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Educational  
Attainment in  
Virginia

*issue* insight

Other reports in the Issue Insight series:

- The High Cost of Low Educational Attainment (#1)
- Why Students Drop Out (#2)
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Dear Reader:

The Council on Virginia's Future is committed to improving the quality of life in Virginia. An important role of the Council is to help assess the progress being made toward vital long-term goals, one of which is elevating the educational preparedness and attainment of Virginia's citizenry. During 2009, the Council worked with internal and external thought leaders to better understand the issues and opportunities affecting educational attainment and the long-term future of higher education in Virginia.

Virginia's reputation for its highly skilled workforce and excellent system of higher education is well deserved. Complacency, however, would be dangerous because other regions and nations are working hard to surpass us: One estimate suggests that Virginia would need to produce an additional 105,000 degrees to meet the attainment levels of top competitive rivals by 2020. This "degrees gap" is particularly worrisome because educational attainment levels in Virginia have dropped. The Commonwealth's 25-to-34 year-old adult cohort is not as well educated as older generations.

This Issue Insight, *Educational Attainment in Virginia*, provides a high-level assessment of education in Virginia and ties together important threads from the research and meetings conducted during 2009. It includes a discussion of the relationship between longer-term workforce needs and what it will take for Virginia to compete with the best economic regions in the world. And while this Issue Insight focuses on postsecondary attainment, it also includes information on the major elements of the "student pipeline" because of the importance of these elements in understanding Virginia's progress toward its long-term educational attainment goals.

As always, questions and comments are welcome.

Jane N. Kusiak

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## Educational Attainment in Virginia

Education, perhaps more than any other single factor, is a direct determinant of the well-being, prosperity, and quality of life for individual Virginians and their families, communities, and the state as a whole. The challenge is that, while Virginia's system of higher education is considered to be among the best in the country, many believe that we need to do more to keep pace with our national and global economic competitors:

- Virginia continues to make progress on many education and workforce training indicators, from third grade reading pass rates, to high school graduation rates, to the number of students passing occupational competency assessments and industry certifications. However, too many students drop out of the pipeline before they get their college degree; as of 2008, only 28 out of 100 Virginia high school freshmen go on to get a college degree.
- Virginia's workforce boasts an impressive concentration of workers in science and engineering occupations and a large number with advanced degrees. However, large regional and demographic educational attainment disparities pose serious challenges to future economic growth.
- According to the U.S. Census Bureau, Virginia's young adults, age 25 to 34, are not as well educated as older workers. Virginia is falling behind a growing number of economic competitors in terms of educational attainment and will need to produce another 104,670 degrees by 2020 to match the best-performing country in the educational attainment of its adults; about the same amount is needed to meet projected workforce requirements.
- Finding the necessary resources to improve educational attainment is growing more difficult; net tuition now accounts for almost 48 percent of total education and related expenses in higher education, up from around 33 percent in 2002.

### Recommendation

Encourage the creation in 2010 of a gubernatorial commission or other high-level group to build on the Council's work on educational attainment issues. Continue to assess and analyze these issues with a longer-term goal of developing a comprehensive strategy for Virginia, including approaches for:

- Enhancing the readiness of Virginia's high school students for college and work
- Improving retention and completion rates in Virginia's colleges
- Increasing the alignment of higher education with rapidly evolving workforce needs
- Strengthening the capacity of Virginia's system of higher education to manage change and growth under difficult fiscal conditions.



# Introduction

Virginia, like many other states, loses too many of its children in the education pipeline before they get a college degree. Figure 1 summarizes the estimated “leakage” of Virginia’s high school freshmen from the pipeline through college graduation.

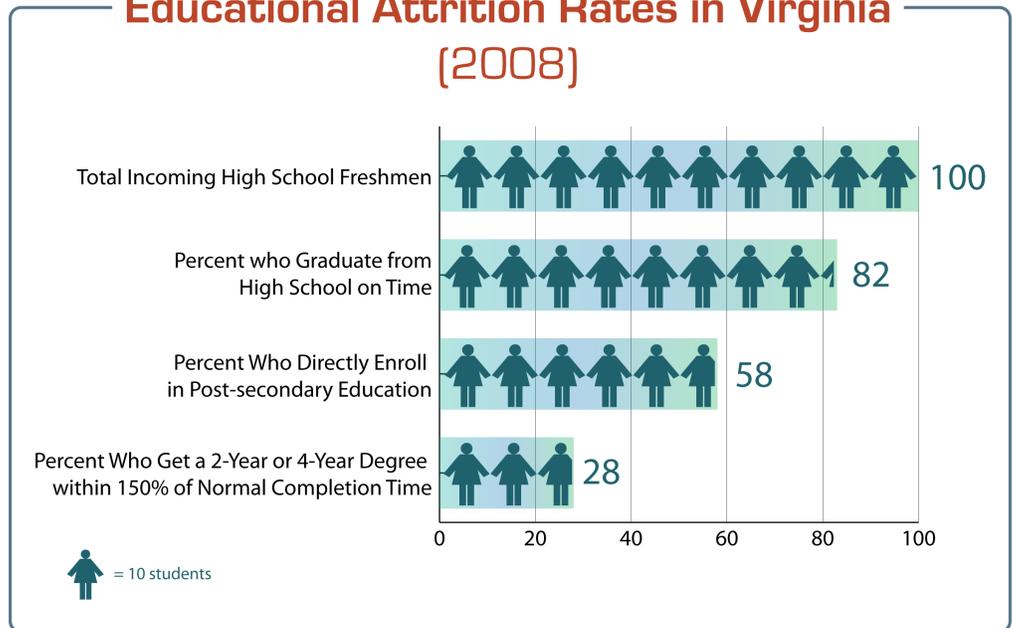
The term “student pipeline” is sometimes used to describe the progression of students through the prekindergarten-to-college-graduation cycle and represents a useful construct for assessing progress. One representation of the student pipeline is presented in Appendix A. Key elements of the pipeline include:

- School readiness through eighth grade achievement
- Secondary education and college and career readiness
- Postsecondary education, including workforce training and associate’s, bachelor’s, and post-baccalaureate achievement.

Appendix B provides additional information on the education pipeline as reported in Virginia Performs ([VaPerforms.virginia.gov](http://VaPerforms.virginia.gov)), the state’s performance leadership and accountability system website. Appendix C provides a summary of key education initiatives underway in the Commonwealth, and Appendix D describes the close relationship between the long-term projections for educational attainment requirements based on future workforce needs and those for meeting the attainment levels of top international competitors.

The focus of this Issue Insight is on educational attainment because it is so closely related to workforce quality and labor productivity, making it a key determinant of economic growth, wages,

**Figure 1**  
**Educational Attrition Rates in Virginia**  
**(2008)**



Source: Council analysis based on data from the Virginia Department of Education, the NCHES Information Center for Higher Education Policymaking and Analysis, and the Integrated Postsecondary Education Data System (IPEDS).



and prospects for Virginia's future prosperity. In today's dynamic economy, jobs increasingly require education beyond a high school diploma.

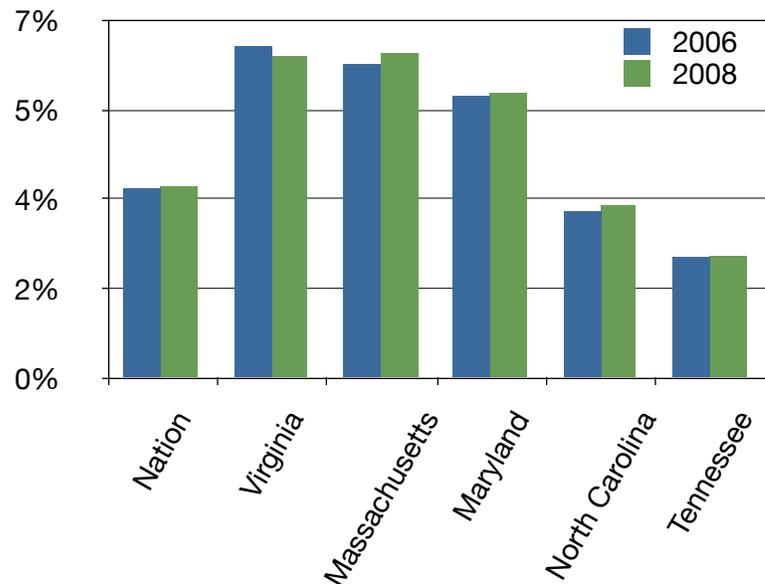
## Background

In recent years, knowledge-intensive industries have become a key contributor to the growth of both the national and Virginia economies. Although this sector was hit hard by the recessions after 2000, skilled workers in knowledge-intensive industries generally experience lower rates of unemployment and faster wage growth than those in other sectors.

Information on educational attainment reveals two opposing trends in the quality of Virginia's workforce: a remarkably well-educated labor force with a significant number of advanced degree holders coupled with significant disparities in attainment among large segments of the population and some geographic areas.

Virginia has an impressively high percentage of skilled workers, and was second in the nation in 2008 for workers in science and engineering (S&E) occupations (6.3%, down slightly from 2006) a figure which reflects Virginia's large knowledge-intensive sector. Massachusetts was the leading state with 6.4 percent of its workers in S&E occupations. Maryland's workforce was similar to Virginia's with 5.6 percent in S&E occupations, while North Carolina (3.4%) and Tennessee (2.4%) were lower than the national average of 3.8 percent.

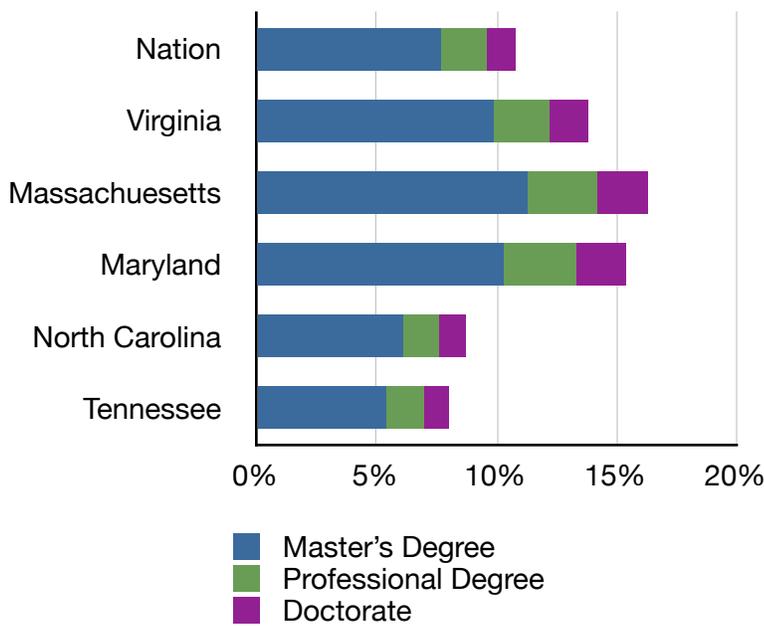
**Figure 2: Percentage of Workers in Science & Engineering Occupations, 2006 and 2008**



The percentage of Virginia's workforce with advanced degrees also demonstrates Virginia's commitment to education, as well as its ability to attract educated workers. In 2008, Virginia ranked fourth in the nation for the most master's degrees (9.9 percent), seventh for the most professional degrees (2.3 percent), and fourth for doctorates (1.6 percent) as a percentage of the population



**Figure 3: Percentage of the Adult Population, 25 and Older, with an Advanced Degree by State, 2008**



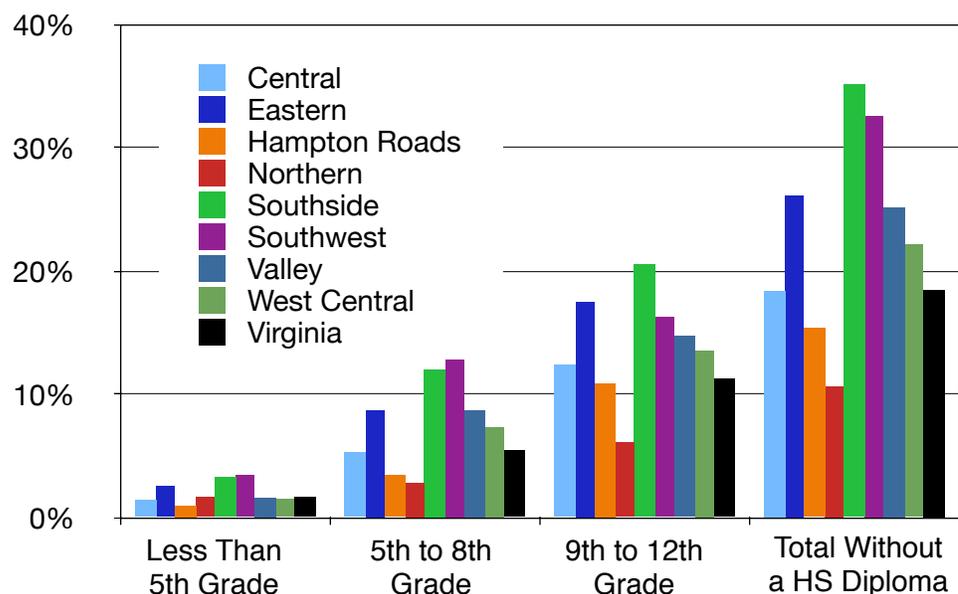
age 25 and over. Nationally, 7.7 percent of the population had a master's degree, 1.9 percent had a professional degree and 1.2 percent a doctorate.

