# Road to Recovery

## New Hampshire's Economy 2010


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# Preface

*Road to Recovery: New Hampshire's Economy 2010* takes a mid-year look at the New Hampshire economy. New Hampshire, like all other states and the nation as a whole, has been affected by the current recession. This report provides information on the indicators used to measure the state's economic health, illustrating how New Hampshire has fared through the economic downturn. It examines the state's population and its connection to the labor force, and the characteristics of the unemployed. The report also looks to the future, analyzing the worker skills and knowledge expected to be in demand by 2018.

This report is intended to provide information for workforce development policy and investment decisions by the Governor, the legislature, the New Hampshire state workforce investment board, local workforce investment advisory groups, and additional partners including community colleges, economic development organizations, and other workforce development interest groups. The information contained herein is also useful to anyone who has a stake in the New Hampshire economy, whether they are involved in business, career planning, or general economic research and analysis.

The primary sources of the data contained in the report are the U.S. Bureau of Labor Statistics, the U.S. Census Bureau, and the U.S. Bureau of Economic Analysis. The analysis of this data stems from the body of work produced by the Economic and Labor Market Information Bureau of the New Hampshire Department of Employment Security, either under contract with the Bureau of Labor Statistics of the U.S. Department of Labor or with the support of grant monies from the Employment and Training Administration of the U.S. Department of Labor.

The report was submitted to the Employment and Training Administration of the U.S. Department of Labor as required by the Workforce Information Grant, Core Products and Services.

# Table of Contents

# Executive Summary

## Economic Indicators

Economic conditions for New Hampshire were extremely tumultuous through 2009. While the state did not feel the effects of the recession as early as many others, New Hampshire did not escape unscathed. The first half of 2010 has seen some speculation that the economy has reached bottom and recovery is in sight.

### Leading Indicators – preceding economic changes

- New Hampshire's average weekly hours of production workers in manufacturing trended downward after December 2007, the beginning point of the recession. Since January 2009, the number of hours has generally been building up, which may foretell new hiring.
- Initial claims for unemployment compensation in New Hampshire spiked between December 2008 and January 2009. As of March 2010 New Hampshire's initial claims had stabilized and were beginning to realize a slight decrease while national claims were indicating a more obvious decline.
- Seasonally adjusted housing permits in New Hampshire from November 2008 through June 2009 dropped to historical lows. Since October 2009, the number of permits issued remained above that of corresponding months of the previous year, though still lower than prerecession levels.

### Coincident Indicators – concurrent with economic changes

- New Hampshire's nonfarm employment faltered in June 2008, and in October began monthly over-the-year declines. By July 2009, nonfarm employment had lost 27,000 jobs, dropping to 618,200 jobs. There has been some positive movement through May 2010, but not enough to confirm a trend.
- In fourth quarter 2008 and the first two quarters of 2009, New Hampshire experienced an over-the-quarter decline in total personal income less transfer payments (seasonally adjusted at annual rates). The last two quarters of 2009 both showed positive increases.

### Lagging Indicators – following economic changes

- From September 2009 through March 2010, the median duration of unemployment has been about 20 weeks and the mean hovered around 30 weeks. This could signal that fewer people are becoming unemployed but also that those who are unemployed are remaining unemployed longer.
- New Hampshire's seasonally adjusted unemployment rate rose from 3.4 percent in December 2007, when the national recession began, and peaked at 7.1 percent in February 2010 before receding to 6.4 percent with preliminary May 2010 estimates.

### Other Economic Indicators

- Comparing cumulative change in gross domestic product (GDP) by state from 2000, New Hampshire's real GDP growth rate kept pace with the nation through 2003 and exceeded national change by a percentage point in 2004. From that point, New Hampshire's trend slowed through 2008.
- New Hampshire's per capita personal income of $42,831 in 2009 ranked eighth highest among the 50 states. That was a decline of $592 from 2008, the first time that New Hampshire experienced a decline in annual per capita personal income since the data series began in 1969.

## Business Employment Dynamics

- Business employment dynamics measure gross job gains and gross job losses at the individual establishment level. During the 2001 recession, data revealed elevated levels of gross job losses in the state, simultaneously with job gains. There were fewer job gains than losses, creating a net job decline.
- During the recent downturn, as gross job losses started to increase, gross job gains declined, leading to a prolonged period of net job losses. This divergence illustrates the reason for New Hampshire's sharp decline in employment.

## Alternative Measures of Labor Underutilization

- A recession period often highlights the population of individuals who are not included as part of the official estimate of the unemployed. Alternative measures of labor underutilization expand the definition of how labor resources are utilized.
- Annual averages of the alternative measures of labor underutilization increased only slightly from 2007 to 2008. Pronounced changes in the 2009 measures for New Hampshire reflected decreased hiring, increased duration of unemployment, and persons dropping out of the labor force.

## Population and the Labor Force

- The U.S. Census Bureau estimate of New Hampshire's resident population was 1,324,575 as of July 1, 2009. From 2008 to 2009, New Hampshire's resident population increased by only 2,703 persons, a considerable slowdown in population growth when compared to earlier parts of the decade.
- Those aged 16 to 64 are the primary workforce supply. Since 2000, New Hampshire's civilian population ages 16 to 64 grew, while the 0 to 15 years age group declined. The increasingly smaller population entering working age will not compensate for those who will age out of the workforce.

- Currently, population in-migration rates are very slow. This might not have an immediate impact on New Hampshire's labor force, but without growth in the very young age cohorts, an influx of migrants, both domestic and international, would be needed to increase the labor supply.

## Characteristics of the Unemployed

- Prior to the current recession, there was a consistent pattern in the share of the insured unemployed by gender: males held a larger share during winter months, whereas females held a larger share during the summer. By 2009, this pattern changed, with the share of males staying higher than the share of females.
- For those aged 35 to 44 years, the share of total claims declined from 2004 to 2009, while those aged 22 to 24 years and those aged 25 to 34 years increased shares slightly.
- The impact of seasonal factors for both age and gender has diminished in this recession. The majority of jobs lost were caused by cyclical or even structural changes in the economy, not seasonal factors.

## Skills and Knowledge Demand Assessment

- Three major occupational groups are projected to substantially increase their share of employment from 2008 to 2018: Healthcare practitioners and technical occupations, Healthcare support occupations, and Personal care and service occupations. Combined, these groups comprise 11.1 percent of total employment in 2008, and are projected to make up 12.6 percent by 2018.
- When evaluating either high skill/high demand/high wage occupations or high replacement occupations, these four O*Net-defined skills were most frequently required: Reading comprehension, Active listening, Critical thinking, and Monitoring. The most important knowledge element was Customer and personal service.
- It is critical that the skill and knowledge elements required by in-demand occupations are considered when assessing individuals for services, in order to determine the need for additional training in these skill and/or knowledge areas. All educational programs should contain elements that enhance these skill and knowledge elements, no matter the area of education.

## A note about the graphs

Many of the graphs in this publication have shaded areas indicating recession periods. The latest recession (Great Recession) was officially determined by the National Bureau of Economic Research (NBER) as having begun in December 2007. The shaded area representing the Great Recession therefore starts with December 2007 (or 4th quarter 2007) and ends with the most current data available. An official determination of the end of a recession takes a considerable amount of time. The Great Recession may have ended but it has not yet been officially determined or announced by the NBER.

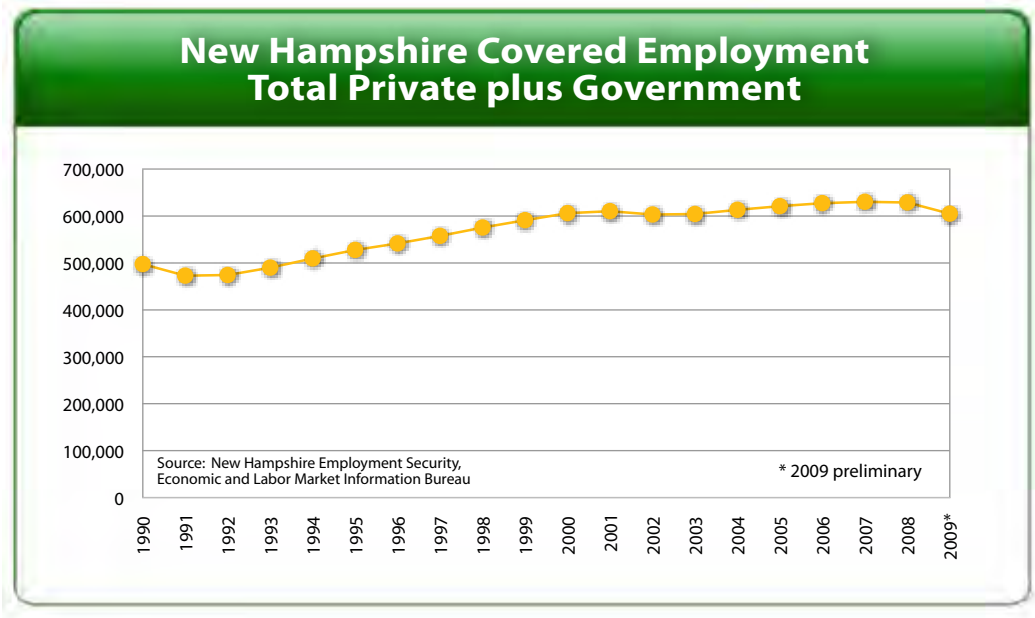
# Economic Indicators

Economic conditions proved to be extremely tumultuous as the economy moved through the fits and starts of 2009. New Hampshire was fortunate not to experience the effects of the recession in its early stages. Unemployment did not escalate as early as in neighboring states, and the unemployment rate remained among the lowest in the region. Recently there has been some speculation that the economy has finally reached bottom, the recession has ended, and recovery is in the not-too-distant future.

The Conference Board, an independent organization that publishes economic information and analysis, organizes economic indicators into measures that help identify turning points in the U.S. economy.

There are three different types of economic indicators: *leading*, *coincident*, and *lagging*. The Conference Board has established an index for each of the three indicator types using several components.[1]

Some of the economic indicators are available at the state level, and can help assess how the New Hampshire economy is faring. State-specific indicators that are available include nonfarm employment, average weekly hours worked, and duration of unemployment.




1. According to The Conference Board, "The composite economic indexes are the key elements in an analytic system designed to signal peaks and troughs in the business cycle. The leading, coincident, and lagging economic indexes are essentially composite averages of several individual leading, coincident, or lagging indicators. They are constructed to summarize and reveal common turning point patterns in economic data in a clearer and more convincing manner than any individual component — primarily because they smooth out some of the volatility of individual components." The Conference Board® U.S. Business Cycle Indicators℠ The Conference Board Leading Economic Index™ (LEI) for the United States and Related Composite Economic Indexes for June 2009. <www.conference-board.org/pdf_free/economics/bci/nightmid.pdf>. Accessed June 29, 2010.

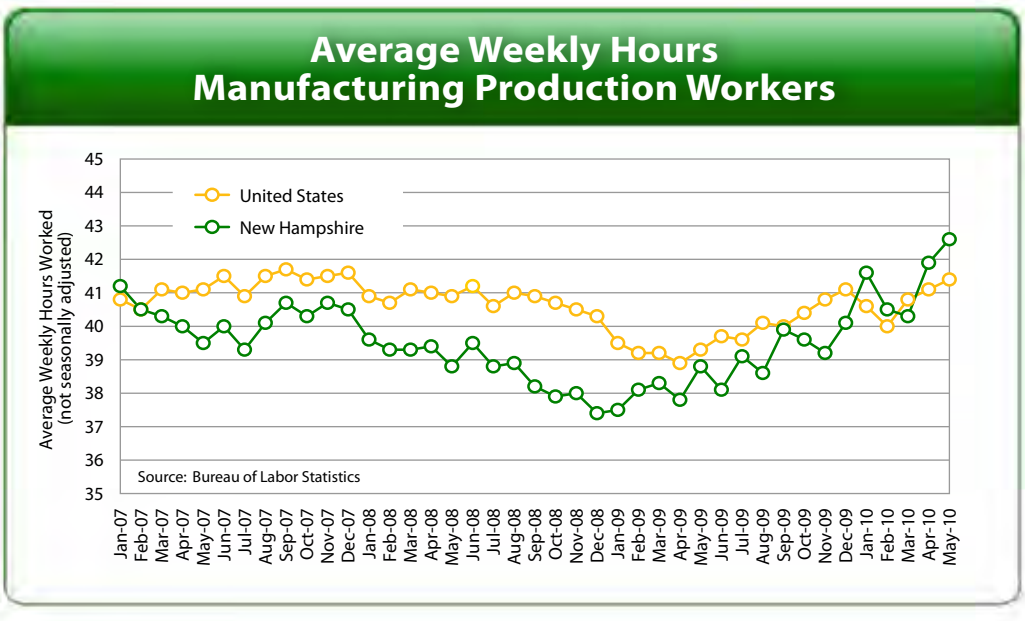
## Leading Indicators

A *leading* indicator is a measure that changes before a trend occurs in the economy.

### Average Hours

Leading indicators are used to help predict what the economy is going to do in the future. One available state-specific leading indicator is average weekly hours of production workers in manufacturing. Typically a company reduces the number of hours worked before reducing the workforce in poor economic times. As the economy recovers, there is normally an expansion in the number of hours worked (restoration of full work-weeks or increasing overtime) before a company feels confident enough to hire more workers. New Hampshire's average weekly hours trended downward after December 2007, which was the beginning point of the recession. Since January 2009, the number of hours has generally been building up, which may predict new hiring.

The nation experienced a similar pattern in the average weekly hours of production workers. Nationally, though, the number of hours did not fall as low or begin as early as the drop in hours for New Hampshire production workers. A decline in the number of hours during the early months of 2010 generated concern that the nation may be on the edge of a double-dip recession, as opposed to the cusp of recovery. However, an increase in *Manufacturing* employment helps explain the change in hours. In May 2010, seasonally adjusted *Manufacturing* employment increased by 29,000 over the month. Factory employment rose by 126,000 from January to May. Average hours exceeded the traditional 40 hours per week, therefore the recent increased employment could have contributed to the reduction in the average number of hours.



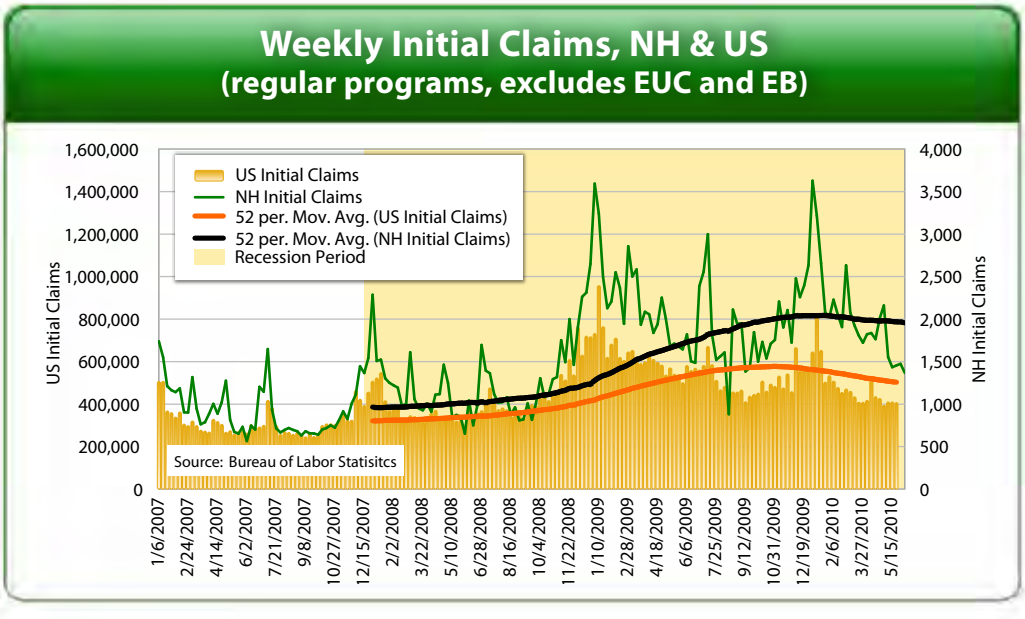
## Initial Claims

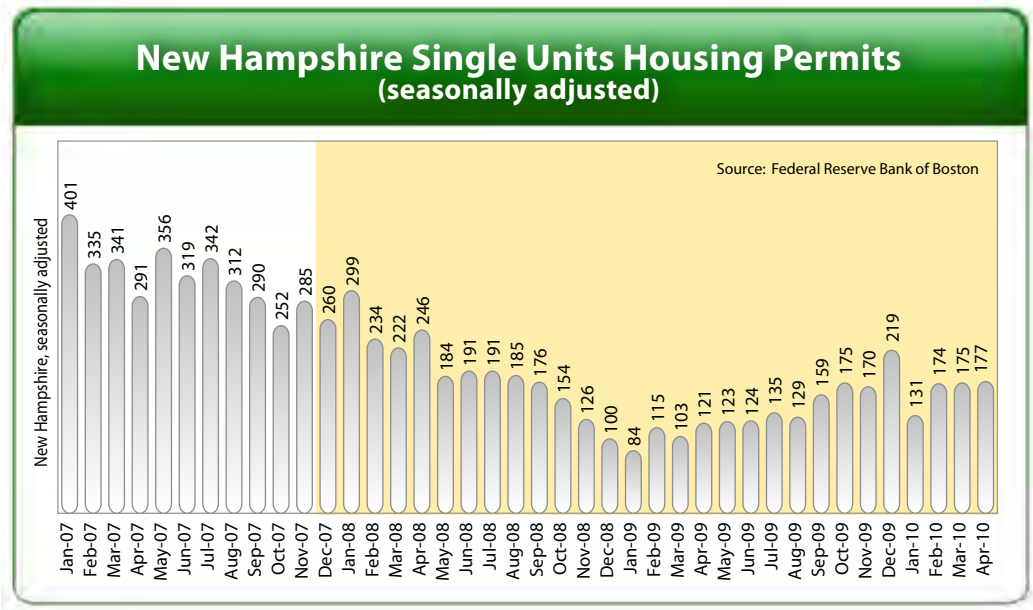
The level of initial claims for unemployment benefits is used as an economic gauge. This measure has an inverse relationship to the economy because a higher level of claims indicates decreased economic activity.

A comparison of New Hampshire's weekly initial claims to those of the nation highlights the delayed effect of the recession on the state. At first glance, weekly claims in New Hampshire looked to be following a similar pattern as that of the nation. But adding a moving annual average (52 weeks) trend to the two entities draws attention to the differences. New Hampshire's trend matched the pattern of claims for the nation through January 2009. From that point, New Hampshire's trend did not indicate the same degree of increase as that of the nation. As of March 2010, New Hampshire's initial claims were stabilizing and just beginning to realize a slight decrease while national claims were indicating a more obvious decline. While the numbers of claims during the first three months of 2010 in New Hampshire have been lower than those of early 2009, they are still significantly higher than previous years.

