

HOW MANY MORE SKILLED WORKERS DO WE NEED?

Using Supply and Demand Reports
for State Workforce Planning

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NATIONAL SKILLS COALITION
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State Workforce and Education Alignment Project
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Where Are the Skill Gaps?

State policymakers are consistently hearing from employers that they cannot find enough workers with specific occupational skills to hire for open positions. Millwrights and machinists, medical therapists and technicians, and installers and mechanics; these are just some of the positions for which governors and state legislators often hear there are “skill gaps.” That is, there are not enough people trained in the state to fill these jobs. Given the resources being spent in the state on workforce education and training programs — either out of the state’s own budget or from allocated federal sources — state policymakers wonder where the disconnect could be between the number of people who are being trained for particular positions in the state and the unfilled openings for those positions.

This paper presents a way that states can identify and measure gaps in the number of newly trained workers — with a focus on middle-skill jobs that require some postsecondary training but not a four-year degree. These are often called “supply-and-demand” reports and are used to compare the supply of skilled workers completing training programs with employer demand as measured by the number of job openings. State elected officials and other leaders can use this information to assess where education and training programs in the state are not at scale to address industry skill gaps, and to direct resources to where they are most needed to meet employer demand.

Figure 1 is indicative of the type of information that supply-and-demand reports can provide. It illustrates the annual

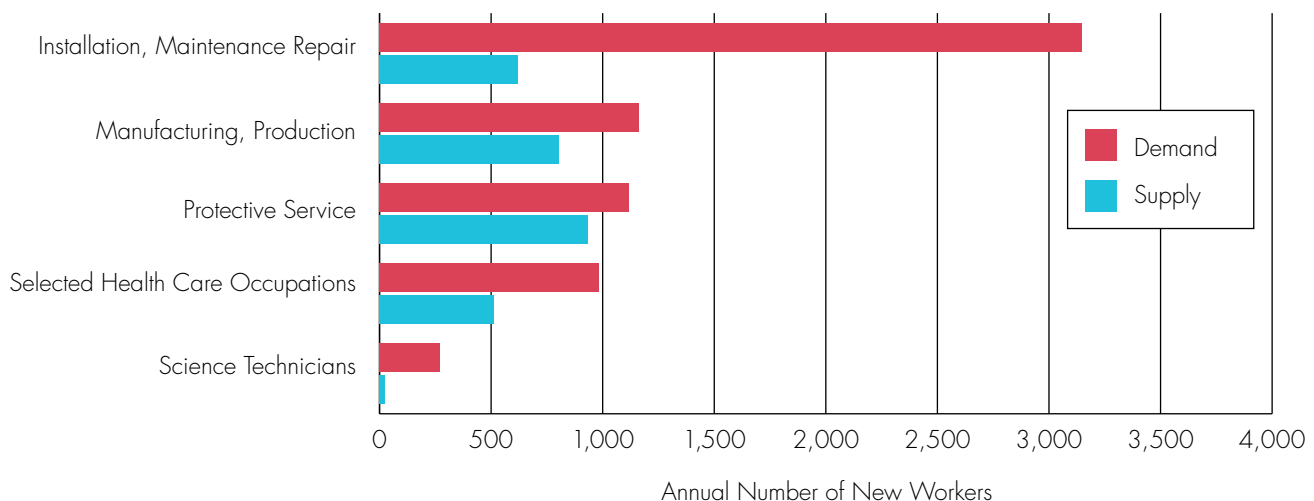
supply of newly trained workers for middle-skill jobs in Washington State compared to employer demand, broken down by field of study or occupation group. The figure shows where the supply of training needs to increase and by how much in order to meet employer demand.

So far, only a few states provide policymakers with this type of information. Drawing from the experience of these states, this paper explains the steps that other states can take to generate such supply-and-demand reports for use by governors, state legislators and state administrators.