In comparing Virginia to its peers, Maryland ranked higher in all three degrees, with 10.3 percent having master's degrees, 3.0 percent professional degrees and 2.1 percent doctorates. Virginia, however, ranked above both North Carolina and Tennessee. Massachusetts had the highest total of advanced degrees nationally with 11.3 percent master's degrees, 2.9 professional degrees, and 2.1 percent doctorates.

These achievements in workforce quality, however, mask a serious weakness in Virginia's labor market. In 2008, 14.1 percent of Virginia adults age 25 and older lacked a high school diploma the 21st highest percentage among the 50 states.

Within Virginia, rural regions have the highest percentage of people without diplomas. In 2000, the percentage of adults with less than a high school diploma was above 30 percent in the Southside and Southwest regions and above 20 percent in the Eastern, Valley

**Figure 4: Adults with Less Than High School Diploma, Age 25 & Older, by Region, 2000**

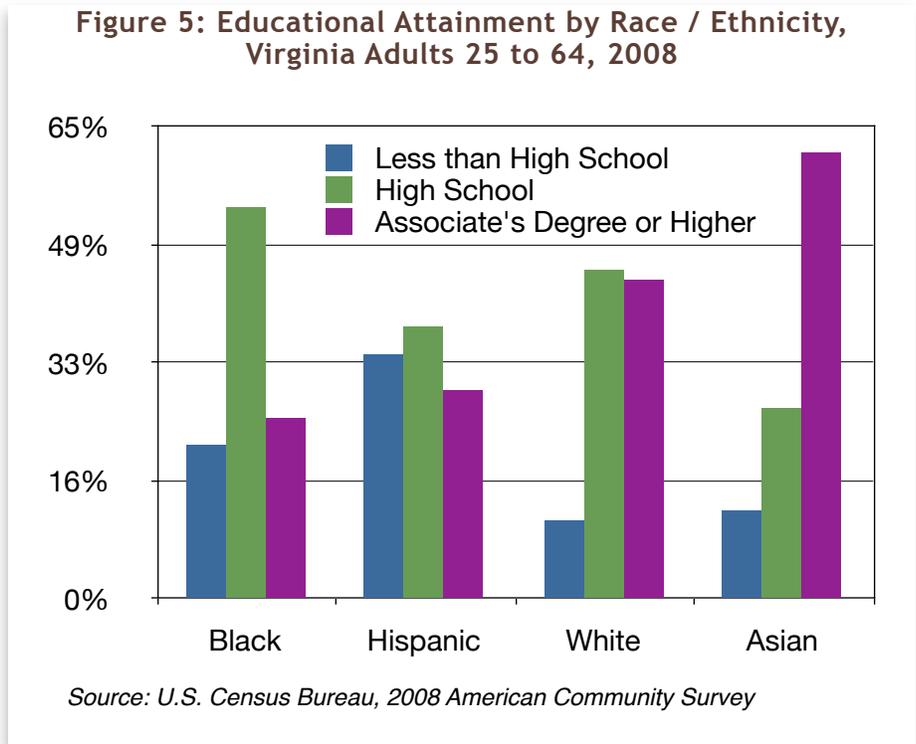




and West Central regions.

As shown in Figure 5, higher education attainment rates also vary significantly by race or ethnicity. In addition, data from the National Center on Higher Education Management Systems (NCHEMS) shows that graduation rates for black (46.9 percent) and Hispanic students (58.8 percent) continue to lag those of white students (67.9 percent) at Virginia’s four-year institutions.

This disparity is more than just a critical social issue; because Virginia is getting older and more diverse, it cannot afford to leave large segments of its growing population behind if it is to have the kind of workforce and high-level entrepreneurial and technical talent that is needed to lead the state into the next “new economy.” Virginia’s white working age (18 to 64) adult population is expected to decline by about 115,000 by 2025, while its African

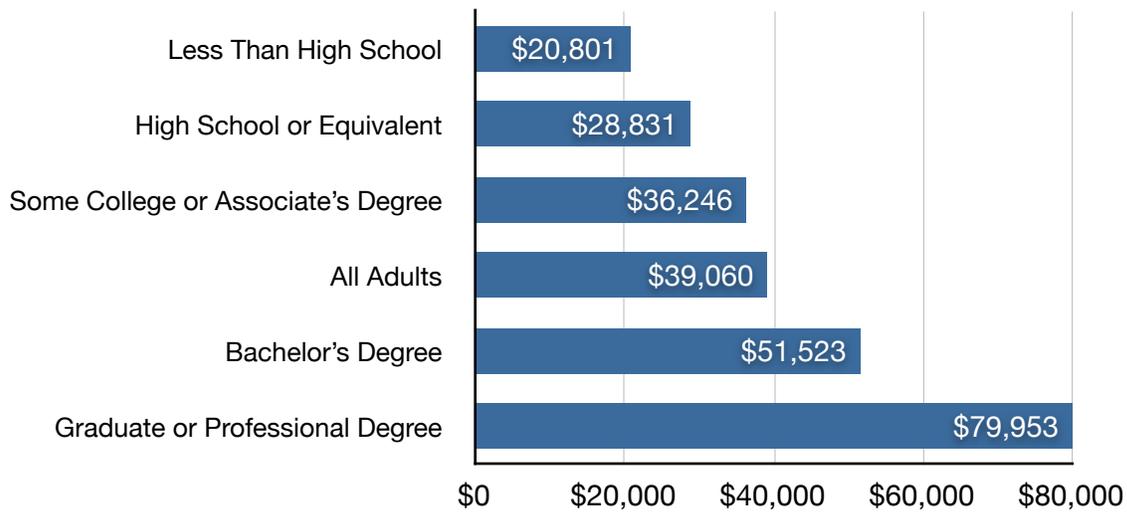


American and Hispanic working age population is expected to grow by 340,000. Given current high school graduation, college-going, and completion rates – and without a greater influx of young, out-of-state degree holders – the college attainment rates for Virginia’s youngest cohorts will continue to decline.

America’s long-term commitment to education has helped make it the preeminent economy in the world. Moreover, the relationship between education and economic prosperity has strengthened over the last few decades as technology and innovation play increasingly important roles in competitiveness and growth. The strong relationship between educational attainment at an individual level, as depicted in Figure 6 (Page 6) for adults in Virginia, is mirrored at the state level: A higher level of educational attainment generally means a higher level of statewide per capita income. Virginia’s future economic prosperity and well-being depend directly on its ability to increase educational attainment and workforce skills across the Commonwealth.



**Figure 6: Median Earnings by Level of Educational Attainment, Virginia, 2008**



Source: U.S. Census Bureau, 2008 American Community Survey

As reported in the Council’s Issue Insight #1, *The High Cost of Low Educational Attainment*, there are other significant benefits that accrue to a more highly educated society: A high school dropout is about eight times more likely to be in jail or prison as a high school graduate and nearly twenty times as likely as a college graduate. Each year, the United States spends \$9,644 per student compared to \$22,600 per prison inmate.

- Less educated workers are less likely to be covered by health insurance and more likely to suffer from heart conditions, strokes, hypertension, and high cholesterol, as well as a range of behaviors that contribute to ill health, such as smoking. More than 22 percent of adults (16-64) without a high school diploma/GED are dependent on Medicaid for their health insurance coverage while 11.6 percent of high school graduates and 3.1 percent of college graduates rely on Medicaid.
- In addition, high school graduates are more likely to vote, participate in their community, and contribute to charitable causes.

This translates directly into fiscal benefits for Virginia and the country. The average high school dropout in Virginia produces a lifetime net fiscal “surplus” (i.e., more taxes than he or she would impose in transfer payments and institutionalization costs) of \$17,690, while the average high school graduate generates a surplus of about \$368,870. For those with bachelor’s degrees, the lifetime net contribution is \$993,330.



## Discussion

Improving educational attainment will lead to direct, measurable benefits for Virginia's families and for the Commonwealth as a whole. The concern is that, while Virginia's current education situation is good, the picture for the future is less clear.

### Economic Competitiveness

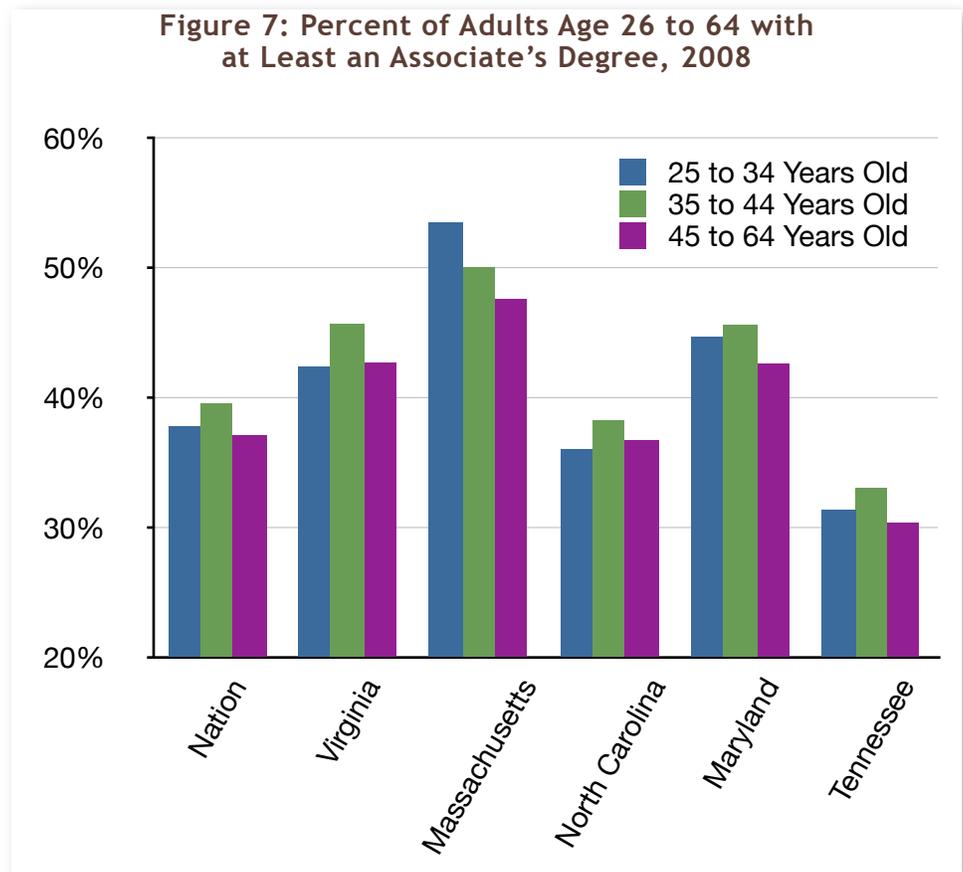
Virginia's workforce is one of the most highly educated and skilled in the country. The issue isn't whether Virginia's workforce is good or very good, it is how fast competitors are getting better relative to Virginia.

Economic development and industry leaders appear to agree that the competition for talent needed for an innovation-based economy will increase.

Virginia will need to generate more of its own exceptional talent base because it is one of 20 states where the younger adult cohort is less educated than both older generations of workers (ages 35 to 44 and 45 to 64).

In 2008, 37.7 percent of adults, aged 35 to 44, in Virginia had attained a bachelor's degree or higher, while only 34.8 percent of adults 25 to 34 had attained at least a bachelor's degree. In addition, Virginia's rank among all states for the percentage of adults by age group with an associate's degree or higher is declining for its younger workers. Virginia's rank among all states for the percentage of adults with at least an associate's degree was ninth in 2008 for adults aged 45 to 64 and adults aged 35 to 44, but only sixteenth for adults aged 25 to 34 years.

As Table 1 (page 8) shows (using slightly older data), Virginia, like the United States as a whole, is lagging behind a growing number of developing countries in the percentage of its younger adults





getting a college degree. Over time this will mean that in both Virginia and the U.S. overall higher education attainment levels will lag behind a growing number of international competitors.

This shift in relative attainment levels is occurring in spite of the fact that Virginia has been successful in meeting critical workforce needs by importing highly educated workers. In fact, Virginia routinely imports more individuals with bachelor's degrees than it exports, and more than 75 percent of adults 25 and older with a bache-

lor's degree in Virginia were born somewhere other than Virginia. And, while the state's attractiveness to highly educated workers is a distinct competitive advantage, a heavy reliance on importing skilled workers might not be optimal for Virginia's long-term future.

### Benchmarking Competitors

To help assess where Virginia is in terms of the number of graduates that Virginia is producing, researchers from NCHEMS benchmarked Virginia against the best performing states and countries. Their analysis indicates that Virginia exceeds the nation in key elements of the "student pipeline" from high school to college graduation but also lags the best performing state in every category (e.g., see Appendix A and the summaries in Appendix B). In addition, as noted in Table 1, Virginia is beginning to lag a growing number of international economic competitors in educational attainment. NCHEMS was asked the question: What would it take Virginia to reach the educational attainment levels (in terms of the percentage of adults 25 to 64 with an associate's degrees or higher) of the top international competitors by 2020?

**Table 1: 2006 Adult Educational Attainment Rates by Age Cohort**

	Adults with at Least an Associate Degree (Per 100 Adults)		
	Age 45 to 54	Age 25 to 34	Percent Difference in Cohort Attainment Rate
Canada	43.2	54.8	26.9%
Japan	39.3	54.1	37.7%
Korea	19.2	53.0	176.0%
New Zealand	38.1	43.6	14.4%
Ireland	24.0	42.2	75.8%
Virginia	42.9	41.6	-3.0%
United States	39.6	39.2	-1.0%

Source: Organization for Economic Cooperation and Development (OECD), *Education at a Glance 2008*. Virginia data from the National Center for Higher Education Management Systems (NCHEMS).