## Housing Permits

Conditions in local housing markets also play a role in identifying the economic turning point for the state. Building permits for new housing, which precede actual construction activity, is a component of the leading indicator index. From November 2008 through June 2009, monthly counts of seasonally adjusted housing permits issued in the state hit historical lows, and marked eight of the lowest ten monthly

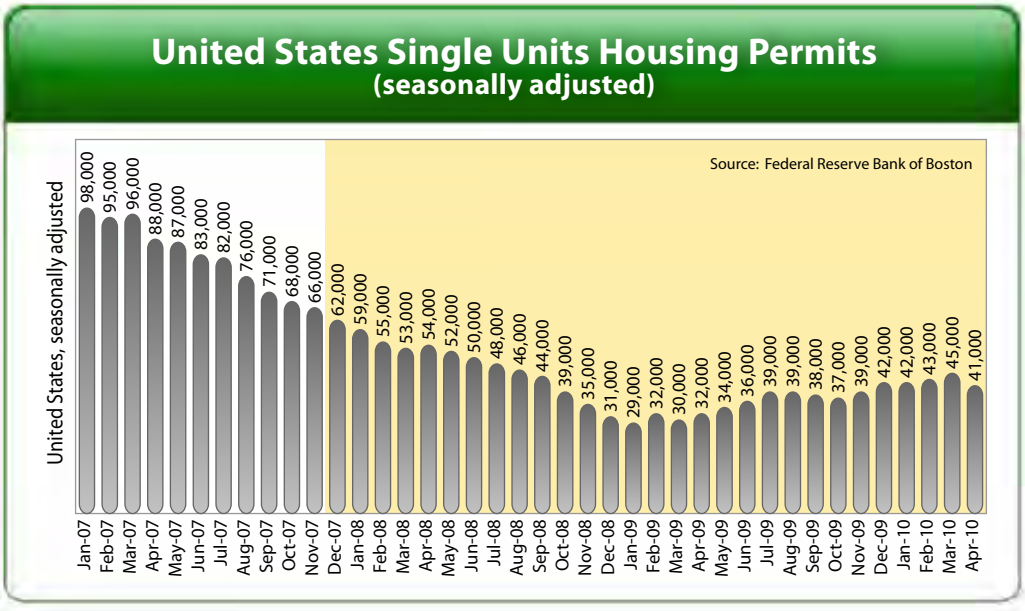





counts going back to when tracking of this indicator began in 1969. Since October 2009, the number of permits issued has remained above the number of permits issued in corresponding months of the previous year, although still lower than prerecession levels. The nation experienced a similar sequence.

## Coincident Indicators

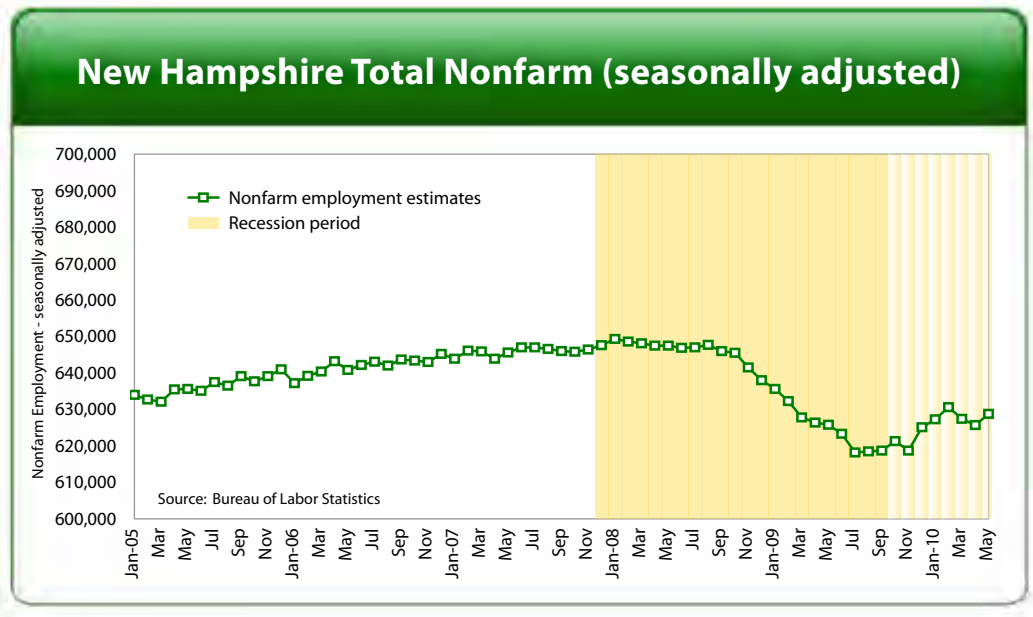
The second type of economic indicator is *coincident*. These indicators typically change at the same time as overall economic changes occur. The Conference Board includes measures of nonfarm employment, personal income (less transfer payments), industrial production, and manufacturing and trade sales in the national coincident indicator.

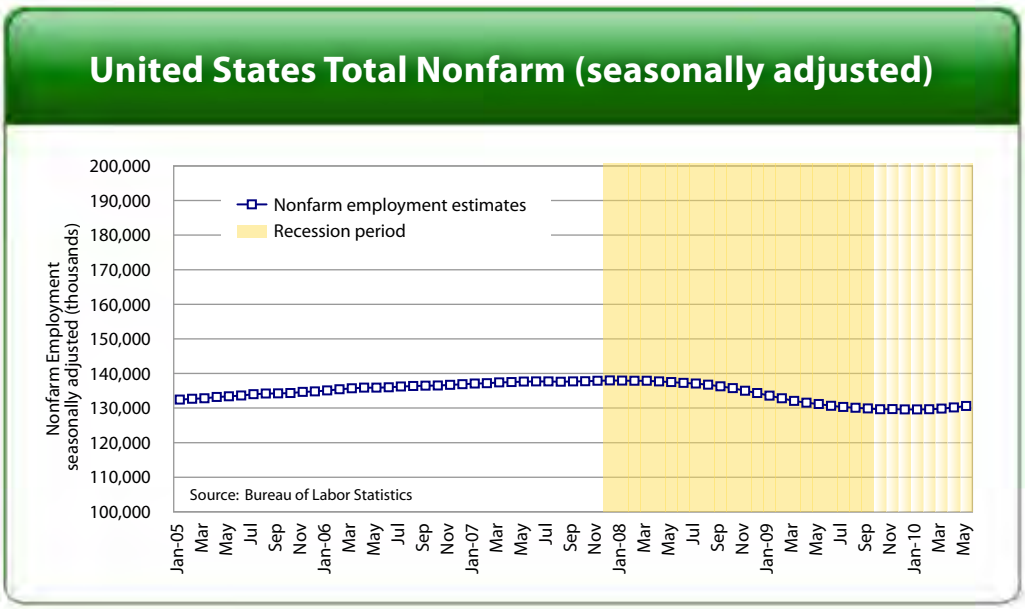


## Nonfarm Employment

One available state-specific component of the coincident indicator index, total nonfarm employment, showed signs of faltering in June 2008. Comparing corresponding months of the previous year, June 2008 showed a decline of 100 jobs (seasonally adjusted). Nonfarm employment continued comparable over-the-year declines from corresponding months in 2007 through September 2008, then in October employment slipped 300 jobs from October 2007. Employment continued this downward trend for each of the next nine months, losing a total of 27,000 jobs through July 2009. The disturbing part of dropping to 618,200 jobs in July 2009, the lowest employment level since May 2002, was that typical summer hiring of construction and seasonal workers in New Hampshire did not take place. Then employment waffled through December 2009 before showing some month-to-month improvement. While higher seasonally adjusted employment through February 2010 is viewed as positive, the lack of steady continued increases through May 2010 adds a cautionary reminder that several months of continued employment growth will be needed before confirming a trend.

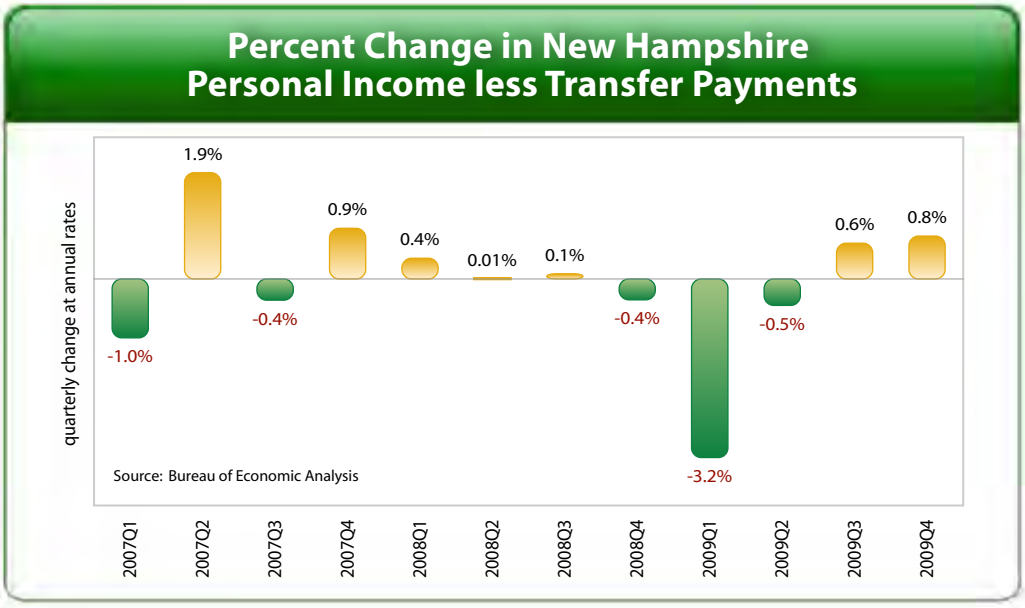
Nationally, nonfarm employment peaked at 137,951,000 in December 2007, later designated as the end of the economic expansion. Employment embarked on a downhill journey through December 2009 when it reached its low of 129,588,000 jobs. That represented a loss of over eight million jobs during the 24-month period. Since that time, the employment level has held fairly steady, not indicating either significant growth or losses. It remains to be seen if employment will begin to grow or slip again, with the risk of a double-dip recession.



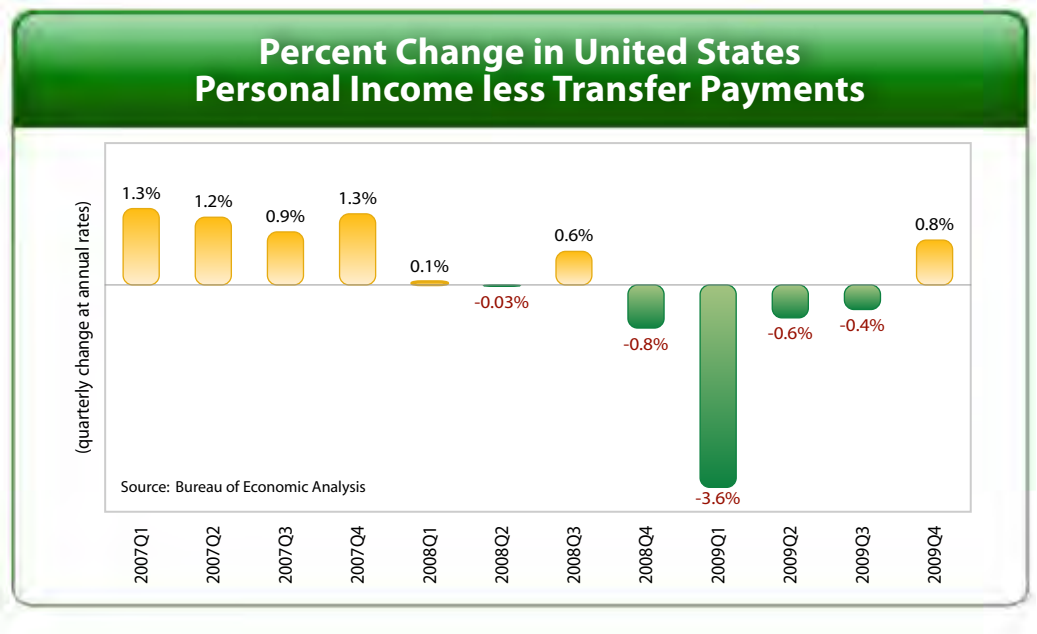



## Total Personal Income less Transfer Payments

Another measure of the coincident economic index is *total personal income, less transfer payments*.[2] Changes in this measure of personal income, less transfer payments, have gained attention as individual income faltered with the collapse of financial and housing markets, volatile stock markets, and job losses. Like the nation, New Hampshire experienced an over-the-quarter decline of the annualized personal




2. According to the Bureau of Economic Analysis "Personal Income is the income that is received by all persons from all sources. It is calculated as the sum of wage and salary disbursements, supplements to wages and salaries, proprietors' income with inventory valuation and capital consumption adjustments, rental income of persons with capital consumption adjustment, personal dividend income, personal interest income, and personal current transfer receipts, less contributions for government social insurance. Removing transfer payments (which is payments to persons for which no current services are performed) from total personal income provides a measure of income change for providing services." Bureau of Economic Analysis. <www.bea.gov/regional/spi>. Accessed June 11, 2010.



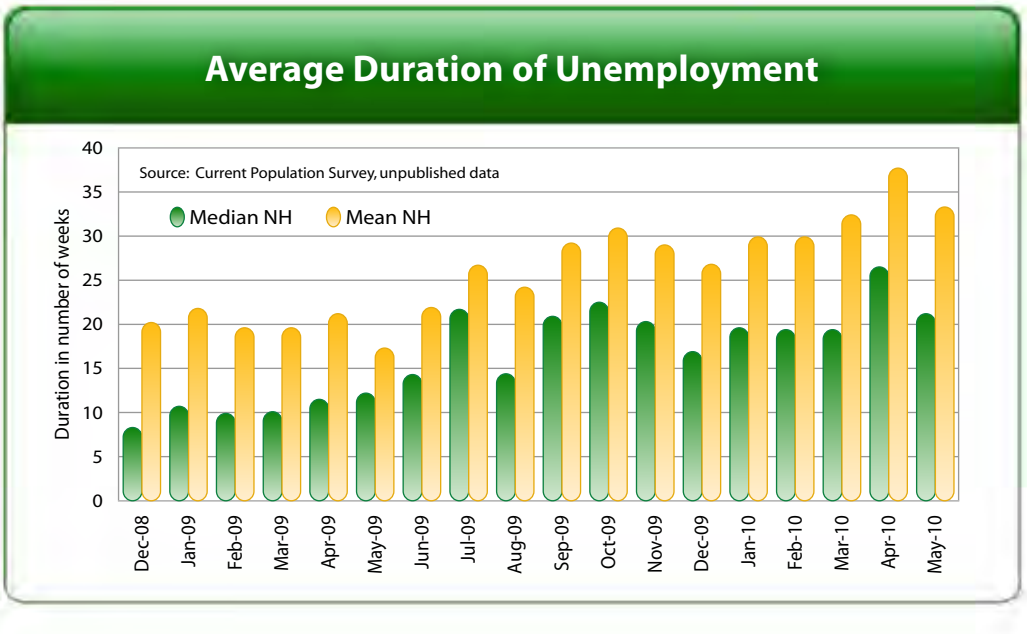

income for the fourth quarter of 2008 and first and second quarters of 2009. First quarter 2009 was most affected by the turbulence, with personal income dropping at an annual rate of over three percent for both the nation and New Hampshire. By third quarter of 2009 New Hampshire was showing a positive change in its annualized rate compared to the negative change of the nation.

Though total personal income, less transfer payments, is a coincident indicator, state level data for this component lags current time by three to six months. Nationally this measure is estimated by statistical imputation to current time, and revisions are performed as more complete data become available.[3]

## Lagging Indicators

A *lagging* economic indicator is one that reflects turning points in the economy substantially after those changes take place. Average duration of unemployment and the unemployment rate are two measures of the lagging indicator.

3. "To address the problem of lags in available data, those leading, coincident and lagging indicators that are not available at the time of publication are estimated using statistical imputation. An autoregressive model is used to estimate each unavailable component. The resulting indexes are therefore constructed using real and estimated data, and will be revised as the unavailable data during the time of publication become available. Such revisions are part of the monthly data revisions, now a regular part of the U.S. Business Cycle Indicators program. The main advantage of this procedure is to utilize in the leading economic index data such as stock prices, interest rate spread, and manufacturing hours that are available sooner than other data on real aspects of the economy such as manufacturers' new orders. Empirical research by The Conference Board suggests that there are real gains in adopting this procedure to make all the indicator series as up-to-date as possible." The Conference Board. <www.conference-board.org/pdf_free/economics/bci/nightmid.pdf>. Accessed June 29, 2010.

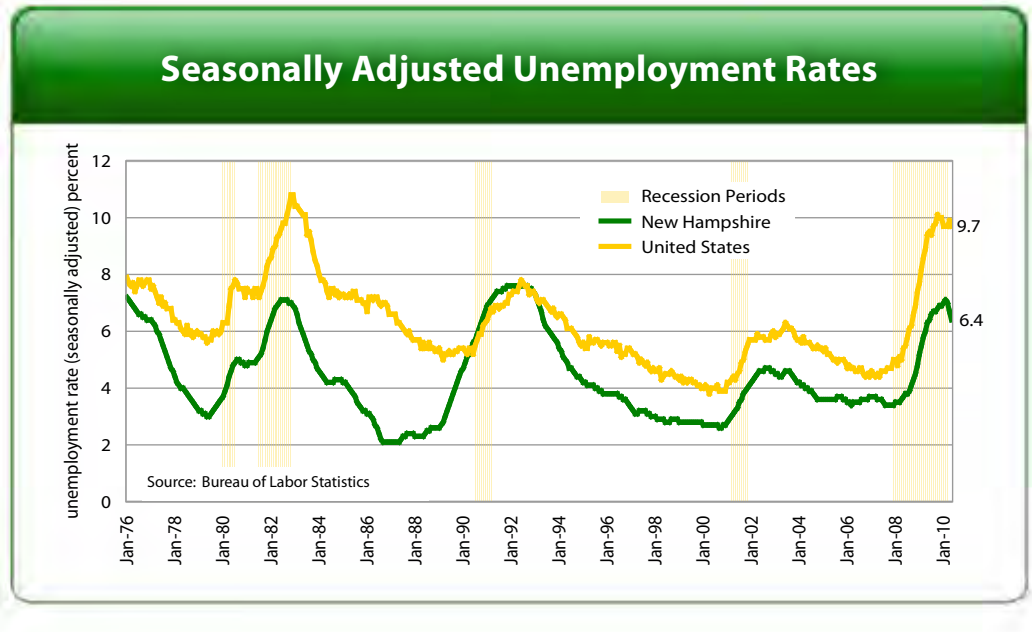



## Average Duration

Average duration of unemployment is a lagging indicator. This component is inversely related to the direction of economic change because a longer duration of unemployment indicates extended periods of economic inactivity and shorter duration indicates expanded activity. Average duration of unemployment is based on the Current Population Survey (CPS), a monthly survey of households used to estimate the total number of people unemployed. The survey reflects all unemployed persons, not just individuals receiving unemployment insurance benefits.

As of July 2009, the median (midpoint) duration of unemployment for New Hampshire was 21.7 weeks, and the mean (average) was 26.7 weeks. This was a significant increase from December 2008 (the month the effects of the recession became harshly evident in New Hampshire) when the median duration of unemployment was 8.3 weeks and the mean was 20.2 weeks. The rapid increase in the number of newly unemployed skewed the average duration of unemployment to fewer weeks. As many of these individuals remained unemployed, the median duration between December 2008 and July 2009 increased, along with the average.