Measuring Credential Attainment

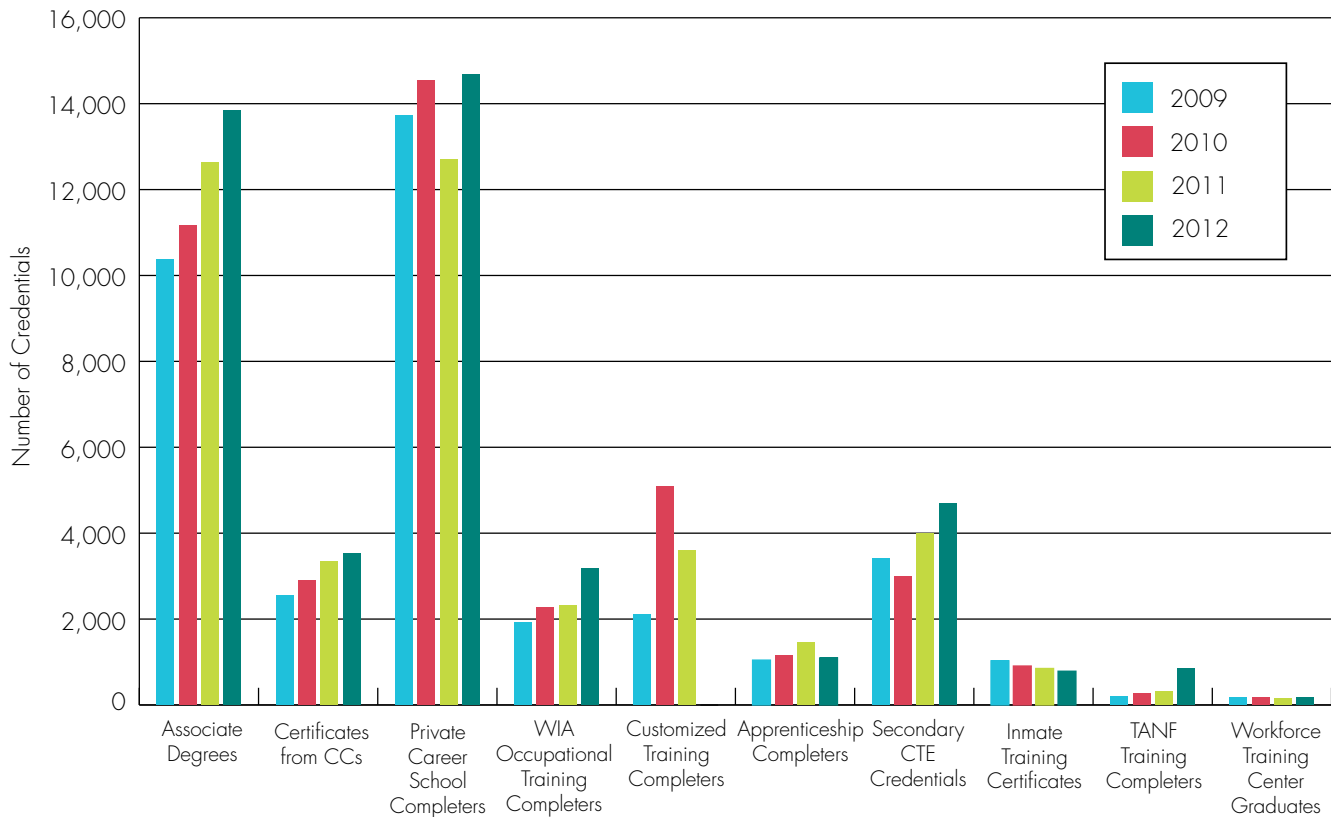
Some states have taken a first step in assessing skilled worker shortages by measuring the number of new credentials attained annually by students and workers. These states go beyond counting credentials issued by traditional higher education institutions and count both degree and non-degree credentials, such as certificates and industry certifications, even if they were obtained in a non-traditional setting. Such credentials have currency with employers and could be earned not only at community college, but also through an apprenticeship program, a union or at a community-based organization. Furthermore, the training that led to the credential could come from a wide range of public programs, including not only higher education programs, but also the Workforce Investment Act (WIA) and Supplemental Nutrition Assistance Program Employment and Training (SNAP E&T), among others.

FIGURE 1 Comparing Current Annual Supply and Future Demand for Middle-Skill Occupations in Washington State



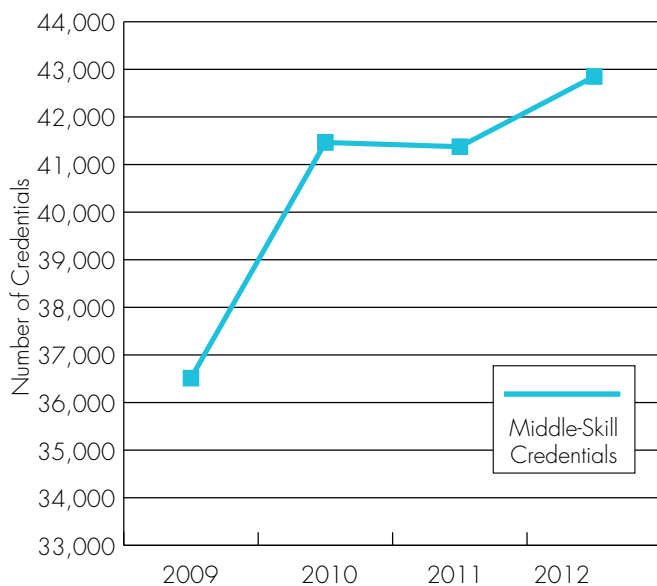
Source: “A Skilled and Educated Workforce,” Washington Student Achievement Council, State Board for Community and Technical Colleges, and Workforce Training and Education Coordinating Board, 2013.

FIGURE 2 Middle-Skill Credential Attainment in Maryland



Source: Maryland StateStat, 2013.