Given current graduation rates and projected population increases, Virginia can expect to produce about 680,270 college degrees by 2020. If past high levels of net migration of college educated adults continue, Virginia can expect to add another 217,150 college educated adults. This means that, given these optimistic net migration assumptions, Virginia would still need to generate another

104,670 degrees (31,400 by private institutions and 73,270 by public four-year institutions). If, the rate of net migration slows, that number would need to increase significantly.

However, reaching best performance levels in every segment of the education pipeline might not be possible or desirable. More research is needed to determine where Virginia should focus its efforts to get the largest return on its public investment in education.

Just as importantly, improving educational outcomes involves more than just increasing the numbers of students receiving a college education; the quality (i.e., the right “soft” and “hard” skill sets) of Virginia’s graduates and the vibrancy of its research and development infrastructure are at least as important, if harder to objectively measure.

### Alignment with Workforce Needs

In a statewide survey, business leaders across the Commonwealth indicated that they were generally satisfied with the quality of Virginia’s college graduates. At the same time, many industry leaders also believe that we are not adequately prepared to meet growing challenges from an increasingly competitive and innovation-based global marketplace. For instance, major industry groups and national commissions on economic competitiveness have long warned that the United States is not producing enough graduates with science, technology, engineering, and math

**Table 2: Summary NCHEMS Analysis of Additional Degree Production Requirements**

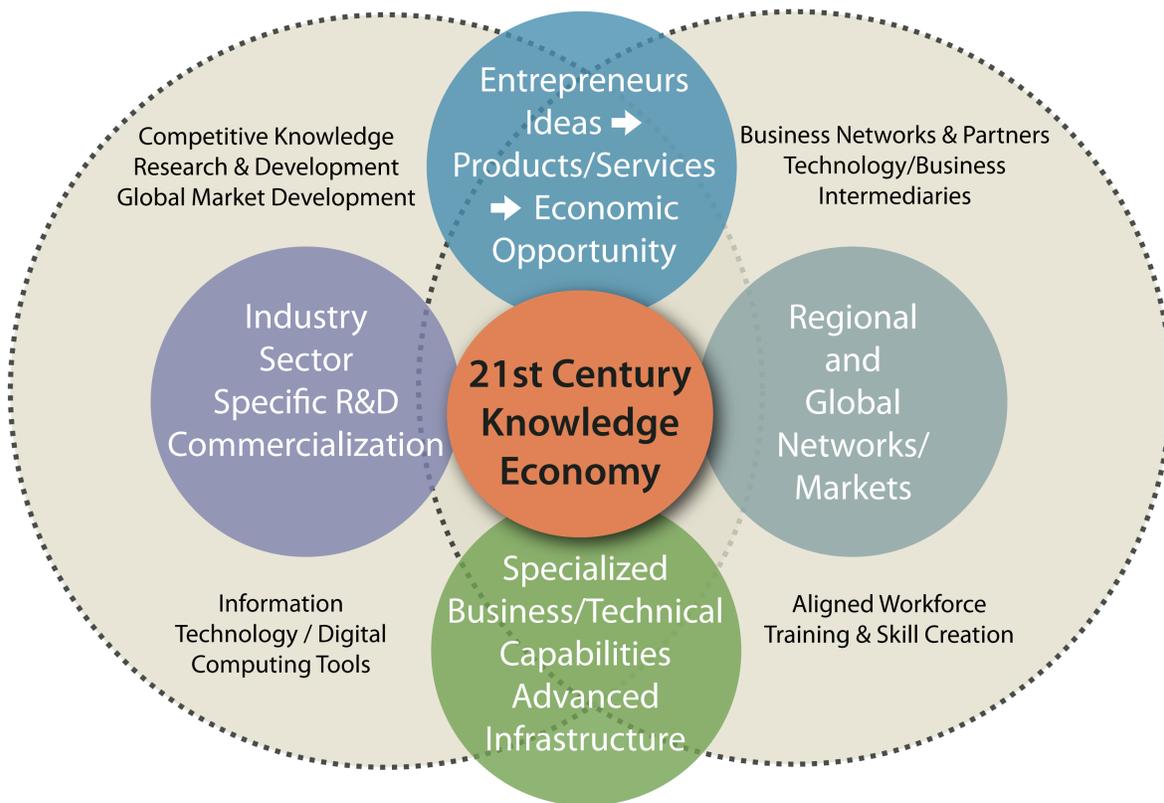
<b>Closing the Degree Gap with Best-Performing Countries</b>	
Projected Virginia Population 25-64 Years Old in 2020	4,753,930
<b>Educational Attainment (Associate’s Degree or Higher) Needed to Match Best-Performing Countries</b>	<b>2,359,230</b>
Number of Individuals in 2020 Population Cohort (25-64 Year Olds) Who Already Have College Degrees	(1,357,140)
Additional Degrees Gained by 2020 if Virginia Maintains Its Current Annual Net Migration of Degree Holders	(217,150)
Projected Growth in Degrees Awarded by Private Sector Institutions	(31,400)
Additional Degrees Produced by 2020 at Current Annual Rate	(680,270)
<b>DEGREE GAP: Additional Degrees (Associate’s and Bachelor’s) Still Needed by 2020</b>	<b>73,270</b>



(STEM) credentials. Now, many believe that the rapidly evolving challenges of the “knowledge economy” require new types of skills, such as leadership, entrepreneurship, and creativity, to be added to the “hard” skill sets that are normally the focus of engineering and related degree fields.

New Economy Strategies, a national consultant on regional economic development strategy, emphasizes the need to move from a technology-centric view of economic development to one based on innovation. In this world, creating value for customers is not limited – or necessarily driven by the availability of new technology; often, what matters most is how entrepreneurs are able to use existing knowledge and technologies to go to market quickly with innovative products and services. Figure 8 outlines how knowledge and innovation “infrastructure” elements are brought together to generate healthy economic growth and job creation.<sup>1</sup>

**Figure 8: Key Elements in an Innovation-Driven Knowledge Economy**



The key to success in this world is people – the leaders, entrepreneurs, researchers, designers, technicians, managers, and others – who can work collaboratively and effectively in a fast-paced,

<sup>1</sup> Adopted from *Clusters of Knowledge: Where are the Skilled Workers?*, a presentation by Richard Seline, New Economy Strategies, LLC, February 2008



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complex, and highly networked system of partners, sophisticated intermediaries, and suppliers to bring value-adding products and services to market quickly and profitably.

The vital role of universities and colleges in knowledge creation and its application has long been recognized. What is now becoming more obvious is the critical role that colleges must play in developing graduates with advanced leadership and entrepreneurship skills. Graduates need not only strong “hard” skills (finance, engineering, etc.) but also a set of cognitive and creative skills to be able to adapt quickly to rapidly changing workplace and market requirements. Regional economies that can attract and retain these talented workers will be well rewarded. According to an advisor to the Council on Competitiveness, America does not need just more engineers, it needs a new kind of engineer:

To compete with talented engineers in other nations, in far greater numbers and with far lower wage structures, American engineers must be able to add significantly more value than their counterparts abroad through their greater intellectual span, their capacity to innovate, their entrepreneurial zeal, and their ability to address the grand challenges facing our world.<sup>2</sup>

During 2009, the Council hosted a forum, titled *Economic Competitiveness: Aligning Higher Education and Workforce Needs*, with internal and external thought leaders to discuss these issues. This forum focused on ways to enhance the alignment of higher education with emerging workforce needs. Dr. Christine Chmura, President of Chmura Economics and Analytics, led the discussion. Figure 9 on the following page, which is based on an analysis by Chmura, projects continued growth in the demand for middle- and high-level workforce skills. Projections of workforce demands by region also show what appear to be ongoing shortages and surpluses of certain types of skilled labor. For instance, Dr. Chmura projects ongoing shortages of nurses and other medical workers in Southside Virginia while Northern Virginia will experience a surplus of computer programmers.

The discussions at the forum made clear that the root causes of persistent regional skill shortages can be difficult to untangle:

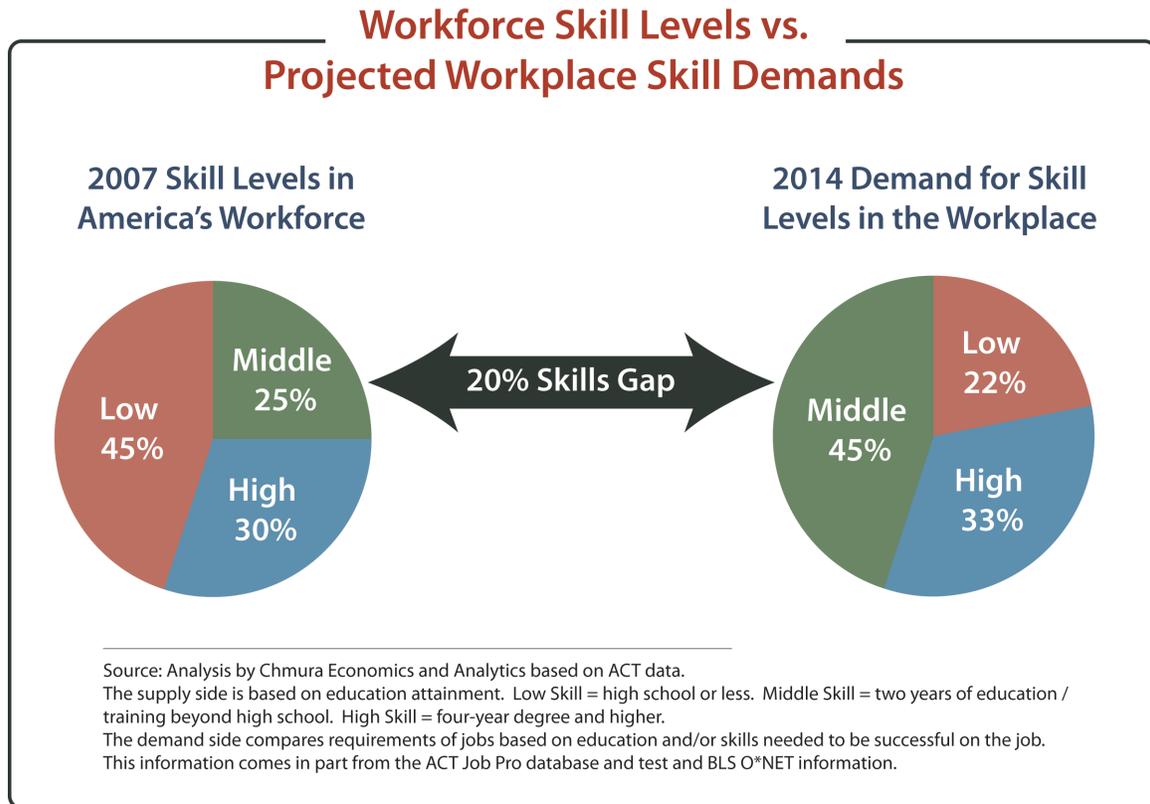
- Regional, state, and national economies can change rapidly, with shorter-term economic boom-and-bust cycles exacerbating or moderating longer-term changes driven by the growth and decline of individual firms, industry sectors, and entire regional economies.

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<sup>2</sup> Duderstadt, James. *Engineering for a Changing World: A Roadmap to the Future of Engineering Practice, Research, and Education*, 2008



Figure 9



- Regions might be able to produce more graduates with needed skills but still not close skill gaps because graduates migrate to other regions with better amenities, compensation levels, or job opportunities.
- Students must weigh many factors about their future with less than perfect information. It can be difficult for individuals to accurately assess future workforce demands.
- One study indicates that ongoing shortages of certain skilled workers, such as teachers, are not due to a lack of supply from colleges and universities. The problem is that schools are finding it hard to retain teachers already working.
- Colleges and universities are responsive to the demands of their primary customers – their students – and are reluctant to offer courses that are not in demand.
- Virginia’s elite colleges produce many students sought after for jobs outside of Virginia.
- While regional differences may persist, projections clearly indicate that at the state level there will be a continuing shift away from lower-skilled jobs to those that require higher skill levels and provide corresponding benefits.



In such a dynamic environment, students make the best decisions they can with imperfect information about long-term consequences. What role should the state play in this dynamic and ever-changing marketplace? The state can help students and colleges improve decision-making by making better information more accessible. This is the goal behind the Education Wizard ([vawizard.org/vccs/Main.action](http://vawizard.org/vccs/Main.action)), a major new information tool developed by the Virginia Community College System that will soon be expanded to cover four-year institutions and a wide range of workforce development programs. The Education Wizard is a web-based tool that brings a wealth of information together—job prospects, career requirements, educational opportunities and costs, and more—to help them make key decisions with as much current data as practical.

[Note: During the forum on economic competitiveness and the workforce, the relationship between workforce requirements based on longer-term industry growth projections and the NCHEMS estimates of the degrees required to meet best-performing countries was discussed. Additional estimates by Dr. Chmura and an analysis by NCHEMS show that the number of degrees required to meet projected workforce requirements is essentially the same as the degrees required to meet the international educational attainment benchmark. More detail is provided in Appendix D.]