From September 2009 through March 2010, the median has been about 20 weeks and the mean hovered around 30 weeks. This could signal that the numbers of people joining those unemployed has slowed but also that those unemployed are remaining unemployed longer.




### Unemployment Rate

The unemployment rate is a lagging economic indicator, as unemployment tends to increase for two or three quarters after the economy starts to improve.

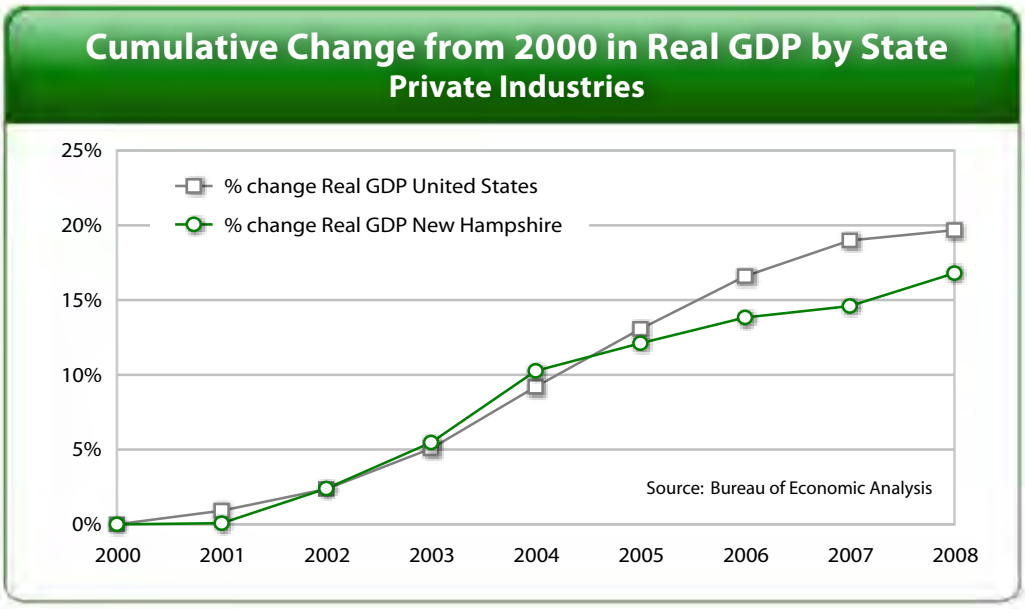
With the exception of the recession of the 1990s, New Hampshire historically has had a lower unemployment rate than the nation. Through the current recession, New Hampshire's seasonally adjusted unemployment rate has generally been increasing, from 3.4 percent in December 2007, when the national recession began, to a high of 7.1 percent in February 2010, before slightly receding to 6.4 percent with preliminary May data. Over the same period, the nation's seasonally adjusted unemployment rate went from 5.0 percent to a high of 10.1 percent in October 2009. In 2010, the unemployment rate has been at 9.7 percent for all but one month through May.

## Other Indicators

### Gross Domestic Product by State

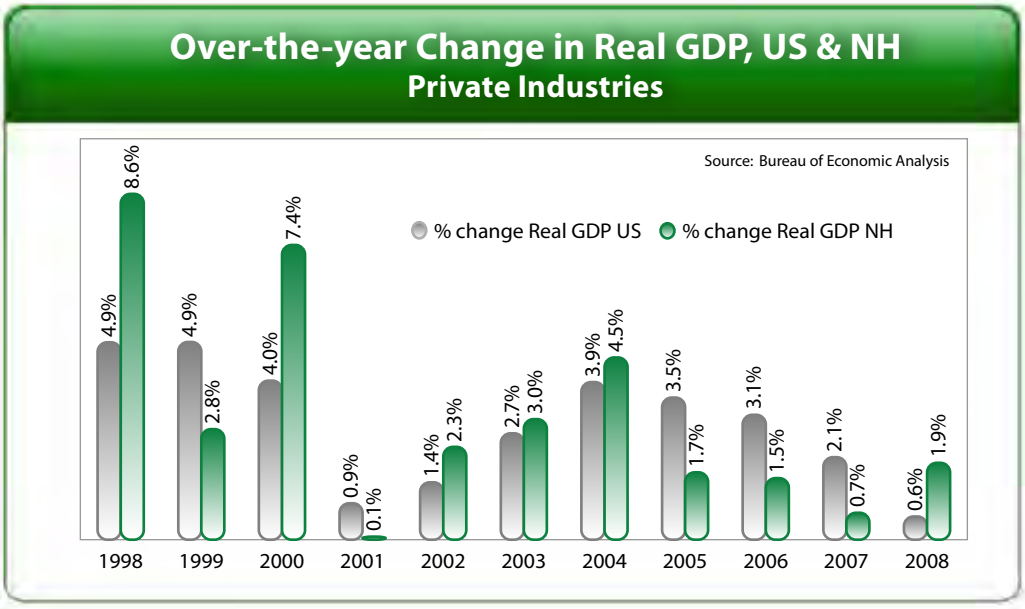
The gross domestic product by state (GDP) is a measurement of a state's output; it is the sum of value added from all industries in the state. GDP by state is the state-level counterpart to the nation's gross domestic product (GDP). Real GDP by state is an inflation-adjusted measure of each state's gross product and is chained to 2000 dollars. However, real GDP by state is limited in that it does not capture geographic differences in the prices of goods and services that are produced and sold locally.[4]

4. U.S. Department of Commerce, Bureau of Economic Analysis. Definitions – GDP by state. <www.bea.gov/newsreleases/regional/gdp_state/gsp_newsrelease.htm>. Accessed May 14, 2010.




Using 2000 as the base year, New Hampshire's real GDP growth rate had barely outpaced that of the nation through 2003. The cumulative change by 2004 of almost 10 percent exceeded the national change by a percentage point. After that point New Hampshire's trend slowed through 2008.

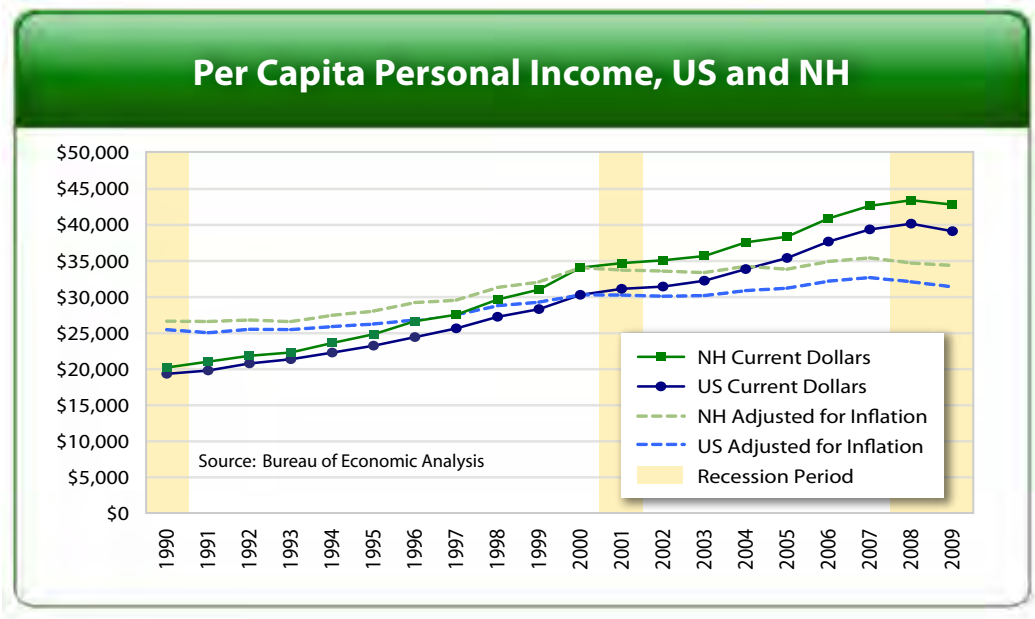
Reviewing the year-to-year trend, New Hampshire's 1.9 percent change over-the-year from 2007 to 2008 in real GDP was more than the nation for the first time since 2004.



## Per Capita Personal Income

New Hampshire's per capita personal income of $42,831 in 2009 ranked eighth highest among the 50 states. That was a decline of $592 from 2008, the first time that New Hampshire experienced a decline in annual per capita personal income since the data series began in 1969. The next lowest change in the state's per capita personal income was between 1989 and 1990 when there was essentially no change over the year. The effects of the recession on personal income were evident as only three states, Maine, Maryland, and West Virginia, had an increase in per capita personal income from 2008 to 2009.

Adjusting for inflation[5] (using 2000 as the base year), New Hampshire's real per capita personal income flattened after 2000 and declined in 2008 and 2009, as a direct result of the recession. New Hampshire's personal income, whether current dollars or inflation adjusted dollars, tracked the same as the nation.




5. Inflation adjusted to base year 2000 using the CPI inflation calculator. The CPI inflation calculator uses the average Consumer Price Index for a given calendar year. This data represents changes in prices of all goods and services purchased for consumption by urban households. This index value has been calculated every year since 1913. <www.bls.gov>.

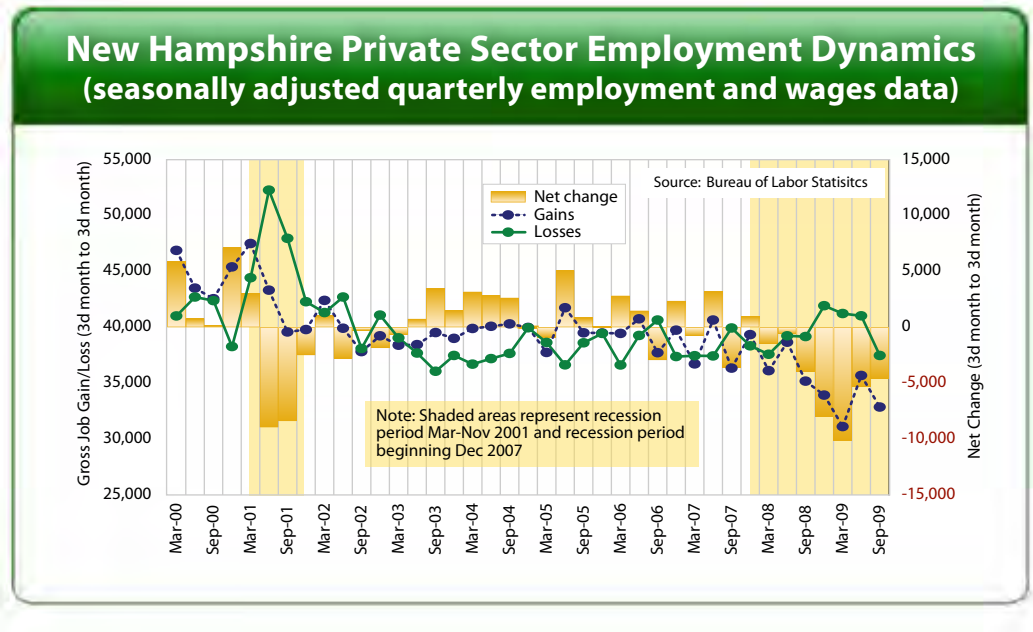
# Business Employment Dynamics

## Seasonally Adjusted data

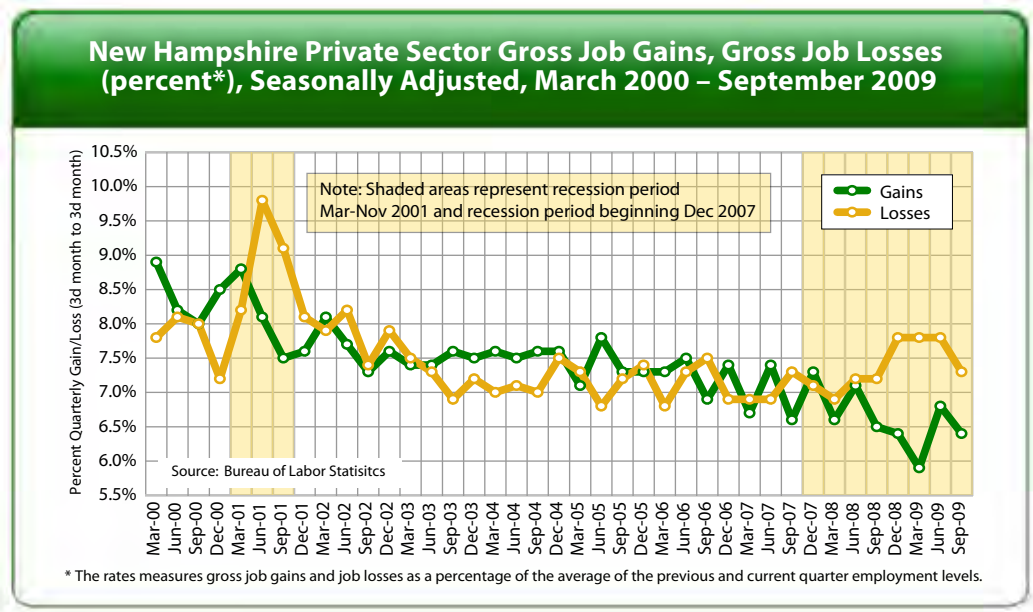
Typically, employment change is calculated as the net change of employment from one point in time to another point in time. This provides a measure of which direction the overall economy is going.

But that overall view masks the cumulative change that occurs at the individual establishment level. The current recession period has been measured by net job losses across all industry sectors. Business employment dynamics (BED) measure underlying employment changes at the individual establishment level.[6] This permits a comparison of the components that generate net employment change – gross job gains and gross job losses. Seasonally adjusted data for New Hampshire, produced by the Bureau of Labor Statistics, show the differences in overall industry behaviors. During the 2001 recession, data revealed the elevated levels of gross job losses in the state, simultaneously with job gains. Since job gains weren't as many as the job losses, there was a net job decline.

During the recent economic downturn, as gross job losses started to increase, gross job gains declined leading to a prolonged period of net job losses. This divergence of these two elements illustrates the reason for New Hampshire's sharp decline in employment - jobs were being eliminated at the same time as fewer jobs were being created.

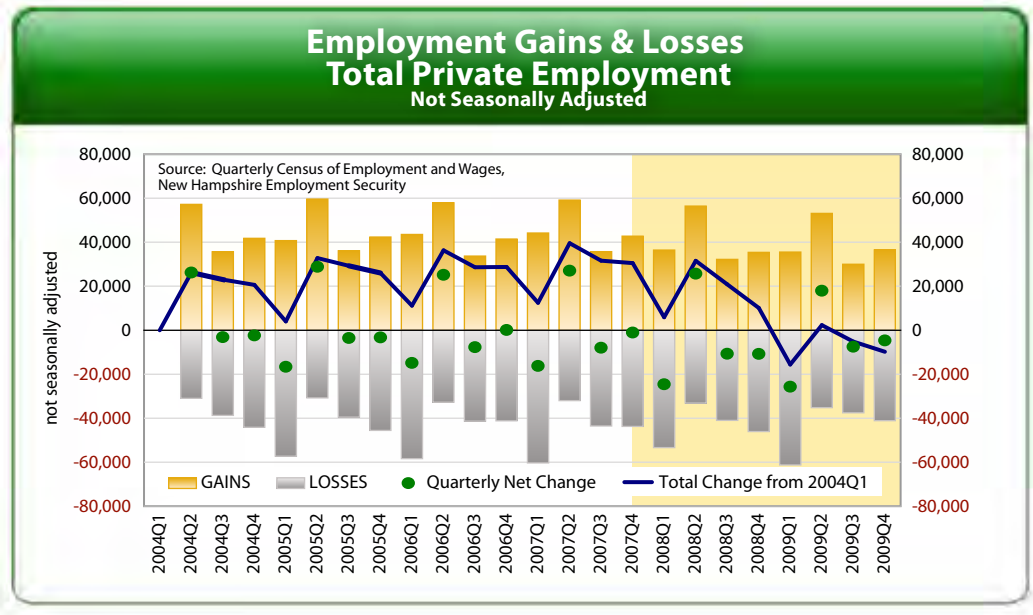



6. The U.S. Department of Labor, Bureau of Labor Statistics prepares these data (from the Quarterly Census of Employment and Wage program) quarterly on a seasonally adjusted basis so they may be compared to other states. New Hampshire Employment Security, Economic and Labor Market Information Bureau utilized the same methodology, comparing gross employment changes in the microdata from month three to month three of each quarter. This method was used for assimilating the data, without applying seasonal adjustment, to allow for comparison of employment change at the industry sector level in the state.

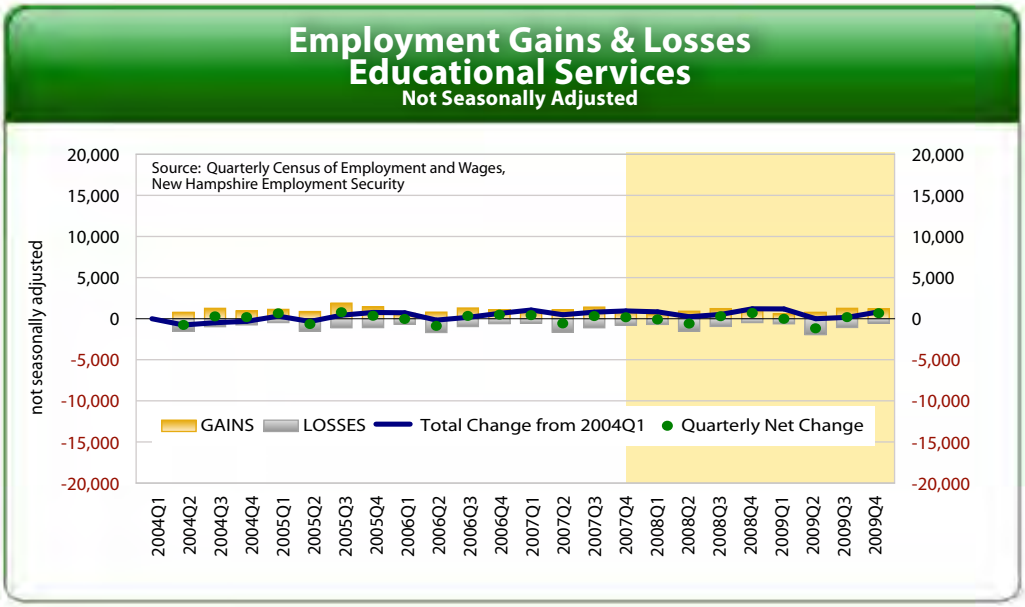



## Not Seasonally Adjusted Data by Industry

In New Hampshire, 2004 was the first year of significant employment growth after the 2001 recession. This provides a starting point for comparisons of quarterly not seasonally adjusted data. Until first quarter 2008, there was over-the-year positive employment change in month-three employment.[7] In both the seasonally adjusted and not seasonally adjusted data, for all private employment industries the basic cause of net employment losses was significantly reduced hiring combined with dramatically larger gross job losses.