FIGURE 3 Total Middle-Skill Credential Attainment in Maryland



Source: Maryland StateStat, 2013.

For example, Maryland Governor Martin O’Malley established the goal of increasing the number of Marylanders who receive skills training by 20 percent by 2018. In order to measure progress against this goal, as part of Governor O’Malley’s highly regarded StateStat system, Maryland tracks the number of individuals who complete training through apprenticeships, community colleges (CCs), private career schools, WIA, the Department of Safety and Correctional Services, Temporary Assistance for Needy Families (TANF), and secondary career and technical education (CTE) (see Figures 2 and 3).

In some states, credential measurement has been directed by legislation. For example, Indiana’s House Enrolled Act 1314 directs the Department of Workforce Development to track the number of credentials issued by public and private training programs in the state, and directs the programs to cooperate in supplying the data required by the department. Additionally, Rhode Island’s legislatively authorized Unified Workforce Development Expenditure and Program Report contains the annual number of credentials from a similar array of programs.



States beginning the measurement process may want to spend some time establishing universal working definitions of credential terminology.

The definitions below are illustrative and align with how these terms are currently being used by federal agencies.

CERTIFICATION: A credential awarded by a certification body (not a school or government agency) based on an individual demonstrating, through an examination process, that he or she has acquired the designated knowledge, skills and abilities to perform a specific occupation or skill. The examination can be written, oral or performance-based. Certification is a time-limited credential that is renewed through a recertification process.

LICENSE: A credential that permits the holder to practice in a specified field. A license is awarded by a government licensing agency based on pre-determined criteria. The criteria may include some combination of degree attainment, certifications, certificates, assessment, apprenticeship programs or work experience. Licenses are time-limited and must be renewed periodically.

CERTIFICATE: A credential awarded by a training provider, educational institution or certification body based on completion of all requirements for a program of study, including coursework and tests or other performance evaluations. Certificates, as an academic award, are not time-limited and do not need to be renewed.

Source: Workforce Data Quality Campaign.

CHALLENGES

One of the common challenges faced by states measuring credentials across programs is consistency. Programs counting certificates, certifications and other credentials at the sub-associate degree level frequently do not define those terms in the same way. States beginning the measurement process may want to spend some time establishing universal working definitions of credential terminology. In addition, there are many industry certifications that are not captured by any single data source. National efforts are underway to address the lack of quality information on short-term credential attainment.

Another challenge is creating unduplicated counts. In order for policymakers to understand their state's workforce, higher education, and CTE education programs as a system, they need to know how the system is performing without counting the same participants multiple times. With the creation of state longitudinal data systems (SLDS), it becomes easier for research staff to provide elected officials and others with a complete picture of their workforce development system that is not clouded by duplications.

SLDS connect the information systems of different programs with one another, and store that information in data warehouses. With SLDS, states can track participants across multiple programs and know, for example, if the certificate reported by a community college and the certificate reported by a local workforce investment board is one and the same. Without weeding out duplicate counts of credential attainment, a state cannot know how many newly credentialed workers it is supplying.

Measuring Demand

In order for policy leaders to know if their state is supplying a sufficient number of newly prepared workers, they need to know how many jobs will be available and in what occupations. For this information, states can turn to their state labor market information (LMI) office typically located in the department of labor or employment security agency. For the LMI office in your state, see: <http://www.bls.gov/bls/ofolist.htm>.

Following U.S. Bureau of Labor Statistics (BLS) protocols, LMI shops forecast the number of net job openings expected in their state for more than 800 occupations. These are job openings due to employment growth or workers leaving their occupation, such as by retirement. If states' postsecondary institutions and other training programs are supplying the right number and mix of skilled workers, one would expect the supply of newly trained workers to generally match the number of net job openings for those occupations.

BLS forecasts occupational demand based upon demographic trends, macroeconomic models, industry input-output tables and industry staffing patterns. In order to forecast changes in staffing patterns, BLS considers expected shifts in product mix, changes in technology and changes in business practices including offshore outsourcing. In order to estimate job openings due to workers leaving their occupation, BLS uses historical survey data that shows the percentage of workers who left their occupation during the most recent five-year period broken down by age cohort, and then adjusts forecasted separations by the aging of the population.

Comparing Supply and Demand

Comparing the supply of newly trained workers for an occupation with net job openings is not as simple as analyzing two readily available sets of numbers. Several additional steps are required. Washington State and, more recently, Colorado have developed a process for refining these comparisons so that they are more accurate.

ADJUSTING THE SUPPLY COUNT

Not all education or training program completers enter the workforce. Some continue their education. Some focus on raising a family. Others enter the military, while still others for any of a number of reasons do not enter employment at all. The actual supply of newly skilled workers available to meet employer demand is therefore less than the number of people with new credentials.