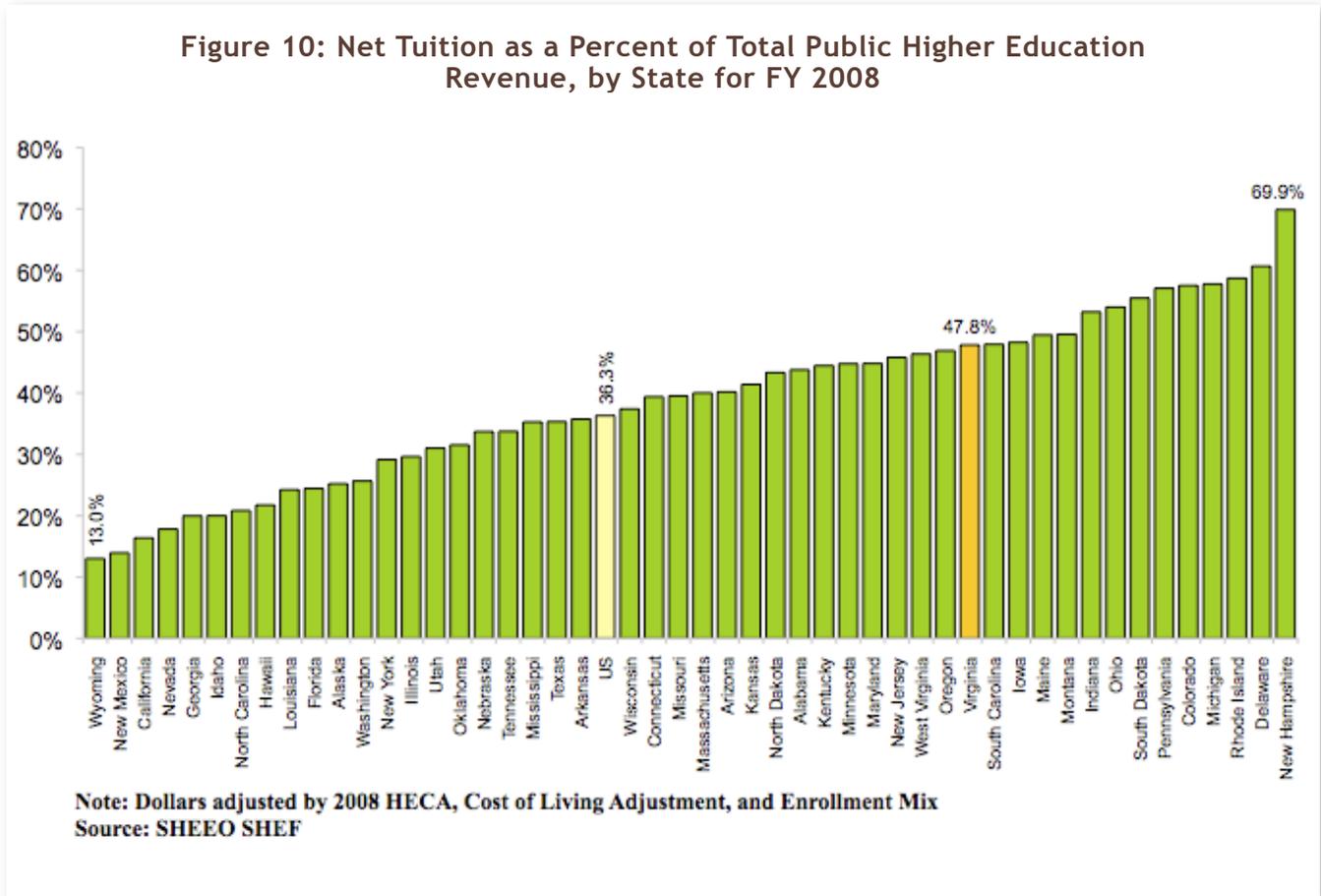
### **Finances and Productivity**

The challenges facing higher education—producing more of the right kinds of graduates—are becoming more complicated because Virginia’s budget difficulties are projected to continue at least into the next biennium. A large budget gap in the current fiscal year was closed in part through a significant reduction in funding for higher education. Moreover, little growth in tax revenue is expected over the next several years, while demands from health care, corrections, and K-12 education will continue to compete with higher education. Rising health care costs also affect the total compensation costs at the colleges and universities. Personnel-related costs account for the majority of education and related-expenses at four-year institutions in Virginia, and health-related expenditures are the fastest rising component of those costs.

Despite increasing tuitions, Virginia’s colleges still appear to be an attractive investment for both in-state and out-of-state students. In Virginia, \$10,885 of state funding and net tuition per full-time equivalent (FTE) student is used for education operations at its colleges and universities, putting the state solidly in the middle of state spending nationally. However, this total has risen faster than inflation and has grown largely because of increases in tuition, as state appropriations have not kept pace with rising costs. Between fiscal years 2003 and 2008, state and local funding per FTE student increased by about 2.4 percent after adjusting for inflation (the number of stu-



dents increased by almost 11 percent).<sup>3</sup> However, net tuition per FTE rose by more than 26 percent in inflation-adjusted terms over the same period. Net tuition is now almost 48 percent of total education funding per FTE (Figure 10) in Virginia. This is the 14th highest rate in the country and is up from about 33 percent in FY 2002.<sup>4</sup>



Some of the growth in tuition revenue was due to the growth in out-of-state students who are generally expected to pay the full cost of their education. While out-of-state enrollment grew by about 9.5 percent between the 2003-04 and 2008-09 school years, it represented 17.4 percent of total enrollment growth in Virginia’s public four-year institutions.

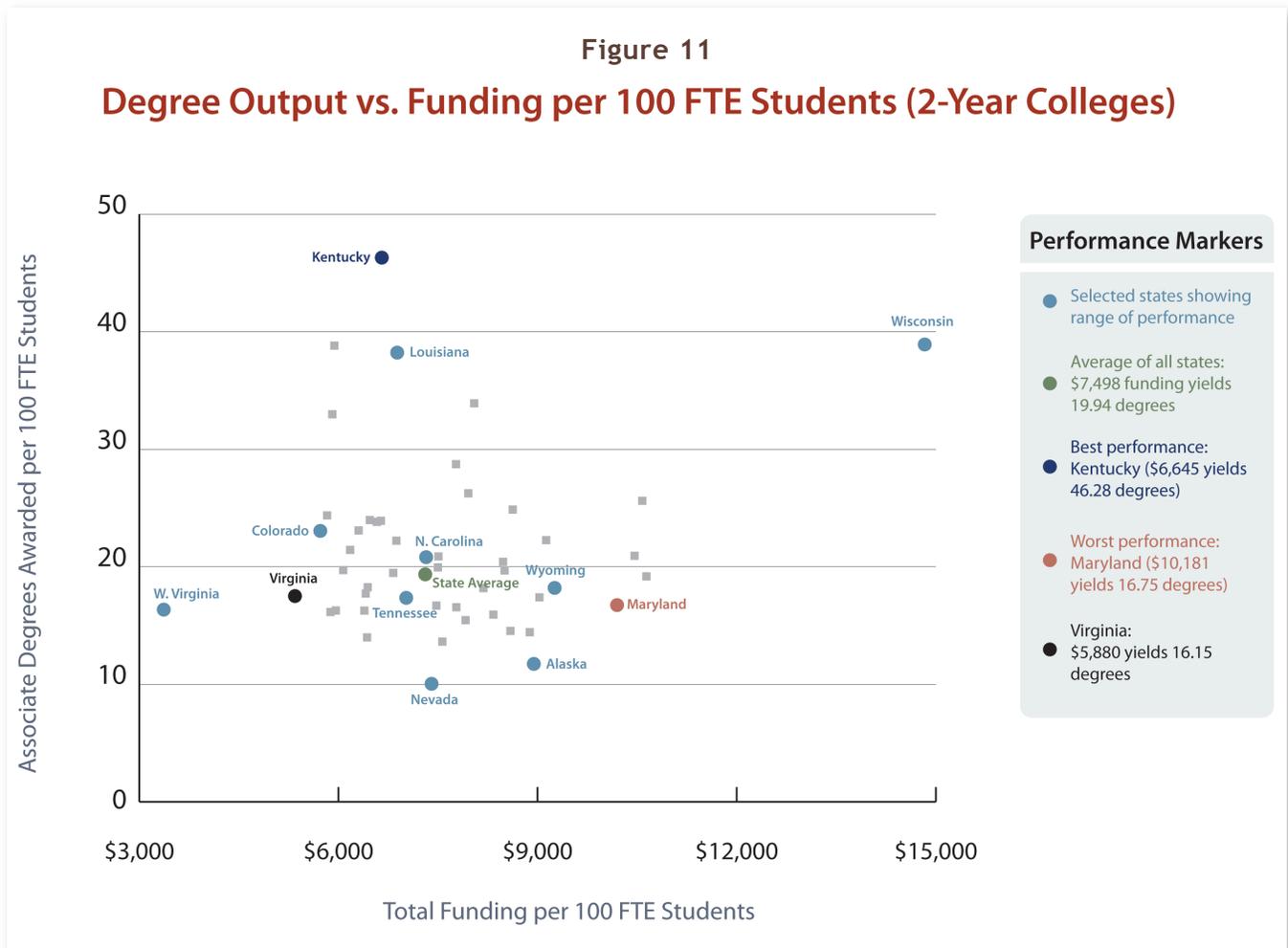
Continuing fiscal challenges make enhancing productivity growth another important issue for higher education. At a recent meeting convened by the Council, data presented by Dennis Jones, President of NCHEMS, and Jane Wellman, Executive Director of the Delta Project on Postsecondary Education Costs, Productivity, and Accountability, indicates that, while productivity levels

<sup>3</sup> SHEEHO, State Higher Education Finance Report (SHEF), 2009.

<sup>4</sup> Net Tuition Revenue is calculated by taking the gross amount of tuition and fees, less state and institutional financial aid, tuition waivers or discounts, and medical student tuition and fees.



as measured by degrees awarded by total funding per FTE student is relatively high in Virginia, there is room for improvement. In any case, Jones and Wellman suggested that continuing fiscal constraints would make increasing productivity a strategic imperative for all institutions no matter how well they are currently performing. Moreover, information for the Virginia Community College System (Figure 11) shows that, while performance is consistent with funding levels and better than many states, there are opportunities to increase degree production.



### Assessing Progress

Virginia is making progress in terms of graduating more students. As noted earlier, Virginia's enrollment rate, measured as the number of native students enrolled as new students per 100,000 residents, has been increasing. Virginia has also performed well in terms of the proportion of students enrolling in postsecondary education directly from high school. In 2006, according to NCHEMS, 67.2% of Virginia high school graduates enrolled directly in a college or university upon graduation (11th in the nation). At another critical juncture in the education pipeline, SCHEV reports that the retention rate of first-time, full-time freshmen returning for their second



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year of education at Virginia colleges and universities in 2009 was a relatively strong 86 percent for four-year institutions and 61 percent at two-year colleges.

**College Readiness:** Progress in preparing students for success in college appears mixed. On the positive side, more of Virginia's high school students are engaging in advanced coursework in preparation for college. The Virginia Department of Education reports that Virginia ranked third in the nation in terms of the percentage of students qualifying for college credit on Advanced Placement (AP) examinations, with 18,568 public high school students earning a score of three or higher on examinations in 2009, up from 12,349 in 2004. In addition, participation in AP testing among minority students has increased dramatically, and the number of African-American students achieving a qualifying score on at least one AP exam has nearly doubled in the last five years.

On a less positive note, SCHEV reports that statewide rates of participation in remedial coursework among first-time, first-year students enrolled directly in college following graduation from a Virginia high school reached 24 percent in 2008-09, up from 19.4 percent in 2007-08, and the highest rate in at least the last eight years. Moreover, ACT reports that only 27 percent of Virginia students met all college readiness benchmarks of the ACT examination in 2008.

**Graduation Rates:** While Virginia's enrollment and graduation rates are increasing, there is room for improvement. Graduation rates—measured as a percentage of entering freshmen that graduate within 150 percent of program time—vary considerably by institution. According to data reported by SCHEV for the freshman class in four-year institutions beginning in 2002, about 67.7 percent completed a degree within six years. However, the rate is only 53.4 percent if the four best-performing universities (James Madison, Virginia, Virginia Tech, and William and Mary) are removed from the calculation. The SCHEV-reported graduation rate in 2008 for first-year community college students entering in 2005 was 14.9 percent. However, the National Center for Education Statistics, utilizing different data sources, reports that the graduation rate was 27.2 percent in 2007.

**Affordability:** A common challenge now faced by all states is improving higher education affordability. Unfortunately, higher education has become much less affordable for students and their families in Virginia. Since 2000, according to data reported by NCHEMS, the share of family income after financial aid needed to pay for college expenses at public four-year institutions in Virginia has increased from 17.1 percent to almost 29 percent. To finance education at Virginia's community colleges, students and their families must now devote approximately 21 percent of their income after financial aid.



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## Conclusion

Virginia's K-16 education system and the educational attainment of its working-age adults are the envy of many of other states and nations. And, while Virginia's education picture is good relative to its key competitors now, the picture for the future is somewhat mixed. The issue isn't whether Virginia's education system is good or very good, it is how fast competitors are getting better relative to Virginia: Can Virginia continue to maintain or enhance its long-term competitive position in a global economy? Critical issues include:

- Enhancing the readiness of Virginia's high school students for college and work
- Improving retention and completion rates in Virginia's colleges
- Increasing the alignment of higher education with rapidly evolving workforce needs
- Strengthening the capacity of Virginia's system of higher education to manage change and growth in difficult fiscal conditions.



## Appendix A

### Education Pipeline Summary, Part 1

This four-part table – a summary of progress along Virginia’s student pipeline – includes one or more indicators of the current state, targets established for key indicators of progress, a list of key initiatives underway in Virginia to improve outcomes in that section of the pipeline, and the key organizations for education in Virginia. Brief descriptions for the initiatives listed in the tables are included in Appendix C. Unless otherwise noted, performance data are reported in Virginia Performs (VaPerforms.virginia.gov). Other sources include the U.S. Census Bureau’s 2008 American Community Survey, the State Council of Higher Education for Virginia (SCHEV), and the National Center for Higher Education Management Systems (NCHEMS).