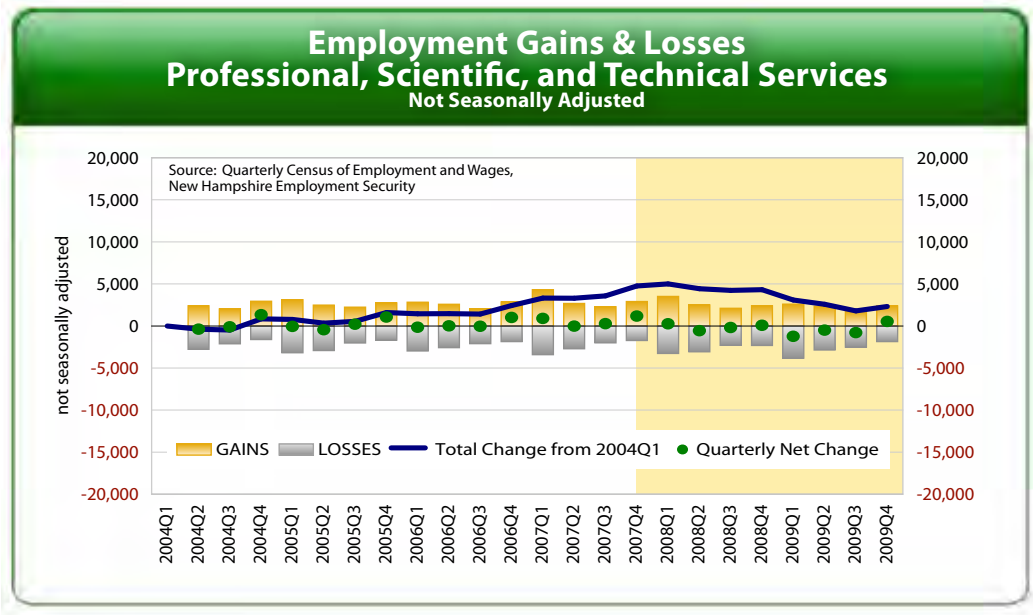



7. The gains and losses from one quarter to the next are measured by comparing employment levels in the third month of the respective quarters, e.g. December to March, March to June, etc.




Among private industries, *Health care and social assistance*, *Educational services*, and *Professional, scientific and technical services* were among the few that by fourth quarter 2009 were not below their first quarter 2004 employment levels.

Employment in private *Educational services* had remained fairly stable since first quarter 2004, with seasonal drops during the non-academic summer season. By fourth quarter 2009, employment gains were 250 jobs ahead of fourth quarter 2004 and job losses were down over 200 over the same period.

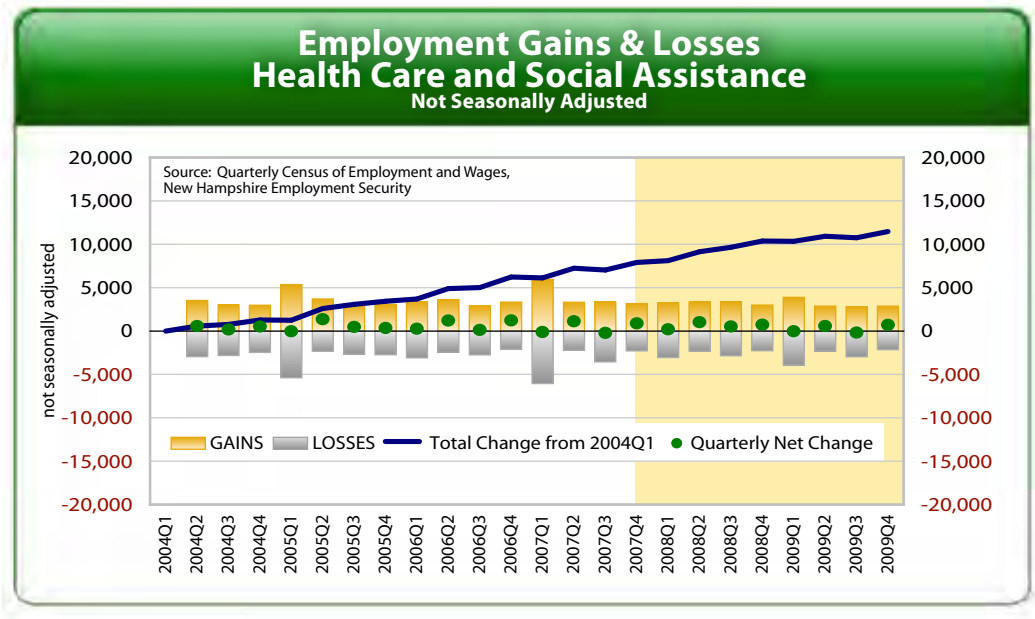


*Professional, scientific, and technical services* reached a peak employment change, up 4,998, from first quarter 2004 to first quarter 2008. However, gross job gains in first quarter 2008 quarter were more than 800 jobs shy of first quarter 2007. All four quarters of 2008 experienced a decline in the number of gross job gains compared to corresponding quarters of 2007.

About 85 percent of employment in the *Health care and social assistance* sector is in the medical and health care services field. Since first quarter 2004, employment in the sector has typically experienced net quarterly employment increases. There are a few exceptions that occurred in the first quarter 2005, and first and third quarters of 2007 and 2009, when there were small negative over-the-quarter net changes.

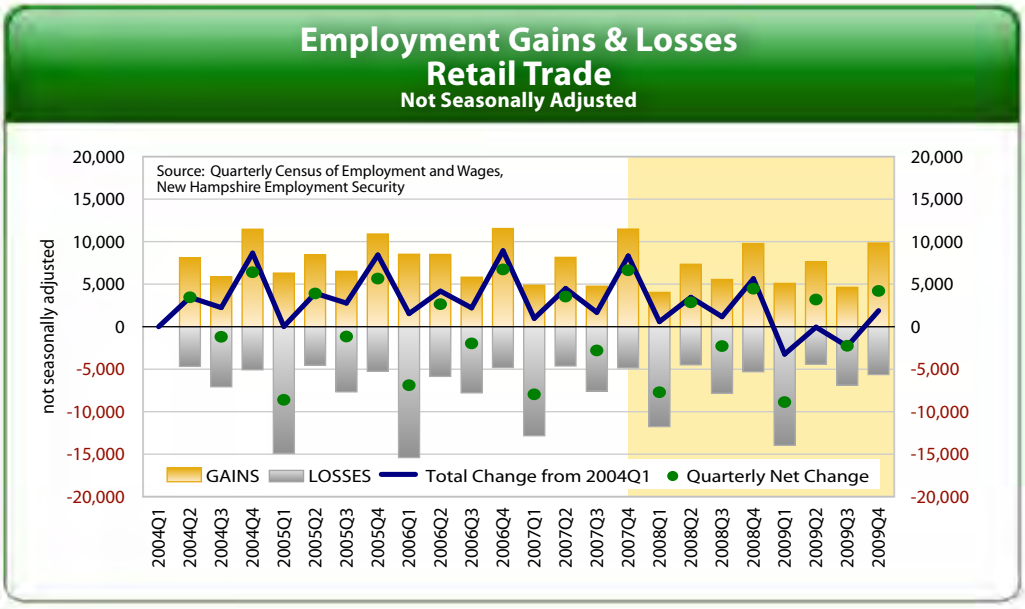
This industry is projected to have the strongest long-term employment growth among all private industries.[8] Where projections incorporate the effects of growing population demands on employment needs for the industry, they do not necessarily account for the cyclical financial burdens created by a weak economy. These include increased demand for uncompensated care, and reductions in Medicaid and Medicare funding, each of which could affect employment growth.

Drops in consumer spending likely affected the employment dynamics of *Retail trade* and *Accommodation and food services*.[9]



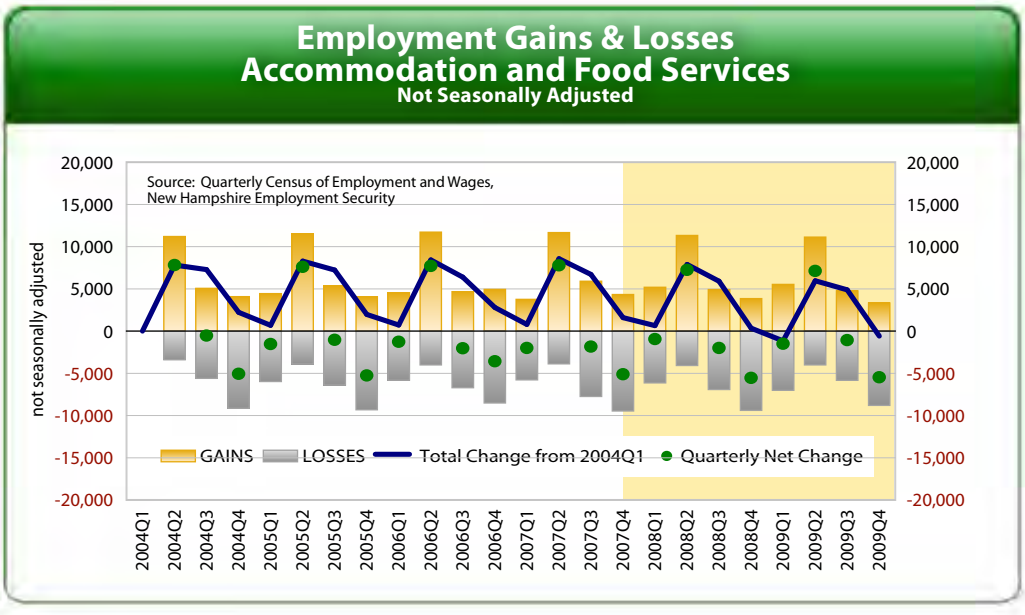

8. Employment growth for Health care and social assistance in New Hampshire is projected to be 25.0 percent by 2018. *New Hampshire Employment Projections by Industry and Occupation, Base Year 2008 to Projected Year 2018.*

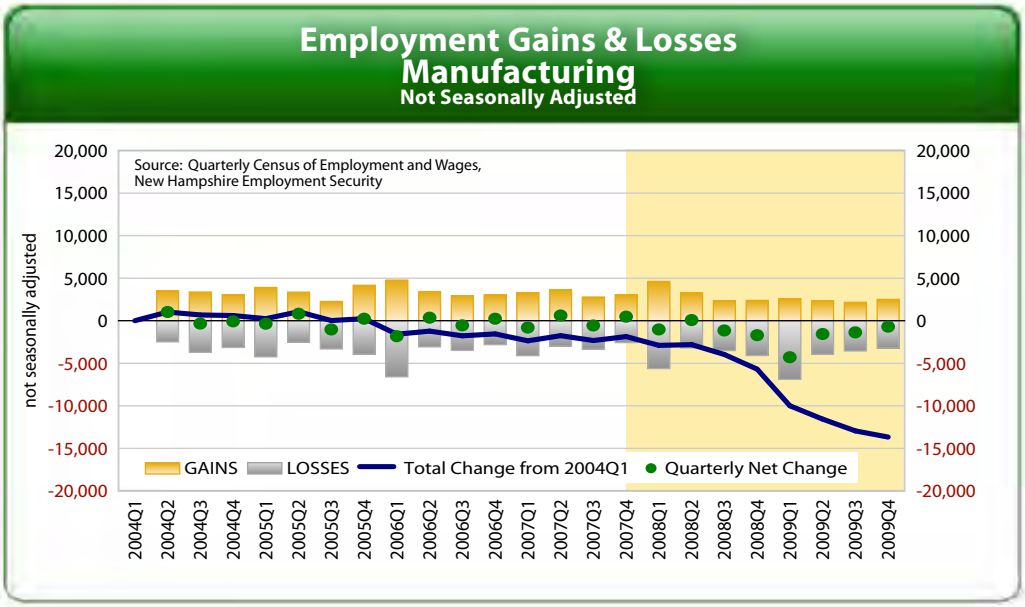
9. According to the Bureau of Economic Analysis, nominal per capita personal income in New Hampshire dropped $592 from 2008 to 2009.




*Retail trade* has been one of the largest employing industries in the state, with strong seasonal trends. From first quarter 2004, gross job gains and gross job losses and net employment changes followed predictable patterns until third quarter 2008. However, in the wake of the recession, retailers found their stores overstocked and consumers more conservative and frugal in their spending habits. During several quarters of 2009, *Retail trade* employment dropped to levels lower than first quarter 2004.

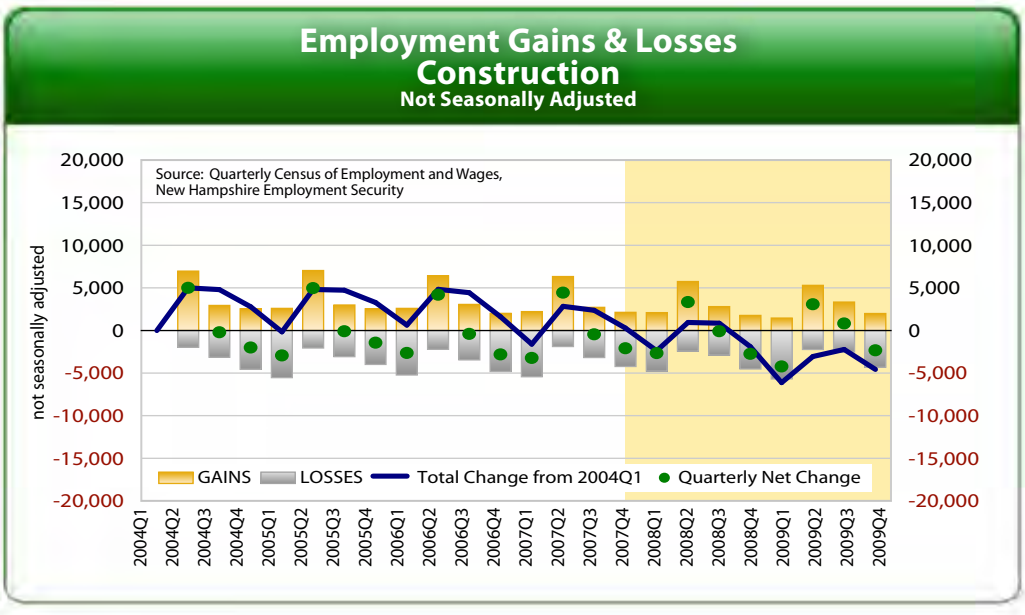
*Accommodation and food services* likewise exhibited consistent employment patterns over the 2004 to 2009 period. Unlike *Retail trade*, fourth quarter 2009 employment was below that of 2004.






There are obvious downward trends in the two largest goods producing industries, *Manufacturing* and *Construction*. There were minor net fluctuations in *Manufacturing*'s employment from first quarter 2004 to fourth quarter 2005. Then larger gross job losses contributed to a net decline in first quarter 2006, with minor fluctuations continuing through fourth quarter 2007. These were followed by a string of quarterly net losses, beginning with first quarter 2008. By the end of fourth quarter 2009, employment was almost 14,000 jobs below that of first quarter 2004.

Building permits are a leading economic indicator, and the poor housing market impacted employment in *Construction* prior to the recession. By first quarter 2007, total employment change was below that of first quarter 2004. Seasonal boosts in



employment during second and third quarters helped increase employment during the next two years (2007 and 2008), however, each quarter after third quarter 2008 has had employment lower than first quarter 2004.

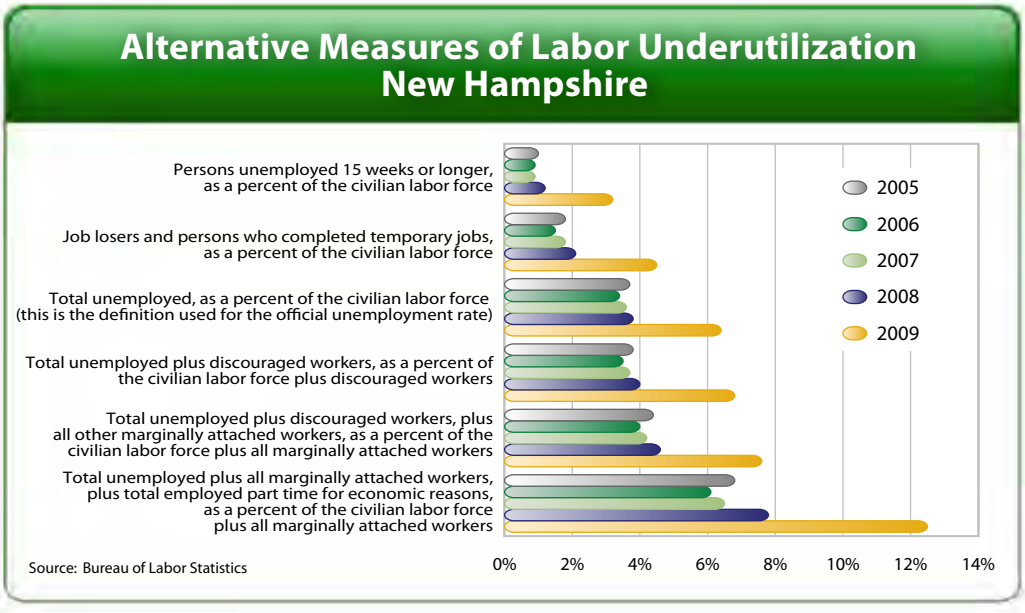
## Labor Underutilization

The official measure of unemployment defines an unemployed individual as someone who is not working but is looking and available for work. During economic downturns, especially over a prolonged period, many individuals may become discouraged and stop looking for work, because they feel there is no work available. Others may decide to wait to join the labor force until the economy improves, by extending educational pursuits, for example, before seeking employment. And yet others accept part time work because they cannot find full time employment. In any of these three instances, the individuals would no longer be counted as unemployed.

### Alternative Measures

A recession period often highlights the population of individuals who are not included as part of the official estimate of the unemployed. This is one reason alternative measures of labor underutilization were developed. These measures have been available on a national level for many years, and recently became available at the state level.

In many ways New Hampshire was delayed in joining the recession that officially began in December 2007. Therefore changes in the annual averages of the alternative measures of labor underutilization increased only slightly from 2007 to 2008. Pronounced changes in the 2009 measures reflected decreased hiring levels among all industry sectors, increased duration of unemployment, and persons dropping out of the labor force. New Hampshire's official unemployment rate for 2008 (U-3



Five alternative measures of labor underutilization have been established to expand the definition of how labor resources are utilized. The first two definitions are very narrow in scope, covering individuals who have been unemployed 15 weeks or longer (U-1), and then combining job losers and persons who completed temporary jobs (U-2). These measures are both expressed as a share of the civilian labor force.

The third measure uses the traditional definition of the unemployment rate, (U-3), those who are not working but are willing and available to work, and actively seeking employment. This is expressed as a share of the civilian labor force.

The last three definitions more broadly expand who is included in the remaining resource measures. The fourth adds discouraged workers to the equation (U-4). Discouraged workers are those who have given up looking for employment because they feel there are no jobs to be had. These individuals are added to the total unemployed and calculated as a percent of the civilian labor force plus discouraged workers.