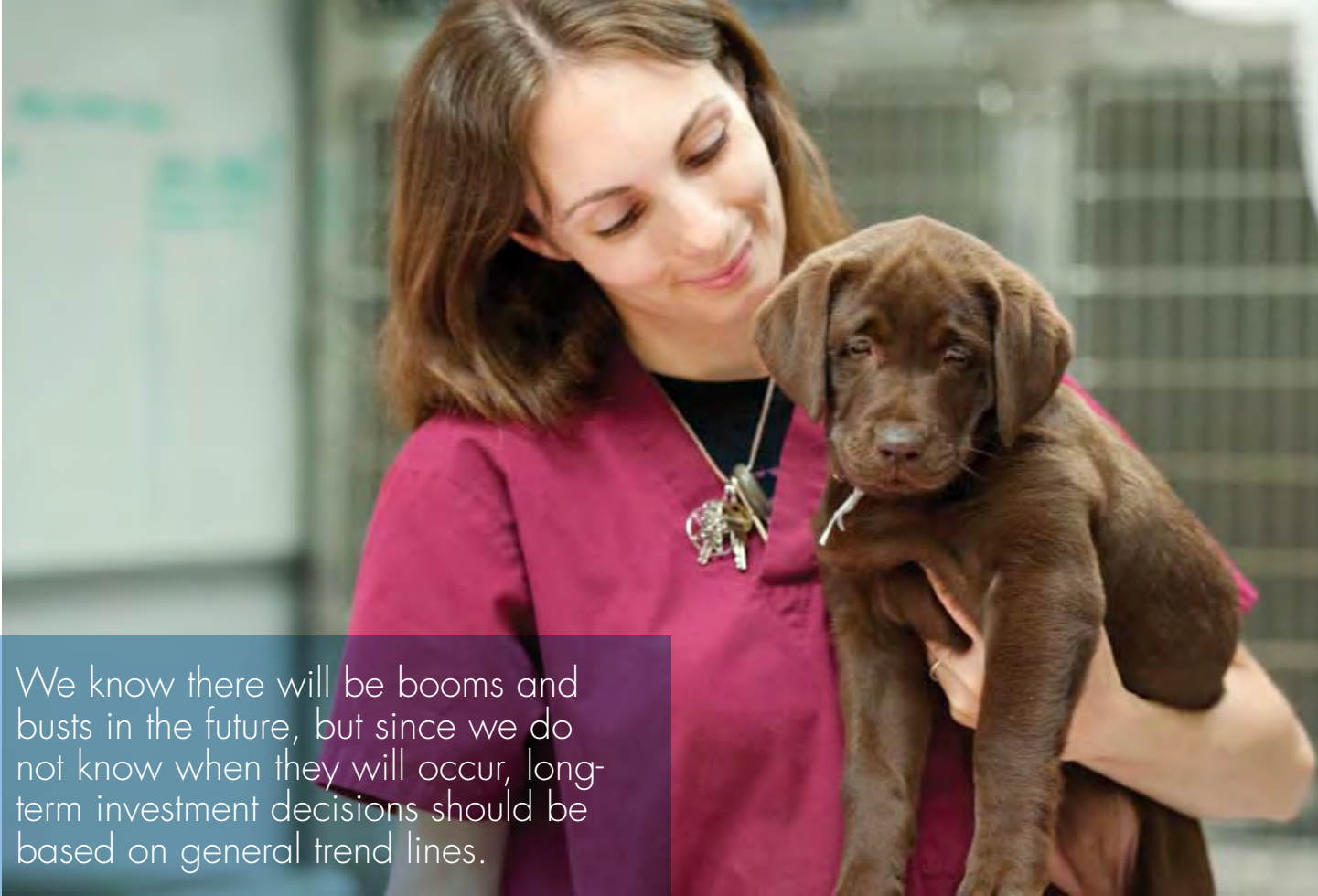
Washington State adjusts the supply of new completers based on data from the American Community Survey (ACS). ACS, conducted by the U.S. Census Bureau, has data on the percentages of graduates who report they were enrolled in education and either unemployed or employed only part-time; enlisted in the military; or not in the labor force. The adjustment for labor force participation is substantial. Washington's most recent report estimates that only 69 percent of middle-skill degree completers in Washington enter the workforce (see Figure 4).

For some reports, Washington performs the additional step of subtracting out from the supply count new middle-skill completers who had already attained that level of education. For example, if someone graduating with an associate degree already holds an associate or bachelor's degree, he or she would not be counted as part of the new addition to the supply. This adjustment makes sense when counting the supply in total, but not when counting the supply in a field of study, since the graduate was likely switching to a new field.

FIGURE 4 Supply of Workers Available to Meet Employer Demand
Calculation of Middle-Skill Workforce Supply in Washington State

	Completions	Enrolled in Education and not Working Full-Time	Enlisted in Military	Not in Labor Force	Remaining Workforce Supply
Middle-Skill Degree Completers	100%	13.5%	3.8%	13.8%	68.8%

Source: "A Skilled and Educated Workforce," Washington Student Achievement Council, State Board for Community and Technical Colleges, and Workforce Training and Education Coordinating Board, 2013.



