Life Course Indicator: High School Graduation Rate

The Life Course Metrics Project

As MCH programs begin to develop new programming guided by a life course framework, measures are needed to determine the success of their approaches. In response to the need for standardized metrics for the life course approach, AMCHP launched a project designed to identify and promote a set of indicators that can be used to measure progress using the life course approach to improve maternal and child health. This project was funded with support from the W.K. Kellogg Foundation.

Using an RFA process, AMCHP selected seven state teams, Florida, Iowa, Louisiana, Massachusetts, Michigan, Nebraska and North Carolina, to propose, screen, select and develop potential life course indicators across four domains: Capacity, Outcomes, Services, and Risk. The first round of indicators, proposed both by the teams and members of the public included 413 indicators for consideration. The teams distilled the 413 proposed indicators down to 104 indicators that were written up according to three data and five life course criteria for final selection.

In June of 2013, state teams selected 59 indicators for the final set. The indicators were put out for public comment in July 2013, and the final set was released in the Fall of 2013.

Basic Indicator Information

Name of indicator: High school graduation rate (LC-20)

Brief description: High school graduation rate (four year cohort) as measured by the Adjusted Cohort Graduation Rate.

Indicator category: Economic Experiences

Indicator domain: Risk/Outcome

Numerator: Number of students who graduate in four years with a regular high school diploma

Denominator: Number of students who form the adjusted cohort for the graduating class

Potential modifiers: Age, Race, Ethnicity, Gender, Income, Disability Status

Data source: National Center for Education Statistics

Notes on calculation: The adjusted cohort that forms the denominator is created by NCES as the number of students who are entering 9th grade or the earliest high school grade for the first time. The cohort number is adjusted by adding the numbers of students who subsequently transfer into the cohort and subtracting the numbers of students who subsequently transfer out, emigrate to another country, or die.

Similar measures in other indicator sets: HP 2020 Focus Area AH-5.1; Chronic Disease Indicators; United Health Rankings Core Measure

Life Course Criteria

Introduction

Socioeconomic environments are strongly related to health, whether health is self-reported or defined by particular acute, chronic, or disabling conditions (e.g., Kitigawa and Hauser 1973; Lynch 2003; Marmot 2006; Moore and Hayward 1990; Morenoff 2003). Socioeconomic environments are often determined by a combination of education, income, and occupation. Graduation from high school (or equivalent) is a pre-requisite for any post-secondary education, which drives occupational status and income.

The U.S. Bureau of Labor Statistics documents trends in earnings as related to educational attainment, exemplifying the association between educational attainment and income. As level of education increases, so do weekly earnings – on average, persons working with less than a high school diploma make $471.00 USD weekly; persons working with a high school diploma make $652.00 USD weekly; persons with a Bachelor's degree make $1,066 USD weekly; and persons with a Professional degree make $1,735.00 USD weekly (Bureau of Labor Statistics 2013).

Whether an individual graduates high school, and within a four year period, is tightly correlated with that individual's earning potential and contributes to current and future socioeconomic status. As a marker of educational attainment, a state's high school graduation rate speaks to the economic experiences, social capital, and health trajectories of its residents (in particular youth) and is therefore an indicator for life course health.

Implications for equity

As a dimension of socioeconomic status, high school graduation rate has strong implications for social equity across populations. Different populations across the United States experience different rates of high school graduation: trend analysis of data from the past forty years shows non-Hispanic Black and Hispanic populations having had lower completion (graduation) rates than other racial/ethnic populations. In 2009, among 18-24 year olds not currently enrolled in high school, Asian/Pacific Islander (95.9) and Whites (93.8) had completion rates of more than 90 percent. For the same year, Blacks (87.1), American Indians/Alaska Natives (82.4), and Hispanics (76.8) had rates below 90 percent (Chapman et al 2011).

In addition, students living in low-income families have higher rates of dropout (non-completion) than their peers from high-income families. In 2009, the national event dropout rate of students living in low-income families was about five times greater than the rate of their peers from high-income families (7.4 percent vs. 1.4 percent). This difference is consistent with trend analysis of data over the past four decades. (Chapman et al 2011)

Beyond race/ethnicity and income, individuals with disabilities also experience lower high school completion rates than individuals without a disability. In 2009, 16-24 year olds with disabilities had a dropout rate of 15.5 percent compared to an overall rate of 7.8 percent among their peers living without a disability.