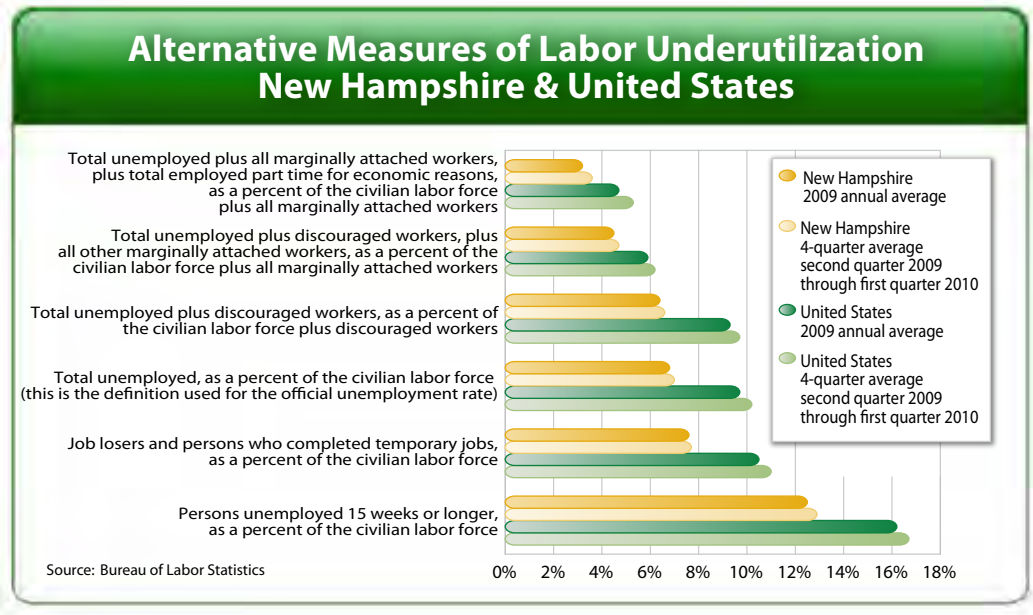
The fifth measure adds all marginally attached workers to the previous group (U-5). Marginally attached workers are individuals currently not working or looking for work, but who have looked for a job in the last 12 months and were available for work.

The sixth and final measure is the most inclusive of the labor underutilization condition. Along with the total unemployed and the marginally attached workers, this measure includes those who are working part time for economic reasons (U-6). Persons employed part-time for economic reasons are those who want and are available for full-time work but have had to settle for a part-time schedule.

For additional information, reference the Economic and Labor Market Information's Web site at: www.nh.gov/nhes/elmi/laborunderutilization.html

measurement) increased from an annual average of 3.8 percent to 6.4 percent in 2009.

Every measure of labor underutilization for New Hampshire is significantly lower than that of the nation. Comparing the four-quarter average ending fourth quarter 2009 to the four quarter average ending first quarter 2010, New Hampshire's increases were smaller than the nation's.



## Alternative Measures of Labor Underutilization
## New Hampshire vs United States

| Alternative Measure | Latest calendar year annual average | | Latest 4-quarter moving average | |
|---|---|---|---|---|
| | **2009 New Hampshire** | 2009 United States | **4-quarter average -- second quarter 2009 through first quarter 2010 New Hampshire** | 4-quarter average -- second quarter 2009 through first quarter 2010 United States |
| **U-1**, persons unemployed 15 weeks or longer, as a percent of the civilian labor force | **3.2%** | 4.7% | **3.6%** | 5.3% |
| **U-2**, job losers and persons who completed temporary jobs, as a percent of the civilian labor force | **4.5%** | 5.9% | **4.7%** | 6.2% |
| **U-3**, total unemployed, as a percent of the civilian labor force (*this is the definition used for the official unemployment rate*) * | **6.4%** | 9.3% | **6.6%** | 9.7% |
| **U-4**, total unemployed plus discouraged workers, as a percent of the civilian labor force plus discouraged workers | **6.8%** | 9.7% | **7.0%** | 10.2% |
| **U-5**, total unemployed, plus discouraged workers, plus all other marginally attached workers, as a percent of the civilian labor force plus all marginally attached workers | **7.6%** | 10.5% | **7.7%** | 11.0% |
| **U-6**, total unemployed, plus all marginally attached workers, plus total employed part time for economic reasons, as a percent of the civilian labor force plus all marginally attached workers | **12.5%** | 16.2% | **12.9%** | 16.7% |

For further explanation of these Alternative Measures of Labor Underutilization, please see *Alternative Measures of Labor Underutilization May 2009*, on the NHES ELMI website at www.nh.gov/nhes/elmi/pdfzip/econanalys/articles/Underutilization.pdf

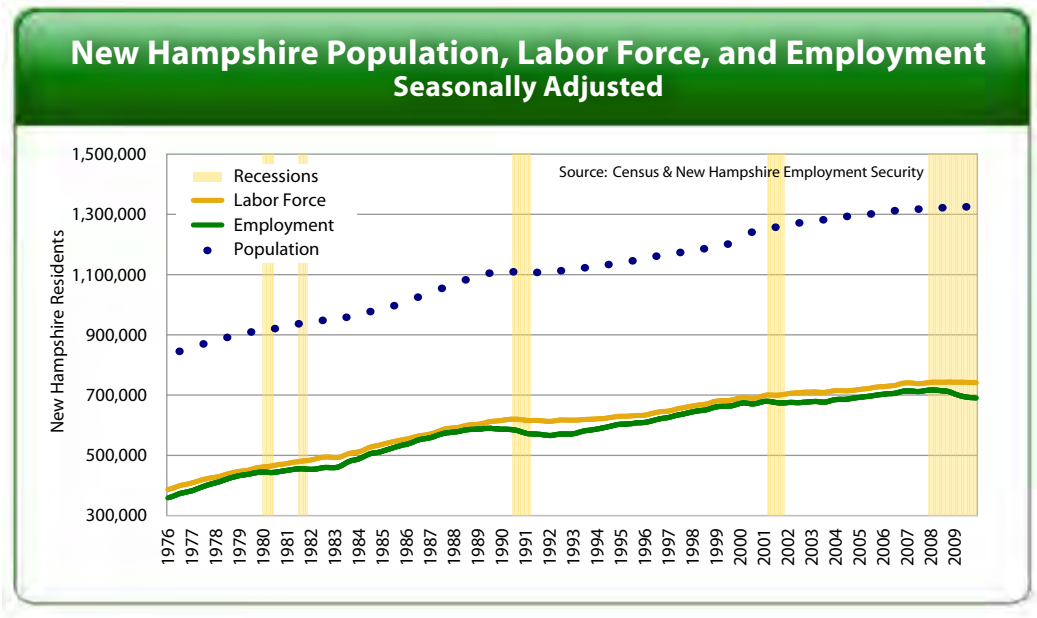
# Population and the Labor Force

The foundation of New Hampshire's workforce is its population, and it is important to evaluate its size and demographic make up to determine how well the potential workforce supply will meet future labor demand.

## Resident Population

The U.S. Census Bureau estimate of New Hampshire's resident population was 1,324,575 as of July 1, 2009. Over the year, from July 1, 2008 to July 1, 2009, New Hampshire's population increased by just 2,703 persons, a considerable slowdown in population expansion when compared to the earlier part of the decade. The last time the state experienced similarly slow population growth was in 1991, when New Hampshire's population declined slightly.

The components of population change for 2008 to 2009 show that New Hampshire's population growth was the result of natural increase and the in-migration of international migrants. A net 3,587 residents were gained from natural increase — the number of births minus the number of deaths — and another 1,787 residents from international in-migration.[10] More residents moved out of New Hampshire to other parts of the nation than moved in between 2008 and 2009, a net loss of 2,602 residents via domestic out-migration. Net population change from migration was –815 residents. This was the third consecutive year that New Hampshire experienced a net population




10. Net International Migration is defined by the U.S. Census Bureau as any change of residence across the borders of the United States (50 states and District of Columbia). Net international migration is estimated in four parts: (1) net international migration of the foreign born, (2) net migration between the United States and Puerto Rico, (3) net migration of natives to and from the United States, and (4) net movement of the Armed Forces population between the United States and overseas. The largest component, net international migration of the foreign born, includes lawful permanent residents (immigrants), temporary migrants (such as students), humanitarian migrants (such as refugees), and people illegally present in the United States. These components are not estimated individually. Rates are expressed per 1,000 population. Source: U.S. Bureau of the Census, Population Topics Glossary, <www.census.gov/popest/topics/terms>. Accessed June 21, 2010.

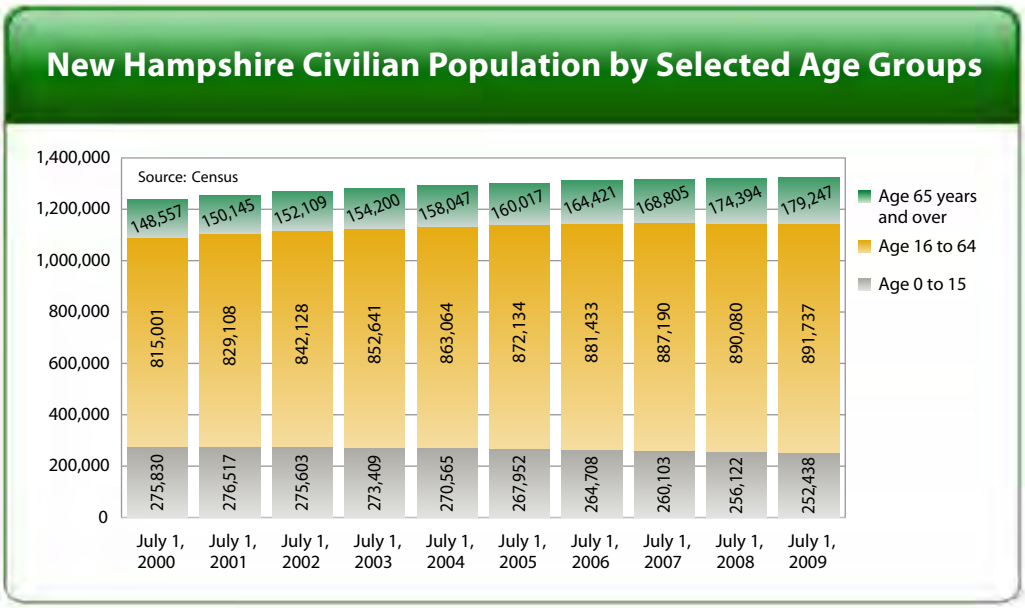
loss from domestic out-migration, demonstrating that the impact of the Great Recession is not the sole reason for slow population growth. It is not possible to draw any direct conclusions on the impact of out-migration on the workforce supply, as the age of domestic out-migrants is not available.

## Civilian Population

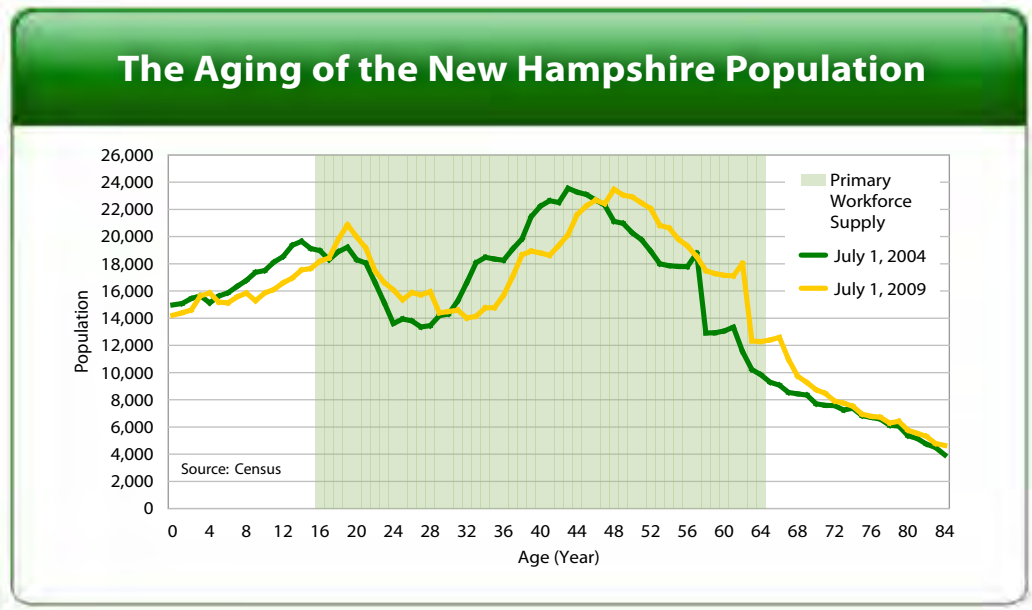
New Hampshire's civilian population (the portion of the resident population not in the active-duty military) was estimated by the U.S. Census Bureau at 1,323,422 persons as of July 1, 2009. From July 1, 2008 to July 1, 2009, the civilian population grew by 2,826 persons, slightly more than the increase in resident population. The increase of those aged 16 years or older was more than double that of the civilian population, a gain of 6,510 people in this broad age group, between 2008 and 2009. However, the population most likely to participate in the labor force[11] — those aged 16 to 64 years — produced a net change in population of 1,657 civilian residents.

From July 1, 2000, to July 1, 2009, the 16 to 64 years age group grew by 8.6 percent, slightly faster than the increase in total population at 6.3 percent. But the 65 years and over age group grew by 17.1 percent over that same period, while the civilian population 0 to 15 years of age decreased in size.

The current slow in-migration rates might not have an immediate impact on New Hampshire's labor force. In 10 to 15 years, however, the increasingly smaller population entering the primary workforce supply will not compensate for current members who will be aging out of the primary workforce supply. Without population




11. According to The Geographic Profile of Employment and Unemployment, 2009, only one in five civilians aged 65 years and over participated in the labor force.




growth from those very young age cohorts, an influx of migrants, both domestic and international, would be needed to increase the labor force supply.

## Labor Force Supply

Changes in migration are affected by available economic opportunities and conversely have an effect on expansion and contraction of economic activity. In other words, the demand for and supply of workers does not always match. The current level of unemployment means there is a larger supply of workers than there are jobs available. Workers tend to migrate towards areas that have ample opportunities for employment. With labor market conditions similar to (or worse than) New Hampshire in most other parts of the nation, many workers are staying where they are for now, reducing both in- and out-migration.

The definition of the labor force includes only civilian non-institutionalized population age 16 years or older. Some age groups are more likely to participate in the workforce, so evaluating just the overall size of the population is not sufficient to understand labor force changes.

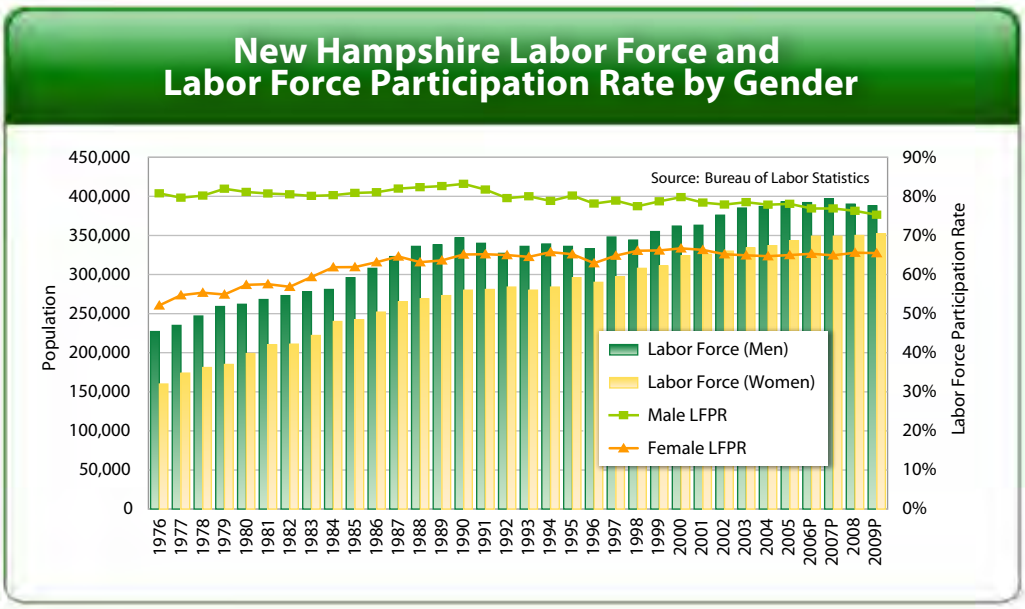
## Labor Force Contractions and Expansions

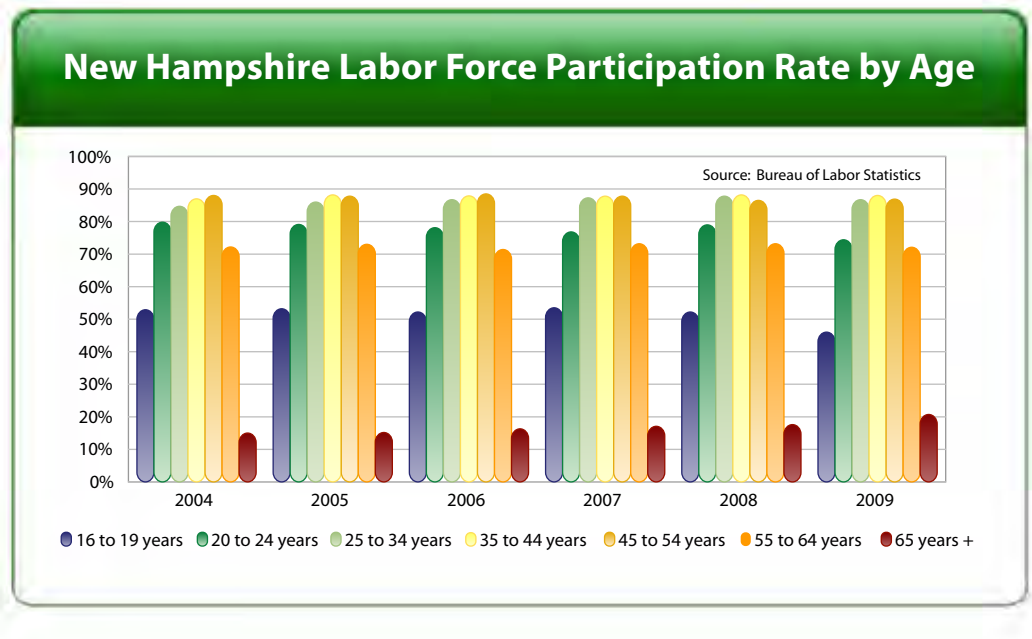
A person's ability and availability for work determine their inclusion in the labor force. Restrictions such as caring for a family member, a child or parent for example; or attending school full-time, limit a person's availability for work. Those reaching retirement age and no longer able or wanting to work are other factors that take population out of the labor force. Economic and labor market conditions can also affect a person's decision to participate in the labor force.

From 1976 through 2009, there has been an increase in the female labor force participation rate. This trend is the main reason why the total labor force participation rate increased from 66 percent in 1976 to a high of more than 72 percent from 1999 through 2001. Since that time, labor force participation rates for both genders declined slightly, so that the total labor force participation rate sat just above 70 percent for 2009.

New Hampshire residents in the 65 years and over age cohort as well as those 16 to 19 years of age are less likely to participate in the labor force, but at the same time these two age cohorts are very responsive to labor market conditions. Depending on the state of the labor market, retirees may attempt to reenter the labor force and the 16 – 19 years age cohort may attempt to get part-time jobs during the school year and explore more full-time employment opportunities during the summer.