We know there will be booms and busts in the future, but since we do not know when they will occur, long-term investment decisions should be based on general trend lines.

COMPARING SUPPLY TO FUTURE DEMAND

Both Colorado and Washington compare current annual supply data to the most recent 10-year Occupational Outlook forecast for their state. The recent reports from Colorado and Washington use demand estimates through 2020 and 2021, respectively.

This approach has two major advantages. First, it is forward looking. Policymakers need substantial lead time since it takes time for legislators to make appropriation decisions, monies to be allocated, institutions and agencies to make their own decisions, and students and participants to enroll and complete the program. While other data sources such as job vacancy surveys and help wanted boards are very useful information on the recent labor market, they do not forecast future demand.¹

Second, data based on the long-term forecast helps eliminate any temporary effects due to the ups and downs of the economy. We know there will be booms and busts in the future, but since we do not know when they will occur, long-term investment decisions should be based on general trend lines.

MATCHING FIELDS OF STUDY WITH OCCUPATIONS

Fields of study are categorized by Classification of Instructional Program (CIP) codes. Occupations are classified by Standard Occupational Classification (SOC) codes. In order to compare the two, states must use a cross walk that is readily available from the National Center for Education Statistics' website. For many fields, such as registered nursing, matching program of study and occupation is a straightforward process. For other fields, such as humanities, there is not a one-to-one relationship between programs of study and occupation. One way of dealing with this is to focus on more vocationally specific fields and in the analysis to group similar programs together. This is usually not a problem for middle-skill occupations.

MATCHING LEVELS OF EDUCATION WITH OCCUPATIONS

In order to compare supply and demand, it is not sufficient to match fields of study with occupations. One must also match the levels of education or training with occupations. For example, a Ph.D. in education is not required to be a classroom teacher, nor is one likely to become a chief financial officer with an associate degree in bookkeeping.

There are two basic sources of data for determining the level of education and training that matches an occupation. One is based on the BLS categorization of the level of education and training typically required for entry into an occupation. BLS categorizes the level of education and training based on extensive research including information from educators, employers, workers in the occupation, training experts, and representatives of professional and trade associations and unions.

The other source is the American Community Survey (ACS) data on the actual education and training of job holders. ACS asks survey respondents to provide their highest level of educational attainment and current occupation. The ACS data indicates the level of education actually held by those filling the occupations. It includes professional development that occurred after entry into an occupation. While ACS data tends to overestimate required education, since many individuals have education beyond what is required for their job, estimates based on ACS suggest the education and training held by individuals with whom newly credentialed workers will have to compete in the labor market.²

The ACS lists “some college” and associate degree as two options for survey respondents. Colorado and Washington count “some college” and associate degrees as middle-skill. They also count BLS categories that include more than a month of some form of training after high school but not a bachelor’s degree as middle-skill.

Colorado and Washington’s recent reports show the number of net job openings by education level based on both BLS and ACS classifications of education. The BLS level is referred to as the entry level and the ACS level as the competitive level. The competitive level is probably most relevant for graduate fields. For example, in business and education, a bachelor’s degree typically gains entry into the field, but a master’s degree is useful for career advancement.³

