is higher than Kentucky would get with a fully compliant NCLB calculation. So the real spread in the rates is even more than shown above. Never the less, it is absolutely clear that the results vary enormously. That is unacceptable. Clearly, something must be done.

Personally, unless all the states adopt detailed tracking of each student throughout the high school years, I would prefer the Massachusetts formula. It does remove most of the migration impacts, and it still provides a credible result that matches what I really see happening in Kentucky.

Clearly, the credibility of NCLB's graduation rate accounting is in great danger. The calculations above using real life data for one real graduating class in one state show how inconsistent the accepted formulas really are. Responsible parties in the federal government who care about consistency and accuracy in the graduation rate under NCLB will have to act quickly to get the federal Department of Education back on a common sense, legally compliant track.

21 March 2003 (Rev 4)

SUMMARY OF MAJOR REVISIONS:

New York formula revised due to apparent intent to not include students retained from the previous year into the accountable year grade 9 membership, Calculation for Indiana Added, Text from Colorado's Workbook added (Rev 1).

Text from NCLB Added (Rev 2).

Minor edits (Rev. 3)

Clarified comments on Colorado and corrected comments in Indiana calculation. Other minor edits (Rev. 4)