Overall educational attainment is also a "protective" factor for overall health (Richardson et. al. 2013). There is a well known and persistent association between education and health. This relationship has been observed in many geographies and time periods, and for a wide variety of health measures (see **Predict Individual's Health** section below). As a protective factor, educational attainment has implications for equity because it may contribute to resilience against additional social risk factors.

Public health impact

The benefits of investments in educational attainment are shared by individual students and the societies of which they are a part. Investments in educational attainment are investments in a knowledgeable, skilled, educated population. This population will provide higher quality workers and improved quality of life in general on both individual and community levels.

Increased academic achievement impacts individuals' lifetime health and well-being, as well as influences the health and well-being of their offspring and ameliorates the effects of socioeconomic and familial disadvantage (Wickrama et al., 2012). (In addition, see **Predict Individual's Health** section below.) As a 'return on investment', each additional year of education is associated with an increase in health promoting behaviors (Cutler and Lleras-Muney 2006).

In addition, educational attainment has larger societal benefits for families, which influence wider community benefits. High school graduation is necessary, but not sufficient, for post-secondary level education and subsequent employment. Research on the impact of higher education opportunities on individual and social outcomes suggests individuals with college degrees, and to a lesser extent those who have some college experience but do not have a degree, earn more than others and enjoy better working conditions. They contribute more to society, both through higher tax payments and through their civic participation, and are lower sources of spending for many social programs, such as unemployment compensation, food stamps, and Medicaid. Finally, college-educated adults give their children benefits that increase the prospects that the next generation will prosper and will be in a position to contribute to society in a variety of ways (Baum and Payea 2010). Overall, increases in high school graduation rates can lead to more positive outcomes for individuals and for their children and communities. These positive (or negative) outcomes persist across the life course.

Leverage or realign resources

As a societal factor, education is a powerful predictor of health, but the public health field has very little control over increasing educational attainment. This indicator has the potential to leverage or realign resources as multiple potential partners, including many non-traditional public health partners, have a vested interest in students graduating high school. Some examples of potential new or strengthened partnerships include:

- New or strengthened partnerships with public school systems as graduation rates are national performance measures for schools
- New or strengthened partnerships with business, commerce and union associations as employers need employees who are well trained
- New or strengthened partnerships with justice system stakeholders as there is a strong correlation between and involvement in the justice system and educational attainment, and this indicator could open new avenues for collaborative public policy and strategies

This indicator provides information which can be used as leverage points for addressing improvement in the high school graduation rate by focusing on early intervention in preschool and early elementary school and targeted programs serving high-risk students at the middle and high school level. A number of such community-based programs exist, many of which focus on connecting high risk students to mentors and community resources to navigate intra- and interpersonal stresses, including health and relationships with peers, and community settings that may contribute to engagement and attainment in school. Programs like the Incentive Mentoring Program in Baltimore, MD (incentivementoringprogram.org/), The Link in Minneapolis, MN (thelinkmn.org/school-matters), or earlier in the life course – Big Brothers, Big Sisters – focus on the complex interactions between individual, family, and community resources and the ability to reach one's potential as a method of increasing resiliency in youth. Such programs are one of many opportunities for public health practitioners to partner with community organizations and education agencies to improve high school graduation rates.

From the standpoint of developing resilience, the positive youth development (PYD) model is an approach that can be used to promote and support protective factors or influences in a young person's life. The Family and Youth Services Bureau of the Administration for Children & Families has committed to promoting a PYD approach among federal agencies, their partners, youth workers, and the general public (http://www.acf.hhs.gov/programs/fysb/positive-youth-development). Rather than focusing on risk factors, PYD focuses on developing leadership skills and seeing youth as assets to be developed. Being involved with school and having strong links between home, school and the community are integral components of PYD and are likely to contribute to improving graduation rates as well.

Predict an individual's health and wellness and/or that of their offspring

There is a large and persistent association between education and health. The connection between education and health has been well documented and spans almost all health conditions (Ross 1995). There is a positive association between education and health behaviors, health status, and particular acute, chronic, or disabling health conditions. Educational attainment also is a strong predictor of overall life expectancy. In addition to these positive associations, the effect of education increases with increasing years of education (Molla et al 2004; Lleras-Muney 2005).