	School Readiness	Third Grade Reading/ Fourth Grade Math	Eighth Grade Achievement
	↑	↑ Third Grade Reading → Math: 16th	↓ Math: 20th → Reading: 16th
Current State	<ul style="list-style-type: none"> <li>• According to PALS-K, the number of kindergartners needing additional instruction dropped from 19% in 2004 to 14% in 2008.</li> <li>• The Virginia Preschool Initiative served 15,639 children in the 2008-09 school year.</li> </ul>	<ul style="list-style-type: none"> <li>• Third grade SOL reading scores improved from an 81% pass rate in 2007 to a 87% pass rate in 2009.</li> <li>• Virginia’s NAEP math score declined slightly to 243 in 2009 from 244 in 2007.</li> </ul>	<ul style="list-style-type: none"> <li>• NAEP math scores declined to 286 in 2009 from 288 in 2007.</li> <li>• The reading score declined to 267 in 2007 from 268 in 2005.</li> <li>• A total of 34% of Virginia students had completed Algebra 1 by the eighth grade as of 2008.</li> </ul>
Targets	<ul style="list-style-type: none"> <li>• Increase the number of at-risk students served by the Virginia Preschool Initiative to 15,000 by the 2010 school year.</li> </ul>	<ul style="list-style-type: none"> <li>• Increase the pass rate on the third grade reading SOL test from 84% as of January 2006 to 95% by October 2010.</li> </ul>	<ul style="list-style-type: none"> <li>• Increase the percentage of students completing Algebra 1 by the eighth grade to 45% by the end of 2010, up from 30% in 2006.</li> </ul>
Key Initiatives	<ul style="list-style-type: none"> <li>• Smart Beginnings</li> <li>• Virginia Preschool Initiative</li> </ul>	<ul style="list-style-type: none"> <li>• Early Intervention Reading Initiative</li> <li>• Reading First</li> <li>• Even Start Family Literacy Program</li> </ul>	<ul style="list-style-type: none"> <li>• Middle School Mathematics Teacher Corps</li> <li>• Algebra Readiness Initiative</li> <li>• Making Middle Grades Work</li> </ul>
Key Organizations	<ul style="list-style-type: none"> <li>• Virginia Office of Early Childhood Development</li> <li>• Virginia Early Childhood Foundation</li> <li>• Virginia Start Quality Rating and Improvement System</li> </ul>		<ul style="list-style-type: none"> <li>• Southern Regional Education Board</li> </ul>
	Department of Education		
	Virginia’s P-16 Council		



## Education Pipeline Summary, Part 2

	Secondary Education	
	High School Graduation	College and Career Readiness
	↑	↑ (Graded B+ by Measuring Up 2008)
Current State	<ul style="list-style-type: none"> <li>The new On-Time Graduation Rate for 2008-09 was 83.2%, up from 82.1% for 2007-08.</li> <li>The new cohort Dropout Rate for 2008-09 was 7.9%, down from 8.7% for 2007-08.</li> </ul>	<ul style="list-style-type: none"> <li>A total of 15,475 students passed selected occupational competency assessments and industry certifications in 2007-08.</li> <li>52% of diploma graduates received an Advanced Studies Diplomas in 2007-08.</li> <li>In 2007-08, 19% of students were enrolled in AP, dual enrollment, or International Baccalaureate (IB) courses.</li> <li>In 2009, 18,568 public high school students earned a qualifying score on at least one AP test, up from 12,349 in 2004.</li> <li>There were 14,121 registered apprenticeship participants as of December 2008.</li> </ul>
Targets	<ul style="list-style-type: none"> <li>Targets will be revamped based on the new On-Time Graduation Rates.</li> </ul>	<ul style="list-style-type: none"> <li>By 2010 increase to 15,000 the number of students passing selected industry certifications.</li> <li>By 2010 increase the % receiving an Advanced Studies Diploma to 57%.</li> <li>Increase AP, IB, and dual enrollment to 25% by 2010.</li> <li>Increase registered apprenticeship participants to 14,691 by mid-2010.</li> </ul>
Key Initiatives	<ul style="list-style-type: none"> <li>Project Graduation</li> <li>GED &amp; Adult Education</li> <li>Middle College</li> <li>America Diploma Project</li> <li>New Technical Diplomas</li> <li>High Schools That Work</li> <li>Academic/Career Plans</li> <li>Grad/Completion Index</li> </ul>	<ul style="list-style-type: none"> <li>Early College &amp; Commonwealth Scholars</li> <li>Dual Enrollment</li> <li>GEAR UP</li> <li>Path to Industry Certification</li> <li>Virtual Advanced Placement School</li> <li>Career Coaches / Pathways / Academies</li> <li>Advance Placement / Intl. Baccalaureate Programs</li> <li>Tech Prep</li> </ul>
Key Organizations	Virginia's P-16 Council	
	Virginia Department of Education	
		Virginia's Workforce Council



## Education Pipeline Summary, Part 3

	Postsecondary Education	
	Associate's Degrees	Certifications & Workforce Training
	↑ 27 <sup>th</sup> (Assoc. Degrees within 3 years)	↑ 8 <sup>th</sup> (50-state poll of workforce training), 9 <sup>th</sup> (New Economy Index Workforce Education)
Current State	<ul style="list-style-type: none"> <li>27.2% of students pursuing an associate's degree beginning in Fall 2004 had graduated within three years (NCHEMS).</li> <li>In fall 2009, 7,082 VCCS students transferred to four-year institutions in Virginia (SCHEV).</li> </ul>	<ul style="list-style-type: none"> <li>In fiscal year 2009, VCCS awarded 5,168 Career Readiness Certificates, a 19% increase over the prior year (VCCS).</li> <li>In fiscal year 2009, VCCS served 253,000 individuals through workforce development initiatives (VCCS).</li> </ul>
Targets	<ul style="list-style-type: none"> <li>Rank in the top ten percent in the nation with respect to graduation, retention and job placement rates (Source: VCCS Dateline 2009).</li> <li>Triple the number of graduates who successfully transfer to 4-year colleges and universities (Source: VCCS Dateline 2009).</li> </ul>	<ul style="list-style-type: none"> <li>Increase the use of Career Readiness Certificates 10% annually (Source: Workforce Development Strategic Plan.)</li> <li>Provide workforce training programs for 225,000 individuals annually (Source: VCCS Dateline 2009).</li> </ul>
Key Initiatives	<ul style="list-style-type: none"> <li>Achieve the Dream</li> <li>Guaranteed Admissions Programs</li> <li>VCCS Education Wizard and Virginia's Career View</li> <li>VCCS Dateline 2009 Strategic Plan</li> <li>Institution-specific goals, targets, and strategies</li> </ul>	<ul style="list-style-type: none"> <li>VCCS Workforce Training Services</li> <li>Career Readiness Certificates</li> <li>Workforce Investment Act (WIA) One-Stops</li> <li>Apprenticeship-related Instruction</li> <li>Workforce Development Academy</li> <li>Career Coaches / Pathways</li> <li>Institution-specific goals, targets, and strategies</li> </ul>
Key Organizations	Virginia Community College System	
	Virginia Department of Education	
	Virginia's Workforce Council	
	Virginia's P-16 Council	
	State Council of Higher Education for Virginia	



## Education Pipeline Summary, Part 4

	Postsecondary Education	
	Bachelor's Degrees	Post-Baccalaureate
Current State	<p style="color: green; font-weight: bold;">↑ 10th</p> <ul style="list-style-type: none"> <li>63% of students pursuing a bachelor's degree starting in Fall 2001 had graduated within six years (NCHEMS).</li> <li>In 2007, 35% of 18-24 year-olds in Virginia were enrolled in post-secondary education (NCHEMS).</li> <li>In 2008, 33.6% of Virginia's population ages 25 and over attained at least a bachelor's degree (2008 American Community Survey).</li> </ul>	<p style="color: green; font-weight: bold;">↑ 4th (Master's Degrees), 9th (Professional Degrees), 4th (Doctorates)</p> <ul style="list-style-type: none"> <li>In 2008, 14.3% of Virginia's population aged 25 to 64 had a graduate or professional degree (NCHEMS).</li> <li>In 2008-09, Virginia's public institutions produced 10,819 master's degrees, 1,450 first professional degrees, and 1,439 doctorates (SCHEV).</li> </ul>
Targets	<ul style="list-style-type: none"> <li>Established by each institution and not all are specific. Includes graduation and retention rates.</li> <li>Increase the proportion of 18-24 year-olds enrolled in post-secondary education to 39% in 2010. (Source: Workforce Development Strategic Plan)</li> <li>Increase the proportion of 25-65 year-olds with at least a bachelor's degree to 37% by 2010. (Source: Workforce Development Strategic Plan).</li> </ul>	<ul style="list-style-type: none"> <li>Established by each institution and not all are specific. Includes graduation and retention rates.</li> <li>By 2013-14, Virginia's public post-secondary institutions project annual degree production of 12,596 master's degrees; 1,437 first professional degrees; and 1,557 doctorates (SCHEV).</li> </ul>
Key Initiatives	<ul style="list-style-type: none"> <li>Liberal Education &amp; America's Promise (Baccalaureate)</li> <li>Career Coaches</li> <li>College Access Challenge Grant Program Initiatives</li> <li>Virginia Mentor</li> <li>Virginia's Career VIEW</li> <li>Guaranteed Admission Agreements/Transfer and Articulation Agreements</li> <li>Institution-specific strategies and initiatives under the Restructuring Act</li> </ul>	
Key Organizations	<p>State Council of Higher Education for Virginia</p> <p>Virginia's P-16 Council</p> <p>Virginia's Workforce Council</p>	



## Appendix B

### Education Data from Virginia Performs ([VaPerforms.virginia.gov](http://VaPerforms.virginia.gov))

#### School Readiness

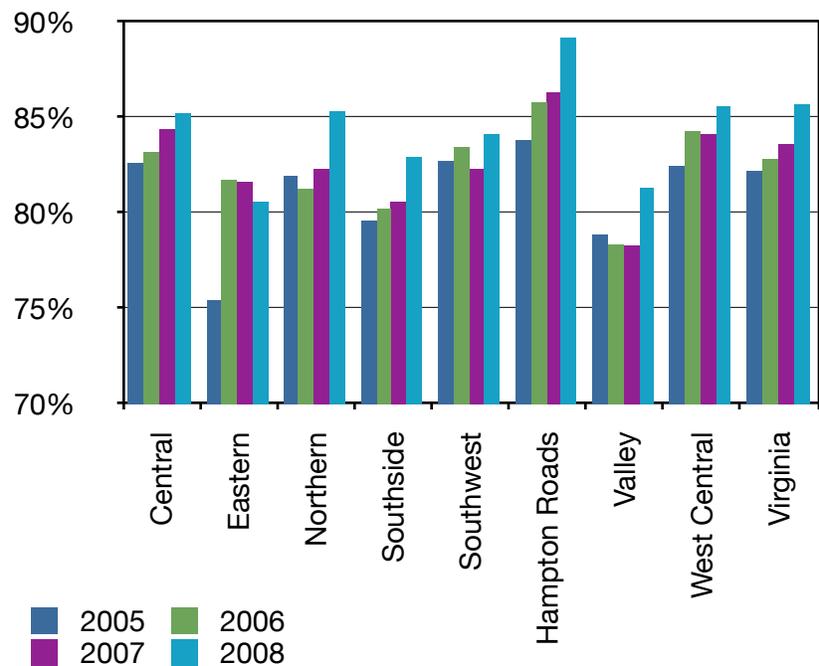
##### Why is this Important?

In order to fully benefit from the instruction provided in kindergarten and beyond, children must come to school with fundamental skills already established. Years of research on child development and early learning show that several interrelated areas of development define school readiness, including physical well-being, personal and social development, language development, and cognition and general knowledge. These areas of development are important because they build on one another and form the foundation of learning and social interaction.

##### How is Virginia Doing?

While no uniform single "readiness" assessment is widely used for all aspects of development, Virginia uses a screening tool to identify students who are at risk for reading difficulties. The Phonological Awareness Literacy Screening for Kindergarten (PALS-K) assessment is a screening tool used to identify students who are below kindergarten-level expectations in important literacy fundamentals. Students identified below these grade-level benchmarks are provided with additional instruction through Virginia's Early Intervention Reading Initiative (EIRI).

Figure B-1: PALS-K Scores by Region



In Fall 2008, 14.3 percent of Virginia kindergartners assessed using PALS-K were identified as needing additional instruction, while 85.7 percent met or exceeded the benchmark. The Hampton Roads region led the state with 89.2 percent at or above the benchmark, followed by the West Central region at 85.6 percent. The Eastern region's rate of 80.6 percent was the lowest.