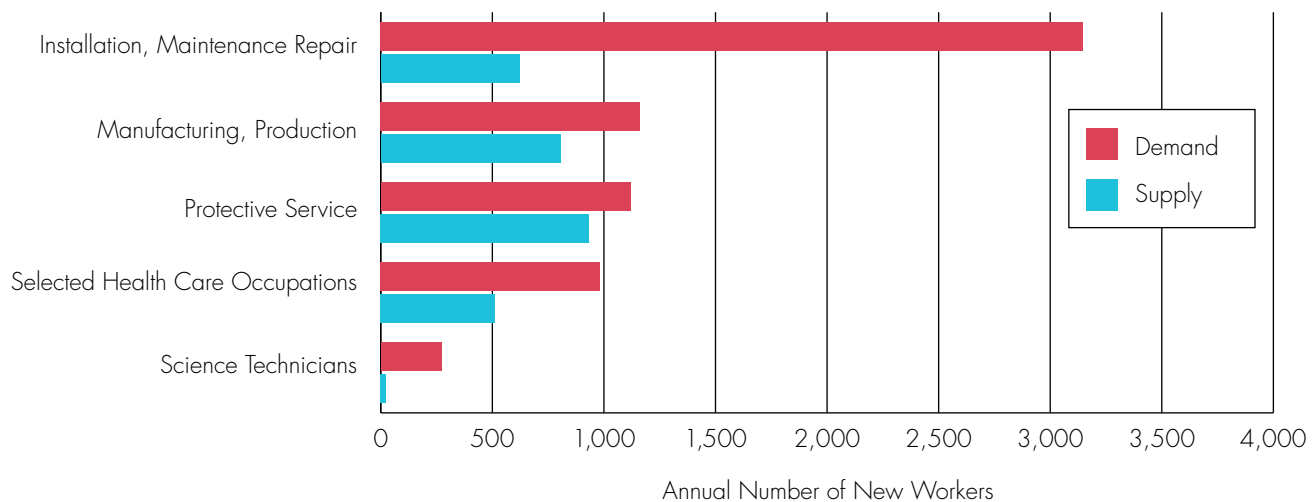
Putting It All Together

Based on the steps described above, Colorado and Washington have issued reports showing the gaps between supply and demand for major occupations. Figures 5 and 6 show middle-skill gaps in each state. Their reports contain similar figures for the baccalaureate and graduate levels.

In Figure 5, the blue bar shows the number of completers in that field at the middle-skill level during 2012, the most recently available year. The red bar shows the annual demand that must be filled if the supply of completers is to match the expected number of annual net middle-skill job openings in the field during 2016–2021, based on the BLS entry level of education and training.

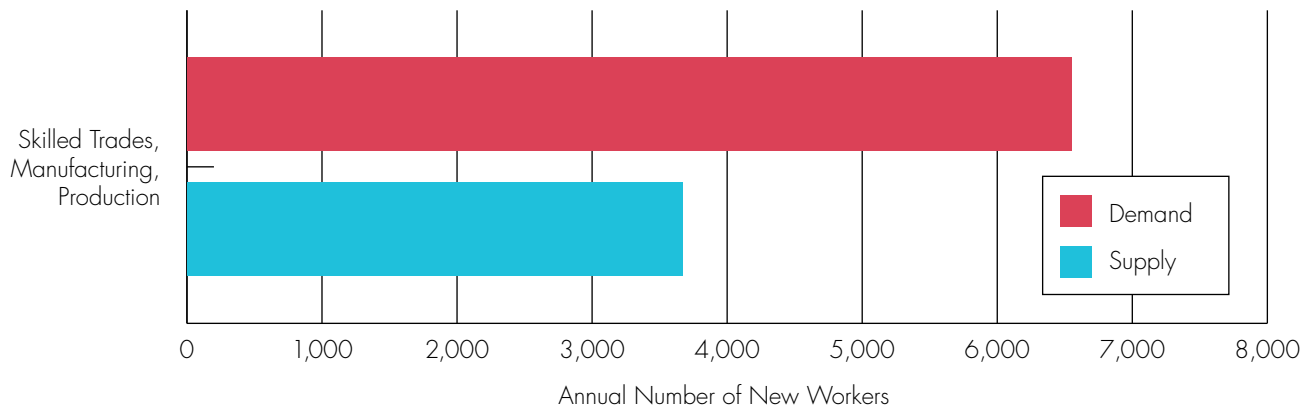
Figure 6 combines skilled trades, manufacturing and production occupations together. The blue bar shows the supply of completers in 2012, and the red bar shows the annual number of completers necessary in order to meet demand

FIGURE 5 Comparing Current Annual Supply and Future Demand for Middle-Skill Occupations in Washington State



Source: “A Skilled and Educated Workforce,” Washington Student Achievement Council, State Board for Community and Technical Colleges, and Workforce Training and Education Coordinating Board, 2013.

FIGURE 6 Comparing Current Supply with Future Demand for Middle-Skill Occupations in Colorado



Source: "2014 Legislative Report on the Skills for Jobs Act," Colorado Department of Higher Education, 2014.

in 2020. The gap is 2,881 more completers needed per year, based on the BLS entry level of education and training.

Colorado and Washington's reports also contain information on some specific occupations. Figure 7 shows the gaps for health care occupations in Washington. More specific analysis can be done with health care because there is a one-to-one relationship between program of study and occupation. The figure shows the gap between current annual supply in 2012 and the expected employer demand from 2016 to 2021.

Considerations, Concerns and Caveats

INTERSTATE MIGRATION OF STUDENTS AND WORKERS

Labor force supply does not always come from in-state, and states cannot prevent people they train from moving out of state. Colorado and Washington, for instance, have long experienced positive net in-migration of workers with postsecondary education and training. Other states have experienced net out-migration. Students also flow between states.

FIGURE 7 Gap Between Current Supply and Future Demand for Middle-Skill Health Occupations in Washington State

Occupation	Supply	Demand	Gap
EMTs and Paramedics	80	195	115
Health Technologists and Technicians	25	125	100
Respiratory Therapists	35	90	55
Dispensing Opticians	10	65	55
Dental Lab Technicians	10	50	40
Dental Hygienists	230	270	40
Medical Transcriptionists	70	100	30
Cardiovascular Technologists and Technicians	20	45	25
Nuclear Medicine Technologists	5	15	10
Ophthalmic Medical Technicians	25	35	10

Source: "A Skilled and Educated Workforce," Washington Student Achievement Council, State Board for Community and Technical Colleges, and Workforce Training and Education Coordinating Board, 2013.