Educational attainment also is a predictive factor for the health and wellness of an individual's offspring. Multiple individual research studies as well as meta-analyses have shown the very strong predictive relationship between level of parent's education on educational achievement and thus future health and well-being for children (Klebanov et. al. 1994; Haveman

& Wolfe 1995; Smith et. al. 1997). In particular, a mother's education level has a large, positive association on the health of her children. That relationship, observed in many small studies in rich countries, turns out to be true everywhere on the globe. A recent meta-analysis of global data illustrates half the reduction in child mortality over the past 40 years can be attributed to the better education of women; for every one-year increase in the average education of reproductive-age women, a country experienced a 9.5 percent decrease in the child deaths (Gakidou 2010).

Data Criteria

Data availability

The National Center for Education Statistics (NCES) is the primary federal entity for collecting and analyzing data related to education in the United States and other nations. Within the NCES are a number of programs and assessments, including the National Assessment of Educational Progress (NAEP) and the Common Core of Data (CCD). The CCD reports the number of dropouts from each grade nine to 12 and the relevant event dropout rate (The event dropout rate describes the proportion of students who drop out in a single year. The rate is the number of students who drop out of a given grade divided by the number of students enrolled in that grade at the beginning of that school year). It also reports the number of high school diploma recipients, other high school completers (defined as students who receive an alternate credential such as a certificate of attendance or an equivalency credential), and the Averaged Freshman Graduation Rate (AFGR).

Beginning in the 2010–2011 academic year, all state education agencies were required to report graduation rates based on the Adjusted Cohort Graduation Rate (ACGR), which is considered to be a more rigorous and uniform standard than the AFGR. The ACGR tracks a cohort of ninth graders who are entering high school for the first time, adding and subtracting dropouts and transfers, and calculating the fraction earning a regular diploma after four years (U.S. Department of Education 2013). The NCES explains that reporting for the AFGR will continue to provide well understood and comparable statistics until evaluation of the newer measure of ACGR has been completed, and so data users can continue to analyze trends in graduation rates. The ACGR is available for most states starting with the graduating class of 2011. For trend analysis, it is recommended data users use the AFGR, with the goal of transitioning to the ACGR as multiple years of data become available.

The most recent data set available from NCES is for 2010-2011, which includes only the AFGR, and was first made available in June 2012. After the publication of the survey data on the NCES website (denoted as version a on the website), state education agencies have one year to revise the data (revised data is denoted as version b). Both the revised and unrevised data sets are available on the NCES website (http://nces.ed.gov/ccd/stnfis.asp). The Department of Education, Office of Elementary and Secondary Education released a preliminary ACGR for 2010-2011 on Nov. 28, 2012 through their ED Data Express online data tool (http://eddataexpress.ed.gov).Local level data are not available for this indicator through the National Center for Education Statistics.

Data quality

The data quality for ACGR is good at the present time. Adjustments are made for students who move into or out of the state, territory, county, or district. Data for private schools and for enrollment for very low numbers (e.g., n<10 students) are not available. The first year that states were required to use the regulatory cohort rate was 2010-11; prior year data are not necessarily comparable to the 2010-11 rates. Because ACGR is a new addition, and evaluation of the measure is not yet complete, the following pertains to the AFGR:

From the National Center for Education Statistics (http://nces.ed.gov/pubs2013/2013309/appendix_a.asp):
There is variation in the degree of rigor with which the states or school districts verify their data. Those states that collect dropout or graduation data through student-level records systems are better able to verify students' enrollment and graduation status than are those agencies that collect aggregate data from schools and districts. In the past NCES did not audit state reports. Starting with the 2006–07 collection, NCES has been more aggressive in verifying data that do not appear to be accurate. NCES also required that some aggregate-level data be confirmed or revised. For 2009–10, NCES contacted Alabama, the District of Columbia, Illinois and Puerto Rico because the submitted dropout counts produced dropout rate estimates that were low when compared to other states and data from earlier years. Alabama and Illinois confirmed the reported counts. The District of Columbia and Puerto Rico did not confirm their dropout counts. As the unconfirmed dropout counts resulted in a calculated dropout rate of less than one percent, NCES suppressed dropout

counts for the District of Columbia and Puerto Rico at the LEA level. The state-level dropout data were imputed for the District of Columbia based on prior year rates. The state-level dropout data for Puerto Rico were suppressed because prior year data was not available. For 2009–10, NCES contacted Connecticut because the submitted high school diploma counts produced AFGR estimates that were high compared to other states and data from earlier years. Connecticut did not confirm their diploma counts. The unconfirmed diploma count represented a 29 percent increase from the prior year, 110 percent of the 12th- grade student enrollments in-year, and resulted in a calculated AFGR of 98 percent. Accordingly, NCES suppressed diploma counts for Connecticut at the LEA level and imputed the counts at the state level using prior year rates. States have been made aware of the new NCES protocols and understand that NCES is working to develop further methods to audit their end of year data.