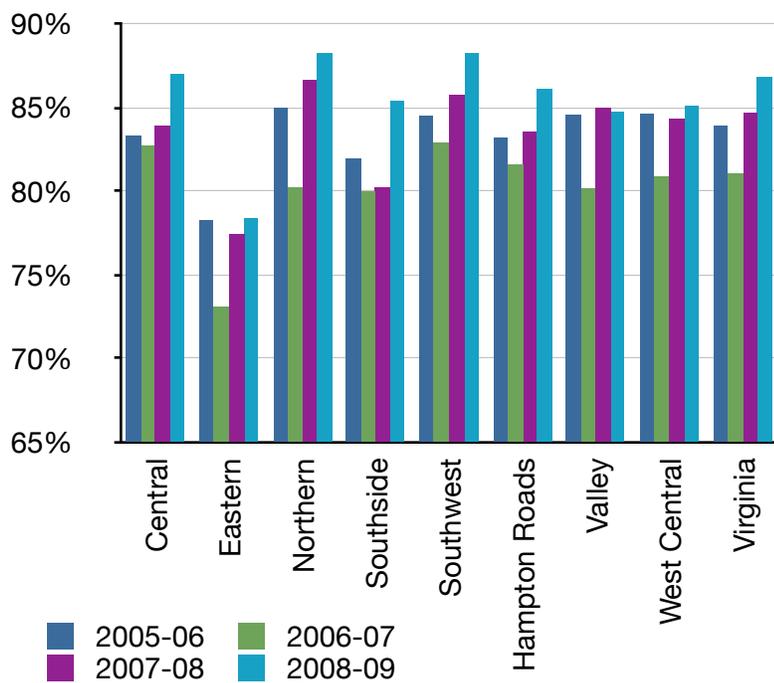
## Third Grade Reading

### Why is This Important?

In the first few years of school, students must learn the core skills that will allow them to reach higher levels of learning in subsequent years. Emphasis in third grade English is on learning about words; reading age-appropriate text with fluency and expression; learning comprehension strategies; and writing stories and reports. From fourth grade on, reading skills are critical to learning other subjects. Achievement scores at the end of the third grade are therefore good predictors of later school success.

### How is Virginia Doing?

**Figure B-2:  
Third Grade Standards of Learning Pass Rate**



In the 2005-06 school year, the Department of Education implemented a new Standards of Learning Reading test that eliminated the writing component and placed a greater emphasis on reading comprehension. After a decline in the 2006-07 school year to 81.0 percent, the statewide pass rate improved to 84.6 percent in 2007-08 and to 86.8 percent in 2008-09. In 2008-09, the Eastern and Valley regions had the lowest pass rates, at 78.4 and 84.7 percent respectively. The Northern (88.2%) and Southwest (88.2%) regions experienced the highest pass rates in 2008-09.

The statewide advanced pass rate meaning students who passed 31 of 35 items declined from 38.9 percent in 2007-08 to 37.2 percent in 2008-09. In 2008-09, the Northern region had the best advanced performance at 41.2 percent, followed by the Central region at 40.4 percent. The Southside region had the lowest rate at 29.8 percent.



## Fourth Grade Reading and Math

### Why is This Important?

The increase in student achievement since adoption of the Standards of Learning (SOL) in 1995 is confirmed by the performance of Virginia students on the National Assessment of Educational Progress (NAEP), also known as the "Nation's Report Card." Performance on fourth grade reading and math assessments predict success in future grades.

### How is Virginia Doing?

In 2007, Virginia ranked sixth in the reading test. In 2009, Virginia tied with Colorado for 16th in math on the fourth grade NAEP test. The national averages for reading (2007) and math (2009) were 220 and 239 out of 500 respectively. In reading, Virginia's score of 227 was better than its three peer states: North Carolina (218), Maryland (225), and Tennessee (216). In math, Virginia's score of 243 in 2009 was essentially unchanged from its score in 2007 of 244. Virginia's score in math outperformed the nation (239) and Tennessee (232) but was lower than Maryland and North Carolina, both at 244. Massachusetts posted both the highest reading score at 236 (2007) and the highest math score at 252 (2009) in the nation.

Figure B-3: Fourth Grade NAEP Reading, 2007

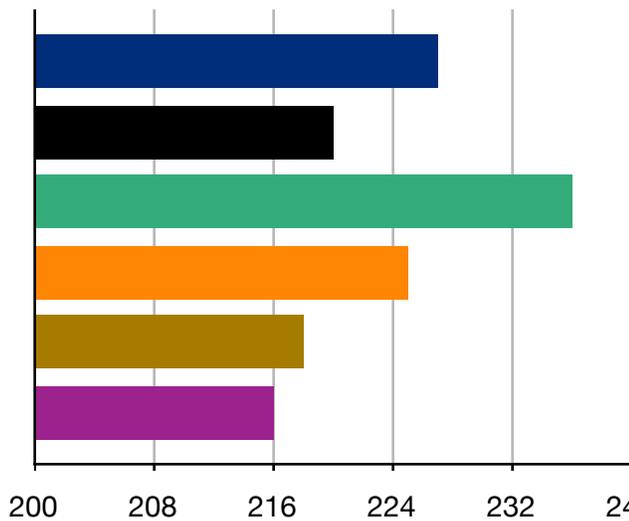
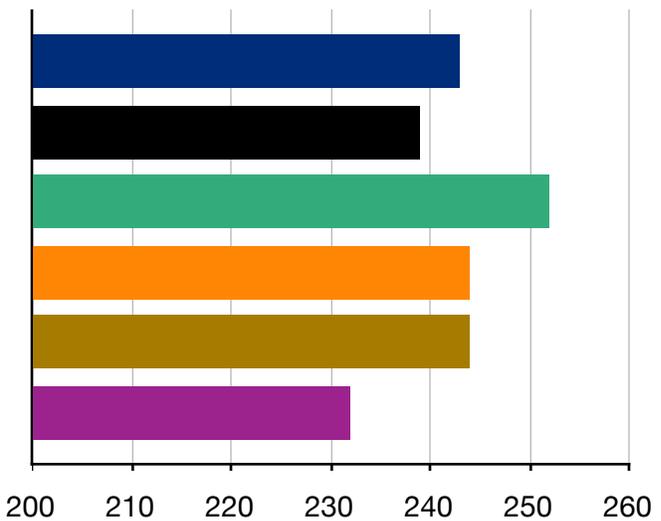


Figure B-4: Fourth Grade NAEP Math, 2009



■ Virginia  
■ Massachusetts  
■ North Carolina  
■ United States  
■ Maryland  
■ Tennessee



## High School Graduation

### Why is This Important?

The high school graduation rate is one measure of the success of a state's elementary and secondary educational system and the quality of its workforce. Completion of high school or its equivalent is increasingly the minimum level of education sought by employers; moreover, unemployment rates are lower and lifetime earnings are substantially higher for high school graduates than for high school dropouts.

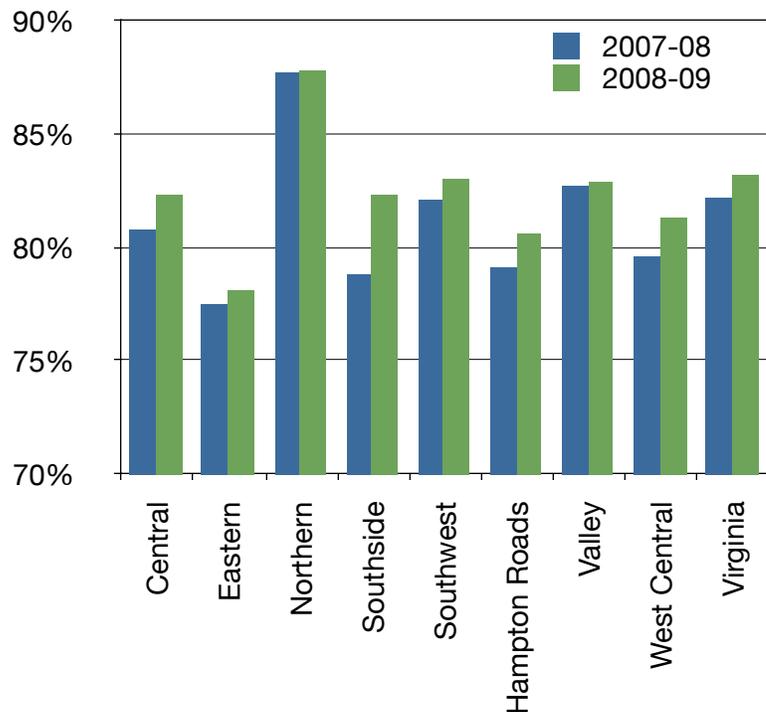
### How is Virginia Doing?

Based on estimates by the National Center for Education Statistics, Virginia's high school graduation rate was 75.5 percent in 2007 (most current year available), which was the 29th highest in the country. Virginia's graduation rate has consistently been above the national average, which was 73.9 percent in 2007. Virginia had a higher graduation rate than Tennessee (72.6%) and North Carolina (68.6%), but a lower rate than Maryland (80.0%). The leading state, Vermont, had an 88.6 percent graduation rate.

Virginia is one of a growing number of states that have imple-

mented a new, more accurate measure of high school graduation. (Almost all states are in the process of implementing this new measure.) Called the On-time Graduation Rate, this measure accounts for transfers in and out of the system, along with other events that were not accounted for in the old measurement approach. Graduation rates (using the new method) improved for each of Virginia's regions in 2008-2009 compared to 2007-2008, with the statewide average increasing from 82.2 percent to 83.2 percent. The Northern region (87.8%) has a rate that exceeds the statewide average, while the Southwest (83%), Valley (82.9%), Southside and Central (82.3%), West Central (81.3%),

Figure B-5: On-Time High School Graduation Rates, by Region, 2007-08 and 2008-09





Hampton Roads (80.6%), and Eastern regions (78.1%) have graduation rates that are below the state-wide average. Graduation rates improved in every region.

## High School Dropouts

### Why is This Important?

The high school dropout rate is also a measure of the success of our elementary and secondary educational systems. Moreover, because high school dropouts are at higher risk of unemployment and other social ills, dropout rates are a leading indicator of potential future problems. For example, according to the U.S. Bureau of Labor Statistics, in 2008 the average national unemployment rate for those without a high school diploma was 9 percent. The unemployment rate for individuals 25 and older with a high school diploma was 5.7 percent and 2.8 percent for those with a bachelor's degree.

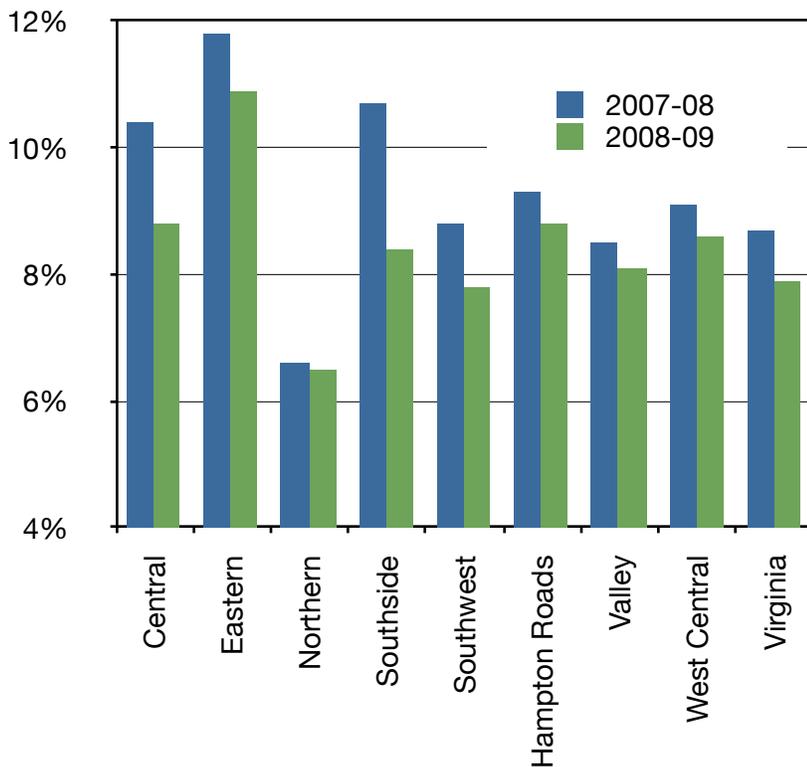
### How is Virginia Doing?

Based on the National Center for Education Statistics data, Virginia's high school dropout rates have

decreased in recent years, falling from 3.9 percent in 2000 to 2.6 percent in 2007. During the 2006-07 school year, Virginia had the 7th lowest dropout rate in the country. Virginia's rate was also lower than the national rate of 4.4 percent and the rates of its peer states. Tennessee's dropout rate in 2006-07 was 3.1 percent and Maryland's rate was 3.8 percent. New Jersey had the lowest dropout rate in 2007 at 1.95 percent.

Cohort dropout rates, like the new on-time graduation rates, improved in all of Virginia's regions for the 2008-09 school year.

**Figure B-6: High School Cohort Dropout Rates**





## College Graduation and Enrollment Rates

### Why is This Important?

High college graduation rates and degree numbers benefit Virginia by contributing to the quality of the workforce and the overall competitiveness of its economy. College graduation rates are an indicator of the quality and productivity of the state's K-12 and higher education resources.

### How is Virginia doing?

Two measures are presented here to help assess how Virginia is doing with regard to college graduation. The first measure is the number of degrees awarded per 100,000 residents, an indicator of the state's progress in elevating the overall educational attainment of its citizenry. The second, and related measure, is college graduation rates or the percentage of the freshman cohort who graduate within 150 percent of normal time – that is, three years for an associate's degree and six years for a bachelor's degree. These rates indicate how Virginia is doing both in terms of number of degrees but also the effectiveness of the colleges and universities in retaining and helping students complete their degrees.

### Degrees Awarded

College degree award rates are measured as the number of degrees awarded by degree level per 100,000 residents. Since 2000, Virginia's degree output has risen for associate's, bachelor's, and graduate/professional degrees. In 2000, the degree rate was 162 per 100,000 residents for associate's, 473 for bachelor's, and 203 for graduate/professional degrees. In 2007, the rates stood at 220, 515, and 235, respectively.