During the most recent economic downturn, the labor force participation of those 16 to 19 years and 20 to 24 years declined substantially, while labor force participation of



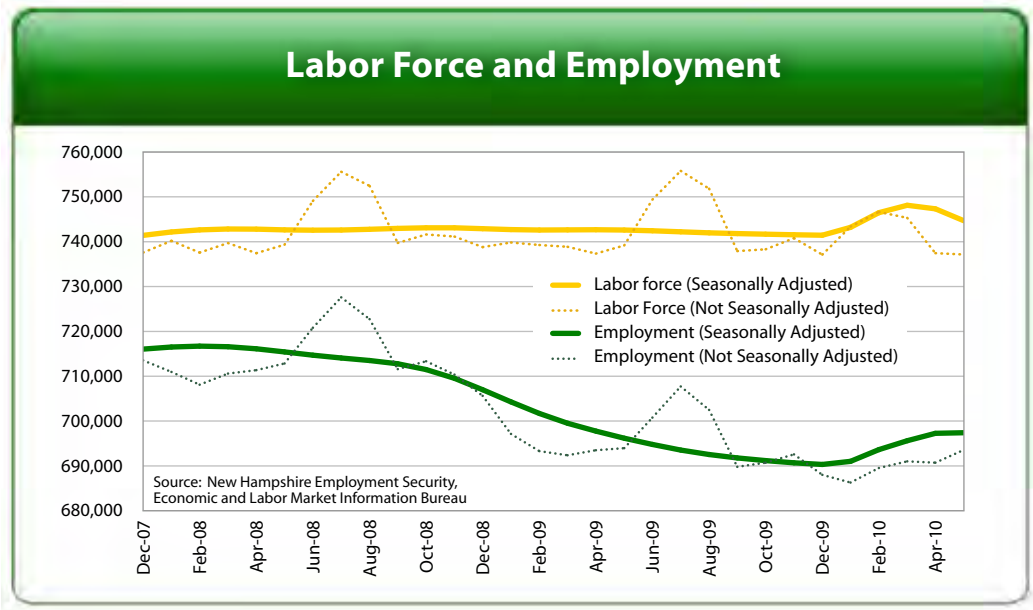



New Hampshire residents age 65 years and over increased. The labor force participation rate for the civilian non-institutional population age 65 years and over rose from 15.0 percent in 2004 to 20.7 percent in 2009, with the sharpest increase from 2008 to 2009. This increase in labor force participation rate for the 65 years and over age cohort was most likely driven by economic factors such as a sudden drop in retirement portfolio values, a decrease in home values, and an increase in tax rates.

As life expectancies increase, a larger percentage of the age 65 years and over population may decide to remain in the labor force. The ability of people to WORK LONGER as they LIVE LONGER may be part of the solution to the dwindling future workforce supply.

## Joining the Labor Force as the Economy Improves

New Hampshire's seasonally adjusted labor force increased by 6,700 from December 2009 to March 2010, in response to perceived improvements in labor market conditions. Seasonally adjusted employment expanded by 5,300 over the same time period. Since March 2010, employment gains have been more in line with expectations for spring hiring.




The labor market is still very competitive, and unemployment is still relatively high. Some labor force participants might be discouraged enough to drop out of the labor force. Combined with stagnant population growth, it is not likely that the labor force will grow substantially before the level of unemployment decreases and business regains a foothold on positive growth.

# Characteristics of the Unemployed

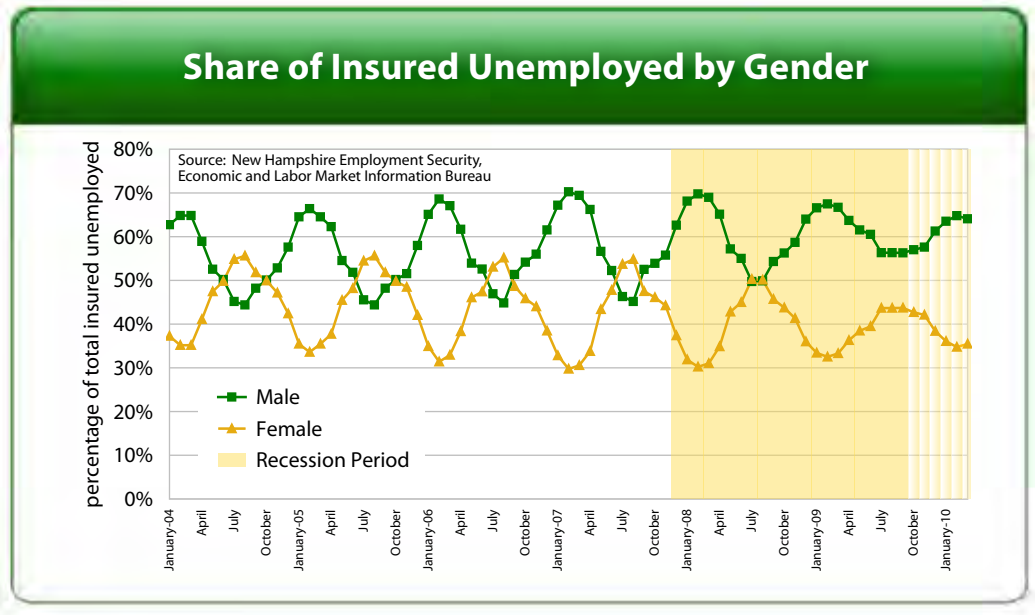
The characteristics of the Insured Unemployed have changed during the current recession.

Demographic and industry data collected on the insured unemployed[12] can help us understand the changes that have occurred to the pool of the insured unemployed during the Great Recession.

When examining monthly data from January 2001 through March 2010, the usual pattern of the insured unemployed by gender stands out:

- A larger portion of the insured unemployed was male during the winter months, whereas a larger share of insured unemployed was female during the summer months.

This normal seasonal pattern seems to correlate with a seasonal industry employment and unemployment relationship. As Construction employment picked up over the summer, a smaller share of total weeks claimed was in Construction, whereas in each February from 2004 to 2008 this industry accounted for about a quarter of total weeks claimed. These claims were primarily filed by male claimants. It is more difficult to detect a direct correlation between seasonal industry employment and the increase in claims filed by females in July and August from 2004 through 2008. It is possible that some of the increase in claims filed by females is due to schools closing for the summer. Teachers with contracts for the following school year do not qualify for unemployment compensation, but there are other auxiliary types of employment in schools such as teacher assistants, cafeteria workers, transportation and janitorial services. These workers may qualify for unemployment

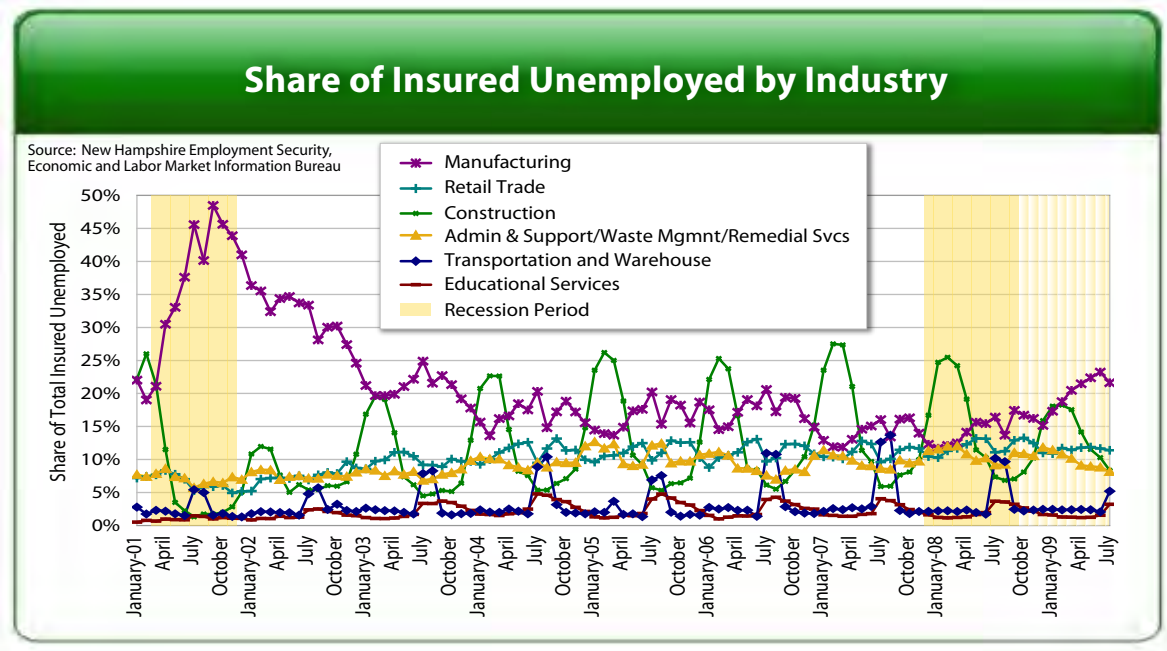



12. The ETA 203 report (Characteristics of the Insured Unemployed) represents data on weeks of benefits claimed which are filed during the week containing the 19th of the month, reflecting unemployment experienced during the prior week containing the 12th of the month. The week containing the 12th of the month correlates with the survey week in the Current Population Survey, which is used to produce estimates of total unemployment.

compensation. Some districts outsource transportation and food services to companies in private industry. Data from the Mass Layoff Statistics program show a gender bias in school-related layoffs. In the third quarters of 2007, 2008, and 2009, about three out of four initial claims included in school-related layoffs were from female claimants.

As opportunities for seasonal employment in Construction seemed to have been fewer during the Great Recession,[13] the usual seasonal gender differences of the insured unemployment has changed. In July and August 2008, the share of insured unemployed males matched the share of insured unemployed females. This had not occurred since the summer of 2002, in the aftermath of the 2001 recession. By the summer of 2009, the share of males stayed high, at about 56 percent of the insured unemployed. Some analysts have suggested that the Great Recession has changed the composition of the workforce, with females faring better than their male counterparts.[14]

When evaluating the age characteristic of the insured unemployed, it stands out that those aged 35 to 44 years declined in the share of total claims. In 2004, the 35 to 44 years age group accounted for about 28 percent of total claims. By 2010, this age group accounted for about 21 percent of total claims. In contrast, the next two younger age groups, those 22

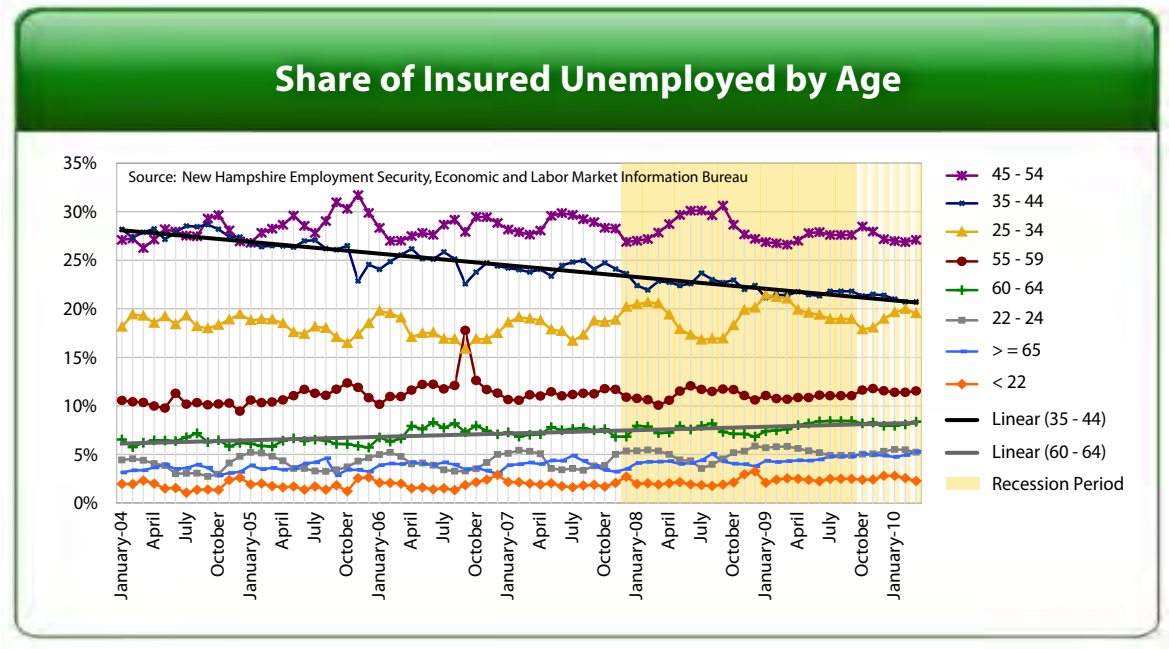



13. Seasonal adjusted nonfarm Construction employment dropped from 26,700 in December 2007 to 21,800 in July and August 2009, and has since then improved to 22,800 for May 2009.

14. Aysegul Sahin, Joseph Song and Bart Hobijn. "The Unemployment Gender Gap during the 2007 Recession." *Current issues in Economics and Finance (Volume 16, Number 2, February 2010)*. Federal Reserve Bank of New York. The national unemployment rate for men has in the past been approximately the same as that of females, except during and in the aftermath of recessions. The difference during the Great Recession is the magnitude of the unemployment gender gap. In August 2009, the employment gender gap (male rate exceeding female rate) was 2.7 percentage points — the largest in postwar era. From 2004 to 2008, the unemployment gender gap in New Hampshire was close to half of percentage point, whereas the unemployment gender gap was more than 1.6 percentage points in 2009.

to 24 years old and those aged 25 to 34 years, increased their shares slightly over the same time period. The employment status of these two groups is susceptible to seasonal swings. Both the 22 to 24 years and the 25 to 34 years age groups experienced their largest share of total insured unemployed in the winter months of 2008-2009. In 2010, the seasonal swing in unemployment for these two age groups declined slightly, which might indicate that the outlook for these age groups is getting brighter as more hiring resumed in spring 2010. For those aged 60 to 64 and those aged 65 and above, shares of total claims have increased slightly since 2004, but did not drastically worsen in the current economic downturn.

Some of the factors that might have influenced the change in shares of total claims of the insured unemployed over time could be the expansion/contraction of population age cohorts in comparison to the age cohort composition of the total labor force. As the baby boomer generation is growing older, the older age cohorts account for larger shares of the total labor force, which could potentially have an impact on the insured unemployed in the older age cohorts. Data from the Geographic Profile of Employment and Unemployment showed that the labor force share of the age cohort 35 to 44 years old declined over the period 2004 to 2009 from 25 to 22 percent.[15] Another factor that could influence the change in shares of the insured unemployed is if the duration of the unemployed claimants for any of the age cohort increases in disproportion to any other age cohort. It is likely that claimants in the age cohort 35 to 44 years are quicker to find reemployment, as their salary expectation in general might be lower than their older job-seeking competitors. Due to longer work history and build up of seniority with previous employers, expectation of replacement wages for older workers are high. Younger claimants might not have settled down in terms of being




15. Geographic Profile of Employment and Unemployment, 2004-2009 Annual Averages. Bureau of Labor Statistics. Accessed June 11, 2010. <www.bls.gov/gps>.

homeowners and could therefore be more flexible in terms of moving to where a potential job opening is located. And the claimants in the age cohort 35 to 44 years of age are not right out of college, so they do possess work experience.

The shift in share of claimants by age and gender is not the sole effect of the Great Recession. Prior to the end of 2008, the total number of weeks claimed was much lower than the current level. As a result, despite a decline in share of total claims for those aged 35-44 years, the number of claims more than doubled for this age group from December 2007 to December 2009.

With both a high level of claims and the extensive length of the Great Recession, the impact of seasonal factors for both age and gender has diminished. The main reason for this shift is that the majority of jobs lost during the Great Recession were not lost due to seasonal factors, but due to cyclical or even structural changes in the economy. Overall, the gender composition of claimants appears to have been more impacted by the recession than the age composition.

As the insured unemployed represent only a portion of all unemployed residents, the following section will evaluate the age and gender composition of the unemployed overall, based on quarterly data from the Current Population Survey.

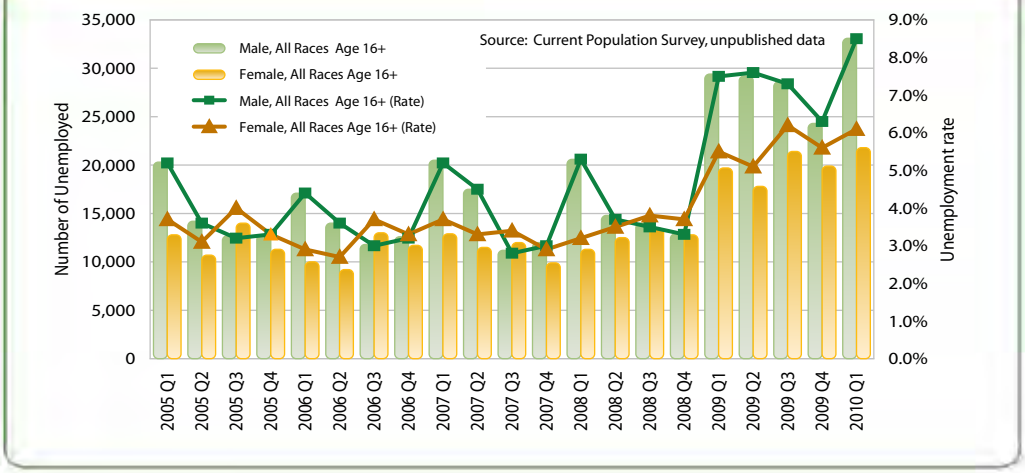
## Characteristics of *total* unemployment and the duration of unemployment

For New Hampshire, the unemployment rate published monthly does not include data on the distribution by gender and age. However, demographics and the employment status of the civilian non-institutional population are included in the Current Population Survey (CPS) tabulations. The following analysis is based on this unpublished quarterly data from the Current Population Survey from first quarter 2005 to first quarter 2010.

### Employment Status of the Civilian Non-Institutional Population by Gender

When comparing the rate and the level of unemployment since 2005, the seasonal gender patterns seems to mirror those of the insured unemployed, with the highest unemployment rate occurring in the first quarter each year among males and with a seasonal high unemployment rate among females in third quarter. So in general, the unemployment rate is impacted by seasonal variations. But beginning with first quarter 2009 – the inception of the Great Recession – the unemployment rate for males in New Hampshire has consistently been above the rate for females.

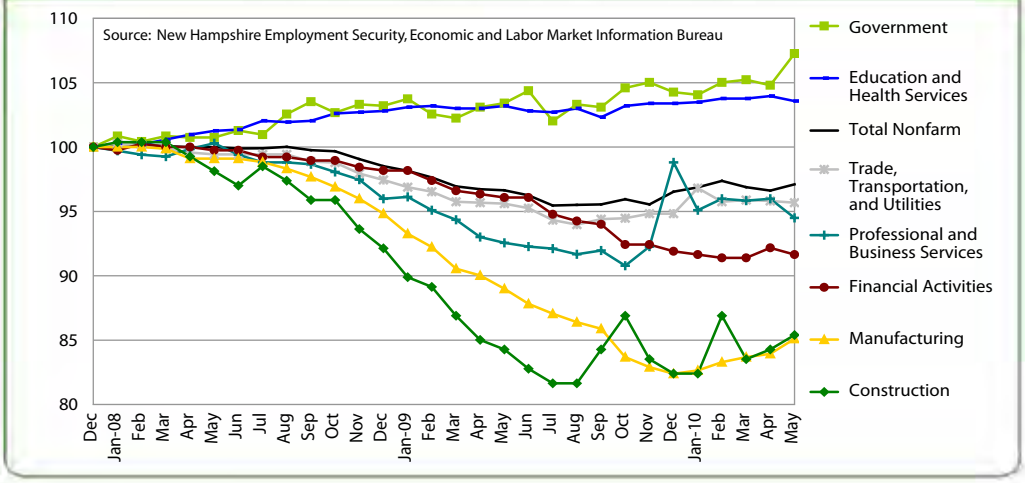
## Number of Unemployed and Rate by Gender, New Hampshire




Even though the unemployment rate and level of the unemployed for both genders increased substantially by first quarter 2009, the unemployment gender gap remained large over the summer of 2009. The main reason for the gender gap is that the unemployment rate among males remained high in the second and third quarters of 2009, contrary to the usual seasonal patterns.