Additionally for 2009–10, dropout data reported at the LEA-level for Kentucky, Maine, and Mississippi accounted for less than 85 percent of the SEA-level reporting. These cross-level discrepancies were noted on data error reports to all three of these states and the states did not submit any revisions to these data as of Jan. 1, 2013. NCES has thereby suppressed the LEA-level dropout counts for these states because these data do not meet NCES data quality and coverage standards.

Cautions in interpreting the Averaged Freshman Graduation Rate. Although the AFGR was selected as the best of the available alternatives, several factors make it fall short of a true on-time graduation rate. First, the AFGR does not take into account any imbalances in the number of students moving in and out of the nation or individual states over the high school years. As a result, the averaged freshman class is at best an approximation of the actual number of freshmen, where differences in the rates of transfers, retention, and dropping out in the three grades affect the average. Second, by including all graduates in a specific year, the graduates include students who repeated a grade in high school or graduated high school early and thus are not on-time cohort graduates in that year.

While the AFGR is a reasonable proxy at the aggregate national or state level, the potential effects of three factors should be taken into account when interpreting the results for individual states. First, if more high school students moved out of a population than transferred in during the high school years, the number of graduates in the numerator would be smaller and the estimated graduation rate would be lower than the actual on-time rate for that group of freshmen. On the other hand, if more high school students moved into a population than moved out during this four-year period, the number of graduates in the numerator would be increased and the estimated on-time graduation rate would be higher than the actual rate for that group of freshmen. This can lead to estimated graduation rates of more than 100 percent for small groups; such cases have been edited to 100 percent in this report.

Second, including the estimate of eighth-graders from the previous year in order to remove the effect of freshmen who were retained, and thus are not first-time freshmen, ignores the fact that in some cases there may be real change in the number of eighth-graders relative to counts of ninth-graders due to transfers between public and private schools. If more students transfer to public schools during these years, using a count of 8th-graders that does not include those students would serve to artificially decrease the estimated number of ninth-graders, and as a result increase the graduation rate for that class. Conversely, if more students were to transfer out of public schools between the eighth and ninth grades, using the eighth-grade count that includes students leaving the population would artificially increase the estimated number of ninth-graders and in turn, decrease the graduation rate.

Third, there may be a tradeoff between the edits for retentions and grade specific differences in the number of dropouts. The use of the 10th-grade enrollment count helps to dampen the effect of ninth-grade retentions, but ignores the fact that ninth-grade dropouts result in a smaller 10th-grade population. Excluding these ninth-grade dropouts would lower the estimate of freshmen and as a result increase the graduation rate.

Simplicity of indicator

The National Center for Education Statistics collects enrollment and completion data and estimates the graduation rate for each state. The AFGR is the number of graduates divided by the estimated count of freshmen four years earlier. This estimated count of freshmen is the sum of the number of eighth graders five years earlier, the number of ninth graders four years earlier and the number of 10th graders three years earlier divided by three. Enrollment counts also include a proportional distribution of students not enrolled in a specific grade. The ACGR tracks a cohort of ninth graders who are entering high school for the first time, adding and subtracting dropouts and transfers, and calculating the fraction earning a

regular diploma after four years. Despite the potential confusion created by the use of the two indicators, and the movement away from AFGR to ACGR, this indicator is generally easy to understand and communicate. It does not require linkage or complex analyses on the part of the data user.

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This publication was supported by a grant from the W.K. Kellogg Foundation. Its contents are solely the responsibility of the author and do not necessarily represent the official views of the W.K. Kellogg Foundation.

To learn more, please contact Caroline Stampfel, Senior Epidemiologist at cstampfel@amchp.org or (202) 775-0436.

Association of Maternal & Child Health Programs
2030 M Street, NW, Suite 350
Washington, DC 20036
(202) 775-0436 ▪ www.amchp.org