In 2007, Virginia's associate's degree rate ranked 25th among the states and below the national average of 241 per 100,000; the rate for bachelor's degrees was above the national average of 505 and ranked

**Table B-1: Graduates per 100,000 Residents by State, 2007**

State	Associate's	Bachelor's	Graduate/ Professional
National	241.4	505.3	250.4
Virginia	219.7	515.3	234.7
Maryland	185.5	457.3	296.9
North Carolina	217.3	455.4	182.1
Tennessee	172.0	443.0	187.1
Wyoming - leading associate's	536.5	323.4	115.1
Rhode Island - leading bachelor's	361.3	943.6	270.6
Massachusetts - leading Grad/Prof	165.8	742.4	552.4



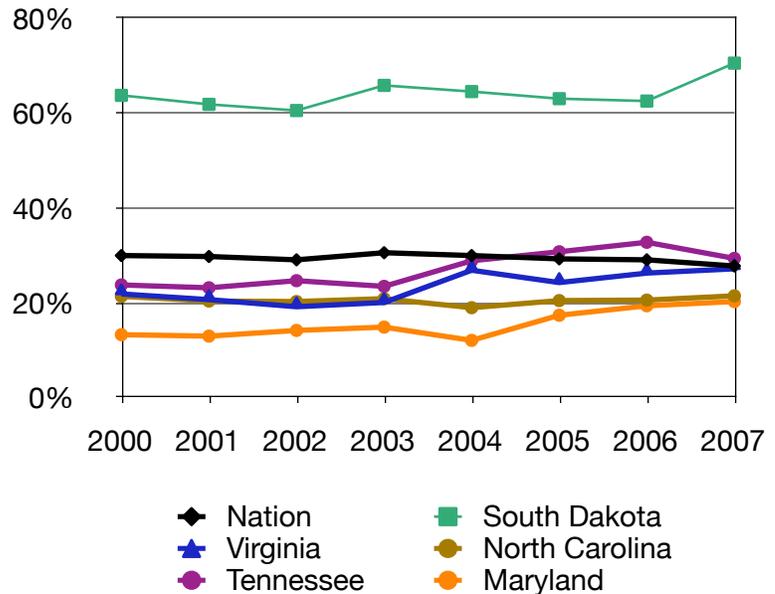
Virginia 28th. Graduate/professional degree production was also below the national average of 250 and ranked 22nd.

The national leaders were Wyoming for associate's degrees (537), Rhode Island for bachelor's degrees (944), and Massachusetts for graduate/professional degrees (552). Among Virginia's neighbors, Maryland produced more graduate/professional degrees (297). However, Virginia did lead the region in bachelor's and associate's degrees.

### Graduation Rates

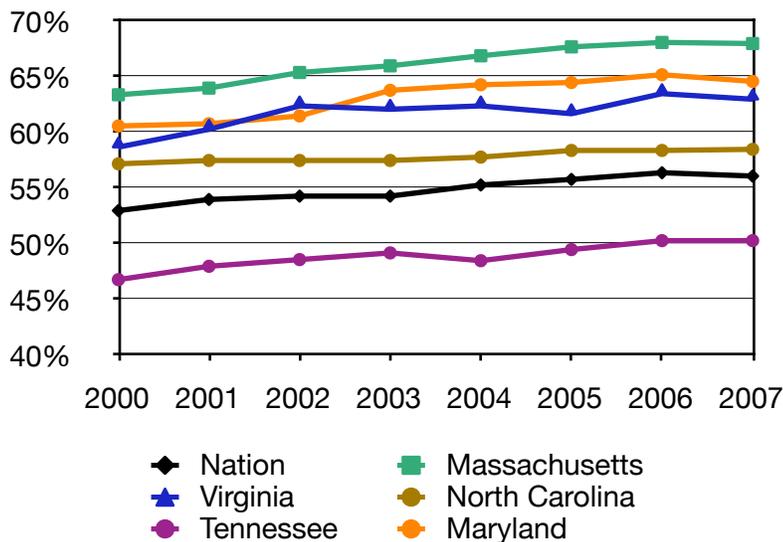
Since 1998, Virginia's graduation rate for students seeking an associate's degree has generally been rising. In 1998, the graduation rate was 20.2 percent. In 2007, the rate stood at 27.2 percent, ranking Virginia 27th nationally

**Figure B-7: Three-Year Graduation Rates, Associate's Degree**



and below the national average of 27.8 percent. However, it is above North Carolina (21.5%) and Maryland (20.3%), but still below Tennessee's 29.4 percent. South Dakota had the highest associate degree graduation rate in the nation in 2007 at 70.6 percent.

**Figure B-8: Six-Year Graduation Rates,**



In contrast, Virginia's rate of graduation for bachelor's degrees within six years is 9th in the nation. The baccalaureate graduation rate in Virginia has generally been increasing, at least since 1998. Virginia's rate in 2007 was 63 percent. The highest ranking state, Massachusetts, had a rate of

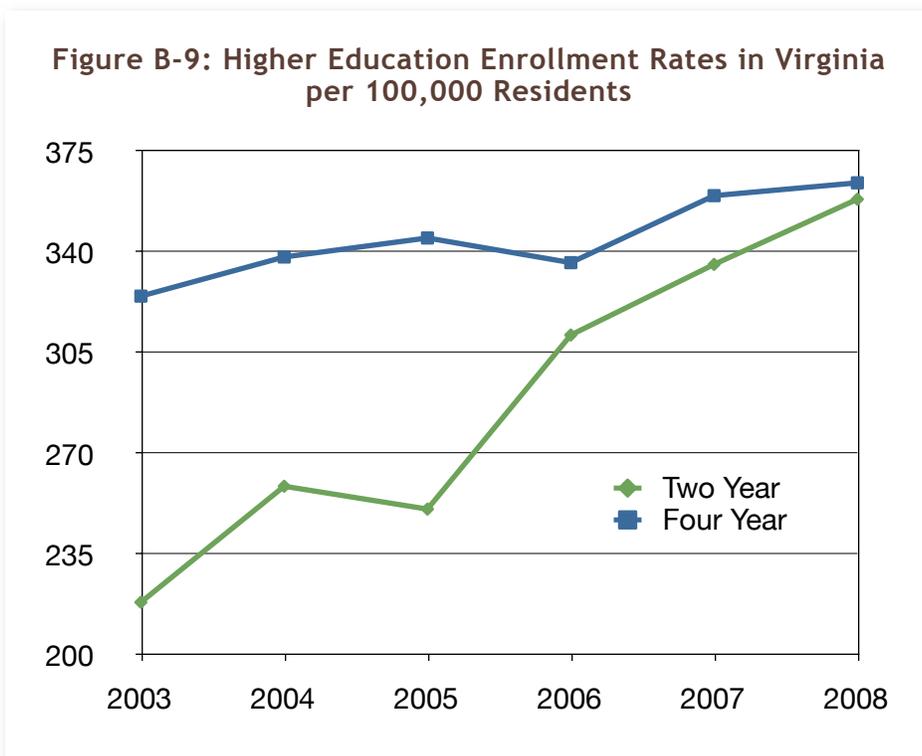


68 percent. North Carolina, Tennessee, and Maryland had rates of 58 percent, 50 percent, and 65 percent, respectively.

### Enrollment Rates at Institutions of Higher Education

Virginia's enrollment rates are measured as the number of native students per 100,000 residents enrolled as new students; these rates have also increased. Enrollment at public community colleges went up from 179 new students per 100,000 residents in 2000 to 359 per 100,000 in 2008. At public and private, non-profit four-year schools, the rate increased from 317 to 364. From 2003 to 2008 the growth in enrollment rates at two-year institutions averaged 10.4 percent a year, significantly higher than the 2.3 percent growth rate at four-year institutions.

Enrollments at two-year institutions include full- and part-time, first-time students that are enrolled in a degree, certificate, baccalaureate credit, or occupational/technical program. Among Virginia's regions, the Southwest sent the most new students to public community colleges (567) and Central Virginia the fewest (294). The Northern region sent the most new students to four-year public and private non-profit colleges (422); the Southwest region (147) sent the fewest.





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## Appendix C

### Key Initiatives for the Education Pipeline December 2009

#### Pre-K Through Eighth Grade

- **Smart Beginnings:** Directs new and improved resources to families with children from birth to age five and is comprised of an array of health, education, and parental involvement programs. The initiative highlights the connection between high quality, early childhood education and a competitive workforce, and ultimately a vital economy for the Commonwealth.
- **Virginia Preschool Initiative (VPI):** Distributes state funds to schools and community-based organizations to provide quality preschool programs for at-risk four-year-olds not served by Head Start. The goal is to provide comprehensive preschool programs for 100 percent of Virginia's at-risk four-year-olds. The purpose of the grants is to reduce disparities among young children upon formal school entry and to reduce or eliminate those risk factors that lead to early academic failure. To obtain state funding, localities must develop a written local plan for programs that include quality preschool education, parental involvement, comprehensive social and health services, and transportation.
- **Early Intervention Reading Initiative:** Provides early reading intervention services to kindergarten through third grade students who demonstrate reading deficiencies on the PALS (Phonological Awareness Literacy Screening) assessment. The initiative assists school divisions in efforts toward ensuring all children read at grade level by the third grade.
- **Reading First:** Authorized by No Child Left Behind, Reading First provides funds to train teachers of kindergartners through third grade in the essential components of reading and to select and administer screening, diagnostic, and classroom-based instructional reading assessments to identify those children who may be at risk of reading failure. Funds may also be used by schools to purchase resources that support reading instruction and for school-based reading coaches.
- **Even Start Family Literacy Program:** Administered by the Virginia Department of Education, the Even Start Family Literacy Program is a federally funded program designed to improve the academic achievement of children and their parents, especially in the area of reading. The program uses a family-centered approach, which embraces the whole family as the "student," and provides an integrated program of early childhood education, adult education and basic skills instruction, parenting education, and interactive literacy activities between parents and their children.
- **Middle School Mathematics Teachers Corps:** Provides the structure and incentives for school divisions to hire experienced mathematics teachers for middle schools that have been designated as at risk in mathematics. Teachers selected are dynamic, well-qualified teachers who have demonstrated success in teaching mathematics in challenging environments.



- **Algebra Readiness Initiative (ARI):** Helps school divisions prepare students for success in algebra. School divisions are eligible for incentive payments to provide mathematics intervention services and instruction to students in grades six through nine who are at-risk of failing the Algebra I end-of-course test, as demonstrated by their individual performance on diagnostic tests (pre- and post-tests) that have been approved by the Virginia Department of Education.
- **Board of Education Recommended Instructional Models/Programs:** Virginia’s Standards of Accreditation (SOAs) require schools accredited with a warning in English or mathematics to implement instructional methods that have a proven track record of success in raising student achievement. The Board of Education is required to publish a list of recommended instructional methods that are proven to work with low-achieving students. The Virginia Department of Education Office of School Improvement also publishes a wide range of resources for improving student achievement.
- **Making Middle Grades Work (MMGW):** Coordinated by the Southern Regional Education Board (SREB), this program is built upon a comprehensive improvement framework that successful schools address to raise student achievement. MMGW schools are developing practices for each of the elements and conditions that promise improvement in student achievement. The goal for all MMGW schools is, “to increase the percentages of eighth graders who perform at the NAEP ‘proficient’ level in core academic subjects and who leave eighth grade ready for college-preparatory work in high school.” Outstanding practices employed by MMGW schools are released regularly.

## Secondary and Postsecondary Education

- **Project Graduation:** Identifies and assists students at risk of not meeting the Standards of Learning (SOL) graduation requirements that became effective in 2004. The initiative includes regional academies for seniors and rising seniors and online tutorials developed specifically to prepare students for success on the SOL reading test and Algebra I SOL assessment. The academies are funded through state grants to individual school divisions or regional cooperatives.
- **GED Programs/Adult Education:** General Educational Development (GED) tests enable persons without a high school credential to demonstrate the attainment of abilities normally associated with completion of a high school program of study. The Virginia Adult Learning Resource Center offers resources on the GED such as testing sites, test-taking strategies, and tutorials for GED teachers. The *Race to GED* is a workforce initiative of the Office of Adult Education to promote GED programs in order to meet or exceed 20,000 Virginians passing the GED tests annually. The “PlugGED In” pilot in Southwest Virginia allows adults without a high school diploma to prepare for technology jobs while they are studying for their GEDs.
- **Middle College:** Allows individuals without a high school degree to simultaneously pursue a GED, community college education, and a workforce certification in a college environment. The program offers targeted remedial courses, access to workforce readiness courses, enrollment in



community college courses applicable to a degree or industry-based certificate, and support services.