The unemployment gender gap experienced during the Great Recession can be attributed to employment losses in Construction and Manufacturing – industries that traditionally have a higher concentration of male workers. Professional and business services and Financial activities also experienced substantial employment losses. On the flip side, net losses were the lowest in Education and health services (private) and Government. [Government

## Employment Change for Selected Supersectors since the beginning of the Recession (Index 100 = Employment level December 2007)



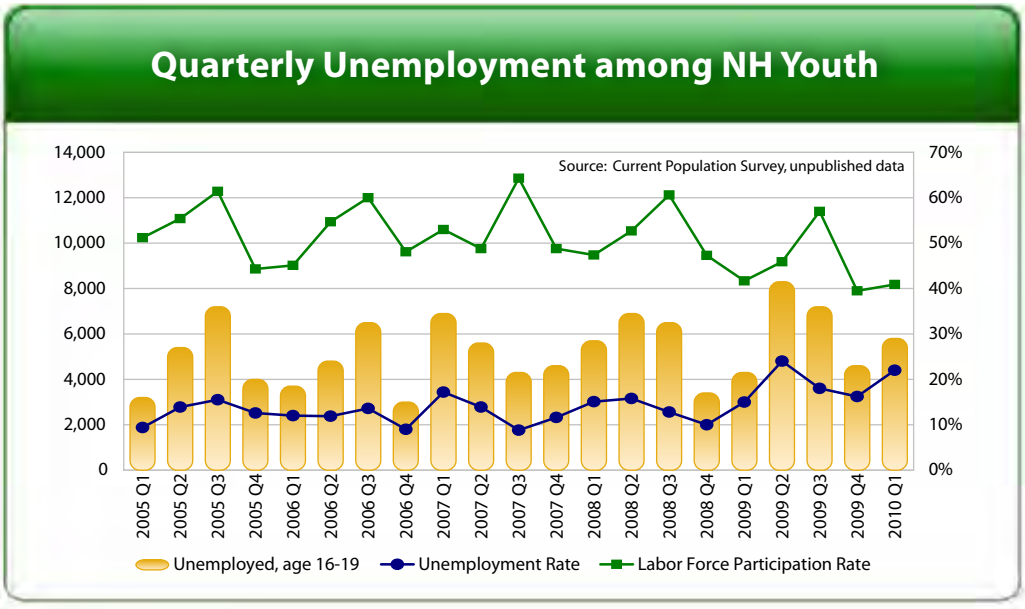
contains a high proportion of educational-related employment, as both public K-12 and public postsecondary education are counted as government employment.]

## Employment Status of the Civilian Non-Institutional Population by Age

Unemployment among those aged 16 - 19 years is highly volatile, as persons in this age group more easily flow in and out of the labor force. As seasonal opportunities arise and schools close for the summer, more 16 - 19 year-old workers attempt to join the labor force. If conditions are less than optimal, those in this age group are more likely to return to school (if they had dropped out) or just stop looking for work. In this case, these potential workers are not counted as unemployed nor as labor force participants (a prerequisite to being counted as unemployed).[16]

The flexibility in the younger youth labor force (aged 16 – 19 years-old) can be exemplified by comparing the number of unemployed workers with the unemployment rate. The number of unemployed in the first quarter 2010 was 5,800 persons. This level of unemployment was approximately the same (5,700) as in the first quarter 2008, but at that time this translated to an unemployment rate of 15 percent as opposed to first quarter 2010, where the same number of unemployed workers translated to a rate of 22 percent.

The key to understanding this dynamic is to evaluate a third component of employment statistics: the labor force participation rate. In this example, the labor force participation rate for this age group in first quarter 2010 was 40.9 percent, compared to 47.4 percent in first quarter 2008. From first quarter 2008 through first quarter 2010, the labor force participation rate was at its lowest point in fourth quarter 2009, at 39.5 percent.




16. The volatility of the employment status of the 16 - 19 years old in New Hampshire is partly due to the relatively small size of the population. As this data is based on a household survey the margin of error for this small segment is relatively large. In first quarter 2010, the 16 - 19 years-olds accounted for 6.1 percent of total civilian non-institutional population age 16+.

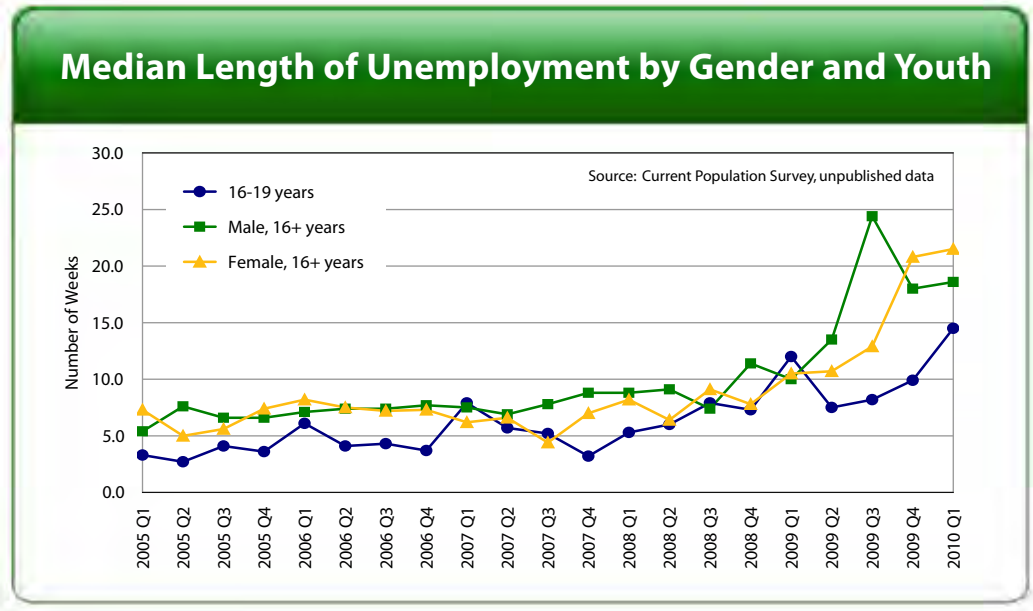
Even though about the same number of workers aged 16 – 19 years were unemployed in these two time periods, the total number of labor force participants was lower in first quarter 2010, resulting in a substantially higher unemployment rate. In first quarter 2010, fewer youth are attempting to join the labor force, and about a fifth of those who do cannot find work.

## Duration of Unemployment

In addition to labor force estimates, the Current Population Survey contains data on the length or duration of unemployment (this data represents duration for all unemployed, not just active claimants for unemployment benefits). How has the duration among the unemployed changed and how has the Great Recession impacted each gender and age group?

From first quarter 2005 to first quarter 2007, the median duration of unemployment in New Hampshire for both males and females over age 16 changed very little. The lowest median duration of unemployment for females in this time span was in the third quarter 2007, compared to a slow, steady increase in length of unemployment for males over the same period. From fourth quarter 2007 onwards, the median duration of unemployment started to climb sharply for males and females.

The median duration of unemployment increased sharply in third quarter 2009 for males and in fourth quarter 2009 for females. From second quarter 2009 to third quarter 2009, the median length of unemployment for males increased from 13.5 to 24.4 weeks. For females, the median duration of unemployment went from 12.9 to 20.8 weeks from third quarter 2009 to fourth quarter 2009. These leaps in the duration of unemployment by the latter half of 2009 correlates with a high number of workers laid off in late 2008 and early in 2009, at the same time as a decline in job openings.



Median duration of unemployment for those aged 16 – 19 years usually spikes in first quarter of the year (though 2008 was an exception). But the median duration of unemployment spiked higher than usual in first quarter 2009 and first quarter 2010. The median length of duration for the age 16 - 19 years is in general lower than the level for all males and all females, and during the Great Recession, the median duration of unemployment for youth remained well below that of all males and all females. This relatively short duration for the 16 –19 years old cohort seems to provide support to the theory that the youth population is highly flexible is term of joining and leaving the labor force.

The Great Recession has caused the median duration of unemployment for New Hampshire residents to be lengthened, but it is too early to determine the lasting impact.

# Skills and Knowledge Demand Assessment

What skills and knowledge will workers need to possess in order to fulfill future job requirements? How do occupations with large replacement needs match up with high skill/high demand/high wage occupations? And, what basic or essential skills and knowledge are needed to enhance reemployment opportunities?

It is important to focus on the skill and knowledge level of those areas most in demand when assessing the individual job seeker. If the job seeker is in the process of transferring to an occupational field with a brighter employment outlook, such assessment will help the job seeker detect any skill and knowledge deficiencies.

## Projected Demand – long term

The process for determining the skills and knowledge that will be in demand in the future begins by examining the 2008 – 2018 long-term occupational projections. The skills and knowledge required by occupations projected to have the highest average annual openings over the ten-year projections period will be used as the baseline for this assessment. Before looking at these details, however, an overview of the share of employment for major groups of occupations will provide a broad perspective on occupational growth in New Hampshire.

Projected Long-term Outlook by Major Occupational Groups for New Hampshire

| SOC Code | Occupation Title | 2008 Employment | 2018 Projected | 2008 - 2018 Change | 2008 Share | 2018 Share |
|---|---|---|---|---|---|---|
| 00-0000 | Total Employment | 695,185 | 756,238 | 61,053 | 100% | 100% |
| 43-0000 | Office and Administrative Support | 110,519 | 116,872 | 6,353 | 15.9% | 15.5% |
| 41-0000 | Sales and Related | 90,676 | 96,091 | 5,415 | 13.0% | 12.7% |
| 35-0000 | Food Preparation and Serving Related | 55,051 | 61,111 | 6,060 | 7.9% | 8.1% |
| 11-0000 | Management | 51,484 | 53,676 | 2,192 | 7.4% | 7.1% |
| 51-0000 | Production | 50,663 | 48,621 | -2,042 | 7.3% | 6.4% |
| 25-0000 | Education, Training, and Library | 45,278 | 51,952 | 6,674 | 6.5% | 6.9% |
| 29-0000 | Healthcare Practitioners and Technical | 36,394 | 44,721 | 8,327 | 5.2% | 5.9% |
| 53-0000 | Transportation and Material Moving | 34,850 | 36,280 | 1,430 | 5.0% | 4.8% |
| 13-0000 | Business and Financial Operations | 31,201 | 35,254 | 4,053 | 4.5% | 4.7% |
| 47-0000 | Construction and Extraction | 27,857 | 29,968 | 2,111 | 4.0% | 4.0% |
| 49-0000 | Installation, Maintenance, and Repair | 25,695 | 27,337 | 1,642 | 3.7% | 3.6% |
| 37-0000 | Building and Grounds Cleaning and Maintenance | 24,468 | 25,890 | 1,422 | 3.5% | 3.4% |
| 39-0000 | Personal Care and Service | 22,777 | 27,446 | 4,669 | 3.3% | 3.6% |
| 15-0000 | Computer and Mathematical | 18,538 | 21,352 | 2,814 | 2.7% | 2.8% |
| 31-0000 | Healthcare Support | 18,336 | 23,254 | 4,918 | 2.6% | 3.1% |
| 17-0000 | Architecture and Engineering | 12,318 | 12,849 | 531 | 1.8% | 1.7% |
| 33-0000 | Protective Service | 11,338 | 12,528 | 1,190 | 1.6% | 1.7% |
| 27-0000 | Arts, Design, Entertainment, Sports, and Media | 8,578 | 9,177 | 599 | 1.2% | 1.2% |
| 21-0000 | Community and Social Services | 8,535 | 10,229 | 1,694 | 1.2% | 1.4% |
| 19-0000 | Life, Physical, and Social Science | 4,858 | 5,598 | 740 | 0.7% | 0.7% |
| 23-0000 | Legal | 3,998 | 4,219 | 221 | 0.6% | 0.6% |
| 45-0000 | Farming, Fishing, and Forestry | 1,773 | 1,811 | 38 | 0.3% | 0.2% |

The two largest major occupational groups in 2008 were Office and administrative occupations and Sales and related occupations, accounting for 15.9 percent and 13.0 percent of total employment, respectively. Despite a projected growth over the ten-year period of more than 6,300 for Office occupations and 5,400 for Sales occupations, by 2018 both major occupational groups will experience a slight decline in their shares of total employment. This minor shift in the overall share of total employment is related to technological advances leading to increases in productivity, thus reducing the need for workers to achieve the same level of productivity.

The third largest major occupational group is Food preparation and serving related occupations, accounting for 7.9 percent of total employment in 2008 and projected to grow by about 6,000 jobs over the ten-year period.

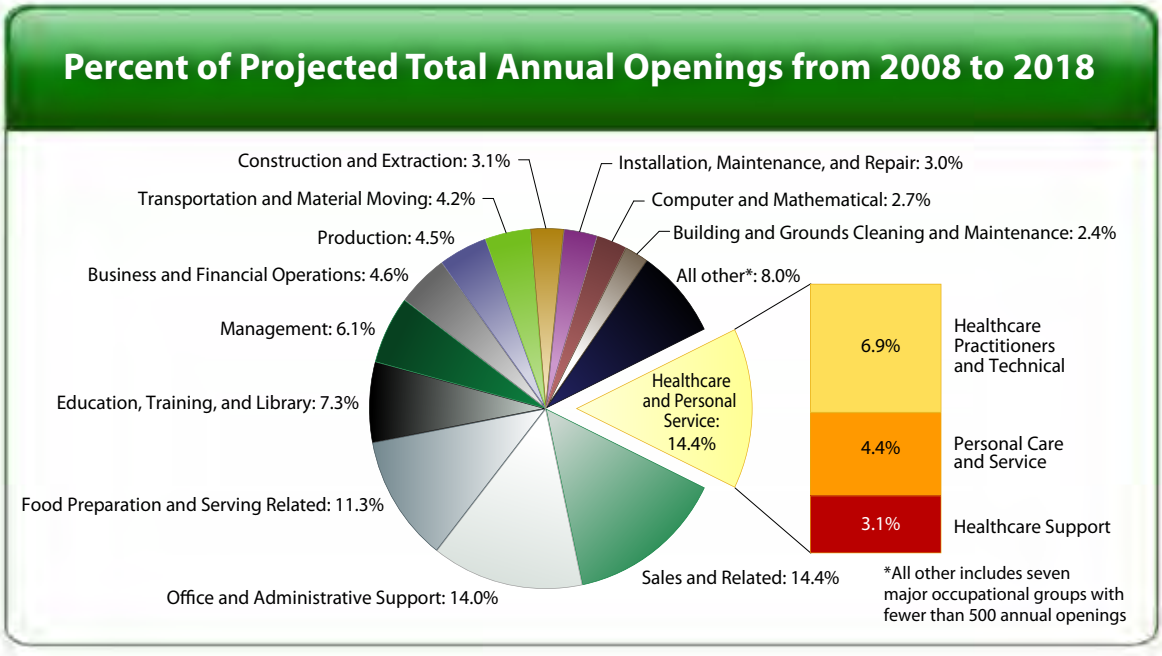
Healthcare practitioners and technical occupations actually ranks seventh with a 5.2 percent share of total employment in 2008. But if Healthcare practitioners and technical occupations are combined with Healthcare support occupations to represent all health care workers, these occupations make up 7.9 percent of total employment in 2008, and are projected to make up 9.0 percent of total projected occupational employment by 2018. The combined group of healthcare occupations will become the third largest occupational grouping by 2018, surpassing Food preparation and serving related occupations.

The only major occupational group projected to experience a net decline in the number of jobs is Production occupations. Production occupations are projected to decline by about 2,000 jobs from 2008 to 2018. This group accounted for 7.3 percent of total 2008 employment, but its share is projected to account for only 6.4 percent by 2018. The decline of jobs in Production occupations is related to a structural change in the need for manpower in Manufacturing, some of which can be attributed to outsourcing/offshoring and automation.

This relatively large shift away from Production occupations is also partly due to the ongoing employment shift in society from goods-producing to service-providing industries. Technological advances over the last century have made manufacturing processes less manpower intensive. During the same time period, living standards increased, and availability of free time and wealth has created a society with many people involved in providing services for each other. As society has grown more complex and specialized, businesses and households are also more reliant on specialized services, such as car and computer repair, legal and tax preparing services, etc.

In a working paper entitled "Education for the Third Industrial Revolution" [17] Alan Blinder explores the shift from goods-producing to service-providing activities further by distinguishing between *personally-delivered* services and *impersonally-delivered* services. As *personally-delivered* services are provided to individuals, or groups of individuals, where person-to-person contact is required, these services are much more closely related to the size of the population. Changes in the demographic make up of the population matters, such as the number of children needing education and the number of elderly needing medical or other personal assistance. Services to individuals cannot, for the most part, be moved abroad as physical presence is needed to perform tasks, and productivity increases are more difficult to obtain since individualized assessment and attention is required.

Alan Blinder's concept of *personally-delivered* versus *impersonally-delivered* services helps explain a more current trend of transferring service-providing employment to other parts of the world. Examples are both low-skill related employment such as jobs in call centers as well as high-skill related employment such as writing computer codes. Technological advances in telecommunications have made such changes possible. Technological advances will continue to be developed and in the future individual assessments and physical attention might be performed remotely. But currently it is hard to envision a haircut done remotely, whereas online education is already taking place. In sum, changes to the occupational make-up over time is more complex than merely the steady employment shift from manufacturing to service-providing activities, which in turn adds to the difficulty in projecting New Hampshire's occupational employment.




17. Blinder, Alan.S., Education for the Third Industrial Revolution, CEPS Working Paper No. 163, Center for Economic Policy Studies, Princeton University, May 2008 < www.princeton.edu/ceps/workingpapers/163blinder.pdf>.

Applying Blinder's concept to employment projections for New Hampshire, there are three major occupational groups that primarily provide *personally-delivered* services. These are Healthcare practitioners and technical occupations, Healthcare support occupations, and Personal care and service occupations. If these three groups are combined, they comprise 11.1 percent of total employment in 2008. By 2018 employment, these three health and personal care service occupational groups are projected to make up 12.6 percent of total occupational employment, adding close to 18,000 net jobs, and reaching the same share of total employment as Sales and related occupations. Because the turnover rate in many of the occupations related to the health and personal services field is relatively high, this field tied with Sales and related occupations with the largest number of projected annual openings over the 2008 – 2018 period.