Newly educated and trained workers are not the only job-seekers. Unemployed workers also compete for jobs in the labor market.

Colorado and Washington's analyses largely ignore interstate flows. This helps keep the analyses more manageable, and also reflects political reality. It makes sense to most state elected officials that their institutions and programs should produce enough graduates to meet in-state employer demand, and they are not particularly interested in training skilled workers for other states. From an economist's point of view, the analyses shows the gap between supply and demand if one assumes no net interstate migration.

JOB-SEEKERS ALREADY IN THE WORKFORCE

Newly educated and trained workers are not the only job-seekers. Unemployed workers also compete for jobs in the labor market. Florida's customized reports on current supply and demand include data on the number of unemployed workers and the occupation from which they separated. This approach focuses on the current labor market, rather than longer-term planning.

Looking toward the future, it is difficult to predict how many unemployed workers will be seeking jobs, and Colorado and Washington make no attempt to do so. However, they are aware of this issue. Washington, for example, does not list construction as a field with a short supply even though the number of recent graduates is less than expected future demand, since there are still thousands of unemployed construction workers seeking employment.

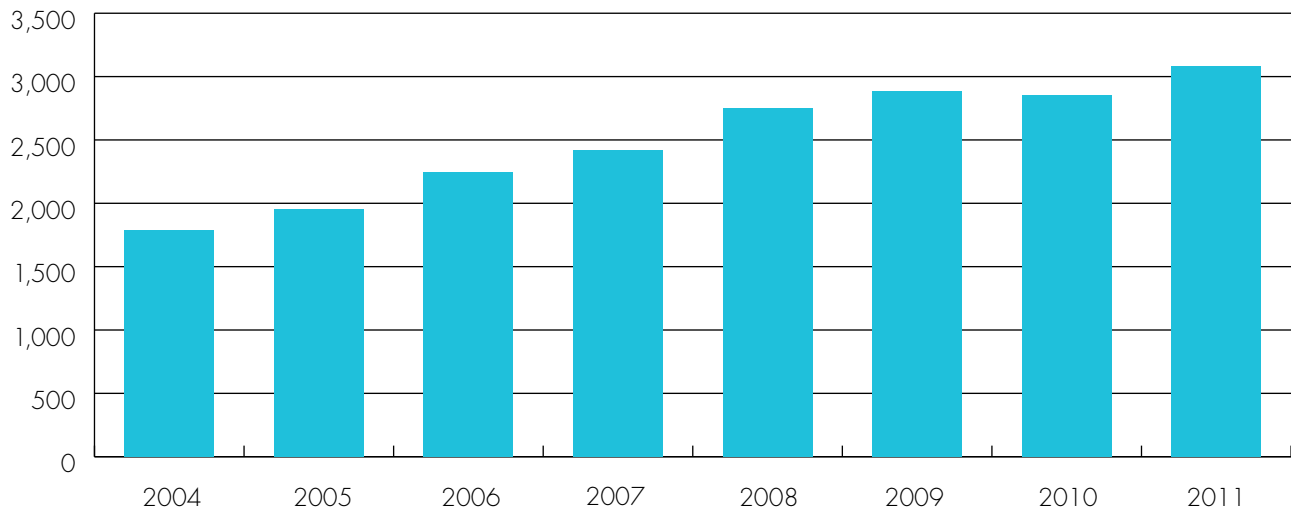
ACCURACY OF FORECASTS

Are forecasts sufficiently accurate for policy planning? There is inevitably some imprecision in forecasting the number of net job openings for a particular occupation. There will be unexpected bubbles and recessions. There will be unpredictable technological breakthroughs. The smaller the population and the less common the occupation, the greater is the margin of error. State forecasts are likely to be more accurate than county-level forecasts while national forecasts are likely more accurate than a state forecast. The forecast for registered nurses (RNs) is likely to be more accurate than the forecast for MRI technicians.

Washington reduces the risk of inaccurate forecasts in two ways. One is by drawing policymakers' attention to fields with very large and persistent gaps between supply and demand. The other way is by focusing more on occupational clusters rather than specific occupations.

HOW MUCH DOES THIS COST?

Colorado and Washington did not request additional resources to measure supply and demand. Instead, they devote some of the time of current research staff to collect and analyze the data and produce the reports.



Source: Health Professions Education in Washington: 2004-2011 Completion Statistics. Workforce Training and Education Coordinating Board, 2012

What Do We Do Once We Know the Gaps?

How can state elected officials and other leaders make use of this information to close skill gaps? Washington lawmakers have earmarked appropriations to expand student enrollments in fields of study where supply is far short of expected demand. This is known as funding for high-demand students. The state also restricted enrollments in certain programs to only those fields with a shortage of supply. Other policy options include scholarships and loan programs for students enrolling in field(s) with a shortage of graduates.