- **Achieve, Inc. and The America Diploma Project:** The American Diploma Project (ADP) is an initiative of Achieve, Inc., which works with its 34 partner states to restore value to the high school diploma through 1) aligning high school standards and assessments with college and career readiness standards; 2) promoting college- and career-ready diplomas; 3) building assessments into state systems; and 4) developing accountability systems that promote college and career readiness. Achieve, Inc. tracks state progress in its annual report, *Closing the Expectations Gap*.
- **Standard and Advanced Technical Diplomas:** Beginning with the ninth grade class of 2010-2011 (pending final regulations), students will have the option of graduating with a Standard or Advanced Technical diploma. To graduate with a Standard Technical Diploma, students must earn at least 22 units of credit by passing required courses and electives, including at least six verified credits (earned by passing end-of-course SOL tests or other assessments approved by the Board of Education). In addition, students must earn at least four standard credits in career and technical education in a concentration approved by the Board of Education. To earn an Advanced Technical Diploma, students must earn at least 26 units of credit and at least nine verified credits, including three standard credits in career and technical education and one additional credit either in career and technical education or fine arts.
- **High Schools That Work (HSTW):** An initiative of the Southern Regional Education Board (SREB) that provides participating states with a variety of staff development and technical services to implement 10 “key practices” aimed at improving student achievement and instituting a culture of high expectations and continuous improvement. Key practices include increasing student achievement expectations, college preparatory coursework, integration of career/technical studies, and use of student assessment and program evaluation data to improve curriculum and instruction. The initiative’s assessment (administered to seniors) provides data on students’ reading, mathematics, and science achievement as well as students’ and teachers’ opinions on high school curriculum and instruction. Outstanding practices identified from HSTW sites are disseminated by SREB.
- **Academic/Career Plans:** These customized plans, beginning at the middle school level and periodically updated, help guide students through course selection and preparation for post-secondary education and careers. Plans will be required for every student beginning with those entering the seventh grade during the 2010-2011 school year.
- **Graduation and Completion Index (GCI):** Under this new metric for accreditation, high schools would earn weighted “index points” towards accreditation based on the status of the 9th grade cohort and all other students in the 12th grade class. The GCI would include weighted percentage points for students who graduate from high school in four years or less, earn a GED certificate, remain in school for more than four years, or earn a certificate of completion. For full accreditation, schools would be required to meet benchmarks on the Board of Education’s GCI. School Performance Report Cards report a school’s GCI, annual and cohort dropout rates, com-



pletion rates, and diploma and credential types.

- **Common Core State Standards Initiative:** This multi-state initiative, entered into by Virginia in May 2009, will develop a “common core” of K-12 English-language arts and mathematics standards that are internationally benchmarked. The standards will build directly on recent efforts of leading national organizations and states that have developed college- and career-ready standards. The agreement calls for the development of a core set of high school standards by late summer of 2009 and elementary and middle school standards in both subjects by the end of 2009. Once developed, states will have the opportunity to adopt the standards or align them with their current content standards. Adoption of the common core of standards is not binding on member states. The initiative is led by the National Governors Association (NGA) Center for Best Practices and the Council of Chief State School Officers (CCSSO). Also involved in the standards-drafting process will be Achieve, Inc. (founder of the multi-state American Diploma Project), ACT, and the College Board.
- **Early College Scholars Program:** Allows eligible high school students to earn at least 15 hours of transferable college credit while completing the requirements for an Advanced Studies Diploma. For eligibility, students must have a “B” average or better, be pursuing an Advanced Studies Diploma, and take and complete college-level coursework (through AP, International Baccalaureate, Cambridge, or dual enrollment).
- **Dual Enrollment:** Arrangements between the boards of participating public high schools and colleges in which students may enroll in for-credit college courses while still in high school. Earned credits may then be applied to the Early College Scholars Program and/or the Commonwealth College Course Collaborative (CCCC), which provides for the acceptance of completed credit hours (for degree credit) at participating post-secondary institutions in Virginia.
- **GEAR UP:** Helps low-income students attend and succeed in post-secondary education by providing early intervention services and a scholarship program for eligible students who demonstrate financial need. Students must be a member of a selected cohort and participating Virginia school. Criteria for school selection include a school’s percentage of students attending a middle school within a school division who qualify for free or reduced lunches.
- **Path to Industry Certification/Tech Prep:** Encourages students to work toward earning an industry certification, achieving a state license, or passing an occupational competency assessment while pursuing a high school diploma. Students who earn a credential and complete a Career and Technical program may earn up to two student-selected verified credits to meet graduation requirements.
- **Virtual Advanced Placement School/Virtual Virginia:** Provides a variety of Advanced Placement (AP) courses, enabling students to earn college credit, regardless of their high school's ability to offer college-level courses. The Virginia Department of Education reimburses school divisions for tuition and test fees for students who sign an Early College Scholars Agreement.
- **Career Coaches:** Career Coaches are Virginia Community College System (VCCS) employees based in local high schools with the mission to help high school students define their career aspi-



rations and recognize post-secondary programs and services that can help students achieve their goals. Services provided to students from career coaches include assistance with dual-enrollment, career pathways and other community college and university programs, college application processes, financial aid/scholarships, and career assessments.

- **Career Pathways:** An evolving initiative involving the strategic deployment and utilization of the Commonwealth's economic, workforce, and educational resources. The Governor's Task Force on Career Pathways System Development was created to develop a strategic plan for implementing the state's career pathways system. The further development of a statewide career pathways system in Virginia is underway in accordance with the December 2008 release of *Bridging Business and Education for the 21<sup>st</sup> Century Workforce: A Strategic Plan for Virginia's Career Pathways System*.
- **Career Prep/Career and Technical Academies:** Career pathways beginning in high school that contain an integrated curriculum of core academics and career and technical education that continues through an associate degree, industry certification or licensure, or registered apprenticeship. Career and Technical Academies are programs designed to expand options for the general student population to acquire STEM (Science, Technology, Engineering and Mathematics) literacy and other critical skills, knowledge, and credentials to prepare them for high-demand, high-wage, and high-skill careers in Virginia. Each academy is a partnership of school divisions, post-secondary institutions, and business and industry.
- **Advanced Placement (AP)/International Baccalaureate (IB) Programs:** This advanced high school coursework gives students with sufficient test scores the opportunity to earn college credit while in high school. Courses are taken either individually (AP) or as a series in a prescribed sequence (IB).
- **Achieve the Dream:** This community college initiative utilizes data-driven research to boost student access and success. The initiative is particularly focused on increasing student access, success, and narrowing the achievement gap among traditionally underrepresented populations.
- **Guaranteed Admission Agreements/Transfer and Articulation Agreements:** System-wide agreements through which students who graduate from one of Virginia's 23 community colleges with an associate's degree and a minimum grade point average may obtain guaranteed admission to more than 20 of the Commonwealth's public and private colleges and universities.
- **VCCS Education Wizard:** A search engine-type technology dedicated to helping Virginia's citizens gain easy access to information about careers and educational opportunities available to them. Specifically, users can choose a career, find information on pursuing this career, enroll in one of Virginia's community colleges, pay for college, or transfer to a four-year college or university. The Wizard allows users to compare costs at different types of colleges and determine how much and what type of financial aid one might expect to receive at an institution.
- **Virginia Mentor:** A web-based system providing information on academic preparation for college, advice and mentoring on paying for college, information and comparative views on two- and four-year public and private institutions in Virginia, high school academic planning and prepara-



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tion for college, and career self-assessment and matching services. Funded through the College Access Challenge Grant Program.

- **Virginia’s Career VIEW:** A web-based system providing information about educational and career opportunities for students from kindergarten through post-secondary education. The service also networks with school guidance counselors to distribute newsletters on financial aid, study skills, and college/career planning.
- **VCCS Dateline 2009 Strategic Plan:** System-wide and institution-specific goals crafted along the broad areas of access to higher education, workforce development, and economic opportunity. Progress is tracked at the system and institutional levels, with the seven goals of enrollment; workforce training; graduation, retention, and placement rates; transfer to four-year colleges and universities; affordable tuition; dual enrollment with high schools; and private funding.
- **Institutional Performance Standards under the Restructuring Act (2005):** The Restructuring Act grants all public colleges and universities, including the Virginia Community College System (VCCS), greater financial and administrative autonomy in exchange for commitments to meet specific statewide goals. These goals include maintaining affordability, offering a broad range of academic programs (undergraduate & graduate), maintaining high academic standards, improving student retention and ensuring timely graduation, developing articulation agreements with the VCCS, stimulating economic development, increasing expenditures for research and number of patents and licenses, establishing programs with K-12 schools to improve student achievement and teacher skills, developing a six-year plan stressing improvements in various academic areas, meeting certain financial and administrative standards, and ensuring student safety and security.
- **VCCS Workforce Development Services:** An array of standard and customized workforce training, skills development, and workforce certification and licensure preparation services provided by VCCS. Key initiatives include career coaches, apprenticeship-related instruction, middle college, and tech prep.
- **Career Readiness Certificates:** A statewide employability certificate that provides a workplace skills certification that businesses can directly connect to productivity, quality, business processes, and profitability. Career Readiness Certificates are graded at three levels – Gold, Silver and Bronze – depending on WorkKeys exam scores.
- **Workforce Investment Act (WIA) One-Stops:** Full-service sites that provide core employment services (including job search and placement assistance, access to computers, telephones, fax and copy machines, resume and cover letter development, employment-and related workshops) to all jobseekers, as well as training and career education services to those who are eligible. Centers also provide access to other partner program services as required by federal legislation.
- **Apprenticeship-Related Instruction (ARI):** Administered by VCCS, ARI is a collaborative effort between the Virginia Department of Labor and Industry, secondary education, technical centers, and local colleges to provide related instruction in high-skill trades and occupations. Instruction for registered apprentices includes theoretical and technical knowledge.



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- **Workforce Development Academy:** A collaboration between the University of Virginia and VCCS, the Academy provides training and professional development to workforce development instructors, administrators, educators, human resources professionals, and those interested in pursuing careers in workforce development. Offerings include a certificate in Workforce Development, a noncredit certificate for the completion of the Workforce Development Professional Competencies course, professional certification, noncredit courses, and competencies training.
  - **Liberal Education & America’s Promise (LEAP):** A signature initiative of the Association of American Colleges and Universities (AAC&U) LEAP champions the value of a liberal education through the development of a common set of “essential learning outcomes” that are transferable across institutions. The “essential learning outcomes” were developed through a multi-year dialogue with hundreds of colleges and universities about needed goals for student learning, analysis of a long series of recommendations and reports from the business community, and analysis of the accreditation requirements for engineering, business, nursing, and teacher education. Virginia is one of four states now involved in a LEAP partnership.
  - **College Access Challenge Grant Program Initiatives:** A two-year federal formula grant program designed to foster partnerships among Federal, state, and local government entities and philanthropic organizations to significantly increase the number of students who enter and remain in post-secondary education. A priority of the grant is to provide services to students and families below the poverty line. Virginia’s campaign, “Information is Key to Access and Success,” is designed to demystify post-high school educational opportunities and access. Workshops provide information on the importance of post-secondary education, career planning, and how to apply, finance, enroll, and succeed in post-secondary education.



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## Appendix D

This appendix describes the relationship between the NCHEMS target of 104,670 additional degrees needed by 2020 and employment projections for jobs requiring college degrees over the same time period.

As noted in this Issue Insight, in the spring of 2009, the National Center for Higher Education Management Systems (NCHEMS) worked with the Council on Virginia's Future to determine how many additional degrees (associate and bachelor's) it would take for the state of Virginia to match the most educated countries in the world by the year 2020. As outlined on page 9, Virginia would need to produce an additional 104,670 college degrees from both private and public institutions by 2020 to match the highest current attainment level among the leading developed economies.

These estimates are not related to projections of specific workforce requirements for 2020. A chart discussed by Dr. Chmura at the Council's first higher education forum suggested to some participants that, based on projected industry growth and the current mix of degree requirements, the state would create only 239,239 more jobs over a 10-year period that would require an associate's degree or higher. This is significantly different from the 784,950 degrees that NCHEMS estimates would have to be produced to attain parity with the best country for higher education attainment. (The 784,950 figure equals the number of degrees expected to be produced if current degree production levels are maintained 680,280 combined with the 104,670 additional degrees needed to meet the international benchmark.)

There are two issues with this comparison:

1. The Chmura slide discussed at the forum showed the growth in total jobs by industry, not total job openings. That is, it did not include an estimate of the jobs that would open over the period due to current workers leaving the workforce due to retirement and other reasons. Revised projections for the period to 2018 were provided by Dr. Chmura and extended to 2020 by NCHEMS using the same growth rate projections. This analysis projects a need for an additional 481,168 degreed individuals by 2020 (300,450 due to industry growth and 180,718 due to retirements).
2. Workforce projections assume that industry will require the same mix of degrees as in the base year. However, the percentage of jobs requiring a degree has increased over the years. The Public Policy Institute of California estimates that the mix of job skill requirements will shift from 31 percent of California jobs requiring a bachelor's degree or better in 2005 to 41 percent of jobs in 2025. The Center on Education and the Workforce at George Washington University estimates that, nationally, the mix will shift from about 42



percent of jobs requiring an associate's degree or better in 2007 to 45 percent of jobs in 2018. Given Virginia's reliance on a well-educated workforce, it is reasonable to assume that job requirements in Virginia would experience a similar evolution. According to an analysis by NCHEMS, occupations requiring an associate's degree or better grew by 0.58 percent a year between 2000 and 2007. If that growth rate continued, the total jobs requiring an associate's degree or better would increase by another 295,402. This suggests that the total projected demand for additional college degrees would equal 776,570. A summary of the NCHEMS analysis is presented in the following table.

Impacts on Degree Requirements	Degrees
Job openings created by industry growth to 2018 that require a college degree (Revised estimate by Dr. Chmura)	250,375
Add two years at projected growth rates (to align with the 2020 date of NCHEMS)	50,075
Growth in demand for college degrees due to retirements	180,718
Growth in demand for college degrees due to changing degree requirements - @ 0.58% per year (Source: NCHEMS analysis based on 2000 Census and 2007 ACS)	295,402
Total projected workforce demand for additional college-degree holders	776,570
Degree production at current annual rate (56,900)	680,280
Projected gap between degree production and workforce demand	96,290
Additional degrees needed to reach the attainment level of best performing countries (NCHEMS estimate)	104,670
Difference	8,380

Since a highly qualified graduate of a Virginia college would be a good substitute for a similarly qualified out-of-state candidate, this small difference (less than four percent of projected net immigration) means that the degree production needed to meet projected workforce demands or to meet the NCHEMS benchmark target are essentially the same.

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