## Future demand of skills and knowledge

To assess the skills and knowledge requirements most likely to be in demand, two lists of occupational groups were chosen: high skill/high demand/high wage occupations, and occupations with the largest number of average annual job openings due to replacement needs. The occupations on each list were analyzed using the O*Net database[18] for skills and knowledge meeting the defined "moderately high" criteria (see methodology sidebar for definition of criteria). Then total average annual openings for all occupations meeting a specific skill or knowledge area were summed to determine the projected demand for workers with that skill or knowledge. The results were then compared to evaluate whether or not there were any substantial differences between the two lists of occupations in demand with respect to the skills and knowledge needed to fulfill those job openings.

18. O*NET database contains information on hundreds of standardized and occupation-specific descriptors. Information from this database is available through O*NET OnLine, an interactive application for exploring and searching occupations. The O*NET® Content Model (conceptual foundation of O*NET) defines skills and knowledge under Worker Requirements. Accessed June 14, 2010. <www.onetcenter.org/content.html>.

1. **High skill/high demand/ high wage occupations**. There were 53 occupations meeting the criteria for this list. Assessment of these occupations is important because they require some educational training. Obtaining high skills has a cost attached, in terms of time, energy, and funds. So it is important that education and training program participants acquire the skills and knowledge related to the skill and knowledge elements most in demand.

   High skill/high demand/high wage occupations satisfied these criteria:

   - At least some Postsecondary vocational training is needed in order to fulfill the occupational requirements;
   - The occupation had at least 100 jobs in 2008 and is projected to have at least 20 annual openings;
   - The growth rate over the ten-year period is higher than the average of all occupations (8.8 percent); and
   - Mean wage for the occupation is greater than the average for all occupations in New Hampshire. (The mean wage was $20.52 in the May 2008 survey produced by the New Hampshire Occupational Employment Statistics Program.)

Although Postsecondary teachers, Dentists, and Physicians and surgeons met the requirements of high demand and high wage, these occupations actually represent multiple groups of detailed occupations. The detailed occupations were combined to a summary level for a more accurate projection assessment. O*Net occupational analysis is only available for detailed occupations, thus they were excluded.

## Methodology

### How occupational skills and knowledge were assessed

O*NET descriptors are categories of occupational information collected and available for O*NET-SOC occupations. Each descriptor contains more specific elements with a value attached in relation to importance and level.

This analysis will focus on descriptors related to Worker Requirements. Worker requirements are attributes developed or acquired of the individual and relate to work performance. (O*Net Content Model)

Knowledge represents the acquisition of facts and principles about a domain of information. O*NET has defined 33 different knowledge elements.

Skills are the foundation for establishing procedures to work with given knowledge. Skills may be further divided into basic skills and cross-functional skills. Basic skills, such as reading and writing, facilitate the acquisition of new knowledge. Cross-functional skills, such as problem solving, coordination and installation, extend across several domains of activities. Altogether, O*NET has defined 35 different skill elements.

O*Net skills and knowledge descriptors are scored according to two variables. Each occupation is assessed with a value for importance to job performance and on the level of competence required for job performance.

**Importance** is rated on a one-to-five scale and **level of competence** is rated on a zero-to-seven scale. For the following analysis, it was determined that occupations with a score of three or higher (3.0 +) met the criteria for medium to high importance and occupations with a score of four or higher (4.0 +) met the criteria for medium to high level of competence.

For example, knowledge levels in mathematics range from simple arithmetic (low level of skill) to complex calculus (high level of skill). Importance of mathematics range from used rarely (once a year or less) to used frequently (at least daily).

The number of occupations and the summation of annual openings for these occupations were included in the tally for a given skill or knowledge element if the occupation met the medium to high range for both the importance and level criteria.

Source: O*Net Online <online.onetcenter.org>

## High Skills/High Demand/High Wage Occupations

| SOC Code | Occupation Title | 2008 Employment | 2018 Projected | Total Annual Openings | Education or Training Category |
|---|---|---|---|---|---|
| 29-1111 | Registered Nurses | 13,866 | 17,340 | 589 | Associate degree |
| 13-1199 | Business Operations Specialists, All Other | 8,914 | 9,795 | 286 | Bachelor's degree |
| 25-2021 | Elementary School Teachers, Ex. Special Ed | 6,599 | 7,657 | 256 | Bachelor's degree |
| 25-2031 | Secondary School Teachers, Ex. Special Ed/Voc Ed | 4,836 | 5,270 | 184 | Bachelor's degree |
| 13-2011 | Accountants and Auditors | 4,395 | 5,354 | 170 | Bachelor's degree |
| 15-1031 | Computer Software Engineers, Applications | 4,906 | 6,004 | 151 | Bachelor's degree |
| 41-3021 | Insurance Sales Agents | 3,985 | 4,462 | 141 | Postsecondary vocational training |
| 29-2061 | Licensed Practical and Licensed Vocational Nurses | 2,532 | 3,121 | 138 | Postsecondary vocational training |
| 25-2022 | Middle School Teachers, Ex. Special Ed/Voc Ed | 3,426 | 3,960 | 131 | Bachelor's degree |
| 15-1051 | Computer Systems Analysts | 2,708 | 2,996 | 87 | Bachelor's degree |
| 15-1081 | Network Systems and Data Communications Analysts | 1,067 | 1,590 | 71 | Bachelor's degree |
| 29-2021 | Dental Hygienists | 1,204 | 1,653 | 70 | Associate degree |
| 49-9021 | Heating/AC/Refrigeration Mechanics and Installers | 1,856 | 2,132 | 58 | Postsecondary vocational training |
| 11-3021 | Computer and Information Systems Managers | 2,113 | 2,323 | 55 | Bachelor's or higher degree, plus work experience |
| 15-1071 | Network and Computer Systems Administrators | 1,643 | 1,924 | 55 | Bachelor's degree |
| 15-1032 | Computer Software Engineers, Systems Software | 2,171 | 2,524 | 53 | Bachelor's degree |
| 29-1051 | Pharmacists | 1,485 | 1,681 | 53 | Doctoral degree |
| 31-9011 | Massage Therapists | 1,384 | 1,727 | 53 | Postsecondary vocational training |
| 13-1111 | Management Analysts | 1,735 | 1,949 | 51 | Bachelor's or higher degree, plus work experience |
| 13-1079 | Human Resource, Training, and Labor Rel. Spec., All Other | 1,091 | 1,298 | 50 | Bachelor's degree |
| 29-1123 | Physical Therapists | 1,205 | 1,557 | 50 | Master's degree |
| 11-9021 | Construction Managers | 2,372 | 2,663 | 48 | Bachelor's degree |
| 11-2022 | Sales Managers | 1,476 | 1,627 | 47 | Bachelor's or higher degree, plus work experience |
| 25-2041 | Special Ed Teachers, Presch/Kindergarten/Elem Sch | 1,022 | 1,215 | 46 | Bachelor's degree |
| 11-9111 | Medical and Health Services Managers | 1,217 | 1,430 | 44 | Bachelor's or higher degree, plus work experience |
| 13-1071 | Employment, Recruitment, and Placement Specialists | 894 | 1,104 | 44 | Bachelor's degree |
| 13-2099 | Financial Specialists, All Other | 1,507 | 1,647 | 41 | Bachelor's degree |
| 17-2112 | Industrial Engineers | 1,110 | 1,236 | 41 | Bachelor's degree |
| 13-1051 | Cost Estimators | 983 | 1,155 | 39 | Bachelor's degree |
| 27-3031 | Public Relations Specialists | 850 | 1,043 | 39 | Bachelor's degree |
| 17-2051 | Civil Engineers | 871 | 1,084 | 36 | Bachelor's degree |
| 21-1012 | Educational, Vocational, and School Counselors | 1,116 | 1,249 | 36 | Master's degree |
| 41-9022 | Real Estate Sales Agents | 1,064 | 1,233 | 34 | Postsecondary vocational training |
| 29-1071 | Physician Assistants | 508 | 740 | 32 | Master's degree |
| 13-1073 | Training and Development Specialists | 654 | 781 | 30 | Bachelor's degree |
| 13-2052 | Personal Financial Advisors | 843 | 1,051 | 30 | Bachelor's degree |
| 23-2011 | Paralegals and Legal Assistants | 1,194 | 1,349 | 30 | Associate degree |
| 29-1122 | Occupational Therapists | 758 | 918 | 30 | Master's degree |
| 15-1099 | Computer Specialists, All Other | 853 | 968 | 29 | Associate degree |
| 11-9151 | Social and Community Service Managers | 712 | 826 | 27 | Bachelor's degree |
| 13-2051 | Financial Analysts | 888 | 996 | 27 | Bachelor's degree |
| 29-9099 | Healthcare Practitioners and Tech. Workers, All Other | 548 | 635 | 27 | Bachelor's degree |
| 25-2042 | Special Education Teachers, Middle School | 559 | 662 | 25 | Bachelor's degree |
| 19-3021 | Market Research Analysts | 518 | 616 | 24 | Bachelor's degree |
| 29-1127 | Speech-Language Pathologists | 650 | 769 | 24 | Master's degree |
| 21-2011 | Clergy | 738 | 824 | 23 | Master's degree |
| 29-2034 | Radiologic Technologists and Technicians | 830 | 936 | 23 | Associate degree |
| 19-2041 | Environmental Scientists/Specialists, Incl. Health | 445 | 536 | 22 | Master's degree |
| 29-2099 | Health Technologists and Technicians, All Other | 514 | 626 | 22 | Postsecondary vocational training |
| 19-3031 | Clinical, Counseling, and School Psychologists | 548 | 604 | 21 | Doctoral degree |
| 25-2043 | Special Education Teachers, Secondary School | 503 | 570 | 20 | Bachelor's degree |
| 25-9031 | Instructional Coordinators | 409 | 517 | 20 | Master's degree |
| 25-9099 | Education, Training, and Library Workers, All Other | 434 | 533 | 20 | Bachelor's degree |
| | **Total High Skill/High Demand/High Wage occupations** | | | **3,753** | |
| 25-1000 | Postsecondary Teachers [a] | 5,347 | 6,497 | 208 | Doctoral degree |
| 29-1020 | Dentists [a] | 469 | 546 | 20 | First professional degree |
| 29-1060 | Physicians and Surgeons [a] | 2,994 | 3,798 | 135 | First professional degree |

[a] Excluded as it is not a detailed occupation that can be translated into a O*NET-SOC code

2. **Occupations with highest number of annual openings due to replacement needs**. The top 53 occupations with the highest number of annual openings due to replacement needs were selected to compare with the 53 occupations meeting the high skill/high demand/high wage criteria.[19]
   - The 2008 – 2018 long-term projections estimate the average annual number of job openings over the ten-year period. The 53 occupations with the highest number of openings due to replacement needs had at least 85 total annual openings.

Annual job openings data is based on two components: openings due to growth and openings due to replacement needs. Openings due to the need to replace workers are based on national occupational turnover data reflecting that workers leave an occupation due to retirement or to either horizontal or vertical career changes. An example of a horizontal change would be a move from Waitress to Retail salesperson, whereas a vertical change would be from a Carpenter to a Construction manager.

The largest share of projected job openings over the next ten years will be generated from the need to replace workers. Of the total 710 occupations that are included in the 2008 – 2018 New Hampshire employment projections, close to one in three occupations are expected to generate all openings from replacements. These occupations are not projected to experience any gain in net employment over the next ten years. For four out of five occupations, replacements account for more than half of total average annual openings.

Postsecondary teachers did meet the criteria of highest number of replacement openings, but was excluded because it is a summary level occupation and not a detail level occupation.

**Eight occupations met the criteria of both high skill/high demand/high wage occupations and the occupations with the largest number of average annual openings due to replacement needs.**

The occupations making both lists are:
- Registered nurses,
- Business operations specialists,
- Elementary school teachers,
- Middle school teachers,
- Secondary school teachers,
- Accountants and auditors,
- Insurance sales agents, and
- Licensed practical and licensed vocational nurses.

19. Basing the selection criteria for the second set of occupations on those with the most openings due to replacement needs was an attempt to capture the skill requirements of a comparison group of occupations with substantial projected openings yet not necessarily meeting the qualifications of high demand occupations due to a lack of growth openings.

## Occupations with highest number of annual openings due to replacement needs

| SOC Code | Occupation Title | 2008 Employment | 2018 Projected | Total Annual Openings | Education or Training Category |
|---|---|---|---|---|---|
| 41-2011 | Cashiers | 22,836 | 24,037 | 1,146 | Short-term on-the-job training |
| 41-2031 | Retail Salespersons | 24,175 | 25,833 | 840 | Short-term on-the-job training |
| 35-3031 | Waiters and Waitresses | 11,989 | 13,043 | 767 | Short-term on-the-job training |
| 29-1111 | Registered Nurses | 13,866 | 17,340 | 589 | Associate degree |
| 43-4051 | Customer Service Representatives | 9,097 | 10,480 | 424 | Moderate-term on-the-job training |
| 35-3021 | Combined Food Prep/Serving Workers, Inc. Fast Food | 11,209 | 13,058 | 423 | Short-term on-the-job training |
| 11-9199 | Managers, All Other | 12,875 | 13,535 | 398 | Work experience in a related occupation |
| 43-5081 | Stock Clerks and Order Fillers | 11,976 | 12,848 | 363 | Short-term on-the-job training |
| 41-1011 | Supervisors/Managers, Retail Sales Workers | 12,267 | 12,781 | 314 | Work experience in a related occupation |
| 43-9061 | Office Clerks, General | 12,316 | 13,630 | 299 | Short-term on-the-job training |
| 13-1199 | Business Operations Specialists, All Other | 8,914 | 9,795 | 286 | Bachelor's degree |
| 25-9041 | Teacher Assistants | 9,022 | 9,859 | 275 | Short-term on-the-job training |
| 25-2021 | Elementary School Teachers, Ex. Special Ed | 6,599 | 7,657 | 256 | Bachelor's degree |
| 43-1011 | Supervisors/Managers, Office/Admin Support Workers | 8,073 | 8,785 | 253 | Work experience in a related occupation |
| 41-4012 | Sales Reps, Wholesale and Mfg, Ex. Tech/Science Prods | 8,150 | 8,770 | 251 | Work experience in a related occupation |
| 31-1012 | Nursing Aides, Orderlies, and Attendants | 8,012 | 9,648 | 244 | Postsecondary voc training |
| 35-3022 | Counter Attendants, Cafeteria/Food Concession | 2,571 | 2,870 | 219 | Short-term on-the-job training |
| 53-3032 | Truck Drivers, Heavy and Tractor-Trailer | 7,411 | 8,242 | 216 | Short-term on-the-job training |
| 37-2011 | Janitors/Cleaners, Ex. Maids/Housekeeping Cleaners | 10,301 | 10,452 | 210 | Short-term on-the-job training |
| 43-3031 | Bookkeeping, Accounting, and Auditing Clerks | 9,957 | 10,842 | 209 | Moderate-term on-the-job training |
| 11-1021 | General and Operations Managers | 7,068 | 6,896 | 205 | Bachelor's or higher degree, plus work experience |
| 43-4171 | Receptionists and Information Clerks | 4,981 | 5,673 | 203 | Short-term on-the-job training |
| 25-2031 | Secondary School Teachers, Ex. Special Ed/Voc Ed | 4,836 | 5,270 | 184 | Bachelor's degree |
| 43-6014 | Secretaries, Except Legal, Medical, and Executive | 10,479 | 10,862 | 180 | Moderate-term on-the-job training |
| 39-9011 | Child Care Workers | 4,608 | 5,046 | 179 | Short-term on-the-job training |
| 25-3099 | Teachers and Instructors, All Other | 6,259 | 7,051 | 177 | Bachelor's degree |
| 35-3011 | Bartenders | 3,552 | 4,032 | 175 | Short-term on-the-job training |
| 13-2011 | Accountants and Auditors | 4,395 | 5,354 | 170 | Bachelor's degree |
| 53-7062 | Laborers and Freight/Stock/Material Movers, Hand | 5,219 | 5,150 | 169 | Short-term on-the-job training |
| 35-2014 | Cooks, Restaurant | 4,702 | 5,177 | 168 | Long-term on-the-job training |
| 37-3011 | Landscaping and Groundskeeping Workers | 6,073 | 7,019 | 168 | Short-term on-the-job training |
| 35-2021 | Food Preparation Workers | 3,465 | 3,672 | 145 | Short-term on-the-job training |
| 35-9021 | Dishwashers | 2,623 | 2,985 | 144 | Short-term on-the-job training |
| 41-3021 | Insurance Sales Agents | 3,985 | 4,462 | 141 | Postsecondary voc training |
| 29-2061 | Licensed Practical and Licensed Vocational Nurses | 2,532 | 3,121 | 138 | Postsecondary voc training |
| 49-9042 | Maintenance and Repair Workers, General | 5,192 | 5,697 | 131 | Moderate-term on-the-job training |
| 25-2022 | Middle School Teachers, Ex. Special Ed/Voc Ed | 3,426 | 3,960 | 131 | Bachelor's degree |
| 35-9031 | Hosts/Hostesses, Restaurant/Lounge/Coffee Shop | 1,633 | 1,771 | 128 | Short-term on-the-job training |
| 11-1011 | Chief Executives | 4,126 | 3,979 | 116 | Bachelor's or higher degree, plus work experience |
| 47-2031 | Carpenters | 5,952 | 6,339 | 113 | Long-term on-the-job training |
| 41-4011 | Sales Reps, Wholesale and Mfg, Tech/Science Prods | 3,651 | 3,873 | 107 | Work experience in a related occupation |
| 53-3033 | Truck Drivers, Light or Delivery Services | 4,812 | 4,949 | 100 | Short-term on-the-job training |
| 39-3091 | Amusement and Recreation Attendants | 1,411 | 1,665 | 98 | Short-term on-the-job training |
| 49-3023 | Automotive Service Technicians and Mechanics | 4,358 | 4,496 | 97 | Postsecondary voc training |
| 43-9199 | Office and Administrative Support Workers, All Other | 4,144 | 3,662 | 95 | Short-term on-the-job training |
| 33-3051 | Police and Sheriff's Patrol Officers | 2,899 | 3,077 | 93 | Long-term on-the-job training |
| 43-3071 | Tellers | 2,056 | 2,126 | 92 | Short-term on-the-job training |
| 15-1041 | Computer Support Specialists | 2,617 | 2,815 | 92 | Associate degree |
| 37-2012 | Maids and Housekeeping Cleaners | 4,774 | 4,824 | 91 | Short-term on-the-job training |
| 51-2092 | Team Assemblers | 3,999 | 3,970 | 90 | Moderate-term on-the-job training |
| 43-5071 | Shipping, Receiving, and Traffic Clerks | 3,589 | 3,321 | 89 | Short-term on-the-job training |
| 11-3031 | Financial Managers | 3,684 | 3,888 | 86 | Bachelor's or higher degree, plus work experience |
| 41-1012 | Supervisors/Managers, Non-Retail Sales Workers | 3,490 | 3,617 | 85 | Work experience in a related occupation |
| | **Total for top 53 occupations by Replacement openings** | | | **12,362** | |
| 25-1000 | Postsecondary Teachers [a] | 5,347 | 6,497 | 208 | Doctoral degree |

[a] Excluded as it is not a detailed occupation that can be translated into a O*NET-SOC code

## Skill elements in demand

There are four common skill elements that consistently ranked highest in demand for both level of competence required and importance to job performance, regardless of the occupations being assessed (see methodology sidebar on page 39 for description of level of competence and importance):

- Reading comprehension,
- Active listening,
- Critical thinking, and
- Monitoring.