In some fields, Washington’s efforts have been very successful in reducing skill gaps. The best example is health care. After the skills gap analysis documented the extreme shortage of health care workers, the state embarked on a coordinated effort to boost supply, especially of RNs. As Figure 8 shows, Washington greatly increased the supply of new RNs. By 2011, the annual number of graduates had reached 93 percent of the demand expected during 2015–2020.

Conclusion

In order for policymakers to address the skill gaps reported widely by employers, they need information on where to make investments. Given limited resources, simply expanding all forms of education and training is not an option. Investments need to be targeted to the gaps. This paper has laid out the steps involved in identifying where education and training within a state is insufficient to meet employers’ long-term needs.

1. States can count the number of newly trained workers completing training across a broad range of programs and providers. At the middle-skill level of postsecondary education and training, there is an array of federal- and state-funded programs and public and private training providers that should be counted in the mix.
2. States can compare the annual supply of completers with the number of annual net job openings expected in the coming years. The supply count can first be adjusted to recognize that not all completers enter the workforce.
3. States can analyze both the aggregate gap between supply and demand by level of postsecondary education and training, and can break the analysis down by major fields of study and occupational groups. In instances where specific programs of study are required to perform occupations (e.g., health care), states may examine occupation specific supply-demand relationships.

As states follow these steps, they will have to make specific methodological decisions that will have some impacts on the results. But attention should be paid to the large gaps that are found no matter the particular methods.

Once the gaps are identified, state policymakers and program administrators can utilize a variety of policy levers to direct resources to close the gaps and meet employer demand.



In order for policymakers to address the skill gaps reported widely by employers, they need information on where to make investments.

Endnotes

- 1 Another type of demand analysis focuses on the current or “real-time” labor market. Many states conduct a job vacancy survey that identifies the number and type of job openings that are vacant at the time of the survey. Some states use information from online help-wanted posts. Florida, for example, uses Help Wanted OnLine, developed by The Conference Board. Such information is useful, particularly for practitioners in the field, but is not focused on informing policymakers regarding future skill gaps.
- 2 A recent study found that 40 percent of employed graduates from a four-year college or university between 2006 and 2011 were working in a job that did not require a four-year degree. Stone, C., Van Horn, C., C. Zukin, “Chasing the American Dream: Recent College Graduates and the Great Recession,” John J. Heldrich Center for Workforce Development, Rutgers University Press, 2013.
- 3 This paper simplifies somewhat the description of BLS and ACS classifications of education levels. BLS does consider job-holder levels of education reported in ACS as one source of information for BLS’s classifications. Both BLS and ACS provide data on the percentage of job holders at each level. For example, for occupation X, 30 percent of job holders have an A.A., 20 percent have a B.A., and 5 percent have an M.A., and so forth. Instead of grouping employment in an occupation regardless of education level, state analysts may instead use the percentage distribution.



About State Workforce and Education Alignment Project

The State Workforce and Education Alignment Project (SWEAP), an initiative of National Skills Coalition, is helping to develop system-wide information about workforce education and training programs for state policy leaders. The goal is to create better cross-program information that allows state policy leaders to see how these programs can work together in their state, and how individuals can advance through these programs over time in the pursuit of post-secondary credentials and higher-paying employment. SWEAP will assess how state policy leaders find such information useful for the purpose of improving workforce development policy in their state, and ultimately educational and labor market outcomes for program participants.



NATIONAL SKILLS COALITION
Every worker. Every industry. **A strong economy.**

About National Skills Coalition

National Skills Coalition is a non-partisan, broad-based coalition of employers, unions, education and training providers, and public officials working toward a vision of an America that grows its economy by investing in its people so that every worker and every industry has the skills to compete and prosper. We engage in organizing, advocacy, and communications to advance state and federal policies that support these goals — policies that are based on the on-the-ground expertise of our members.

National Skills Coalition was founded in 1998 as The Workforce Alliance in response to a series of federal policies that signaled the end of national investments in the skills of America's workers at a time when skill gaps were growing in key U.S. industries. Since then, we've demonstrated that investments in skills work. We've shown that diverse stakeholders can find agreement around specific reforms that will improve a variety of workforce education and training policies. And we have documented that the American public is strongly supportive of a deeper investment in the skills of America's workers. We continue to mobilize support for a new national skills agenda that cuts across public policies, and simultaneously serves a wide range of U.S. workers and industries.

National Skills Coalition is governed by a Board of Directors and advised by a national Leadership Council drawn from the ranks of business, labor, community colleges, community-based organizations, and the public workforce system.

More than 8,000 members, representing more than 3,000 organizations in all 50 states, comprise the broad-based membership of National Skills Coalition.

Learn more at www.nationalskillscoalition.org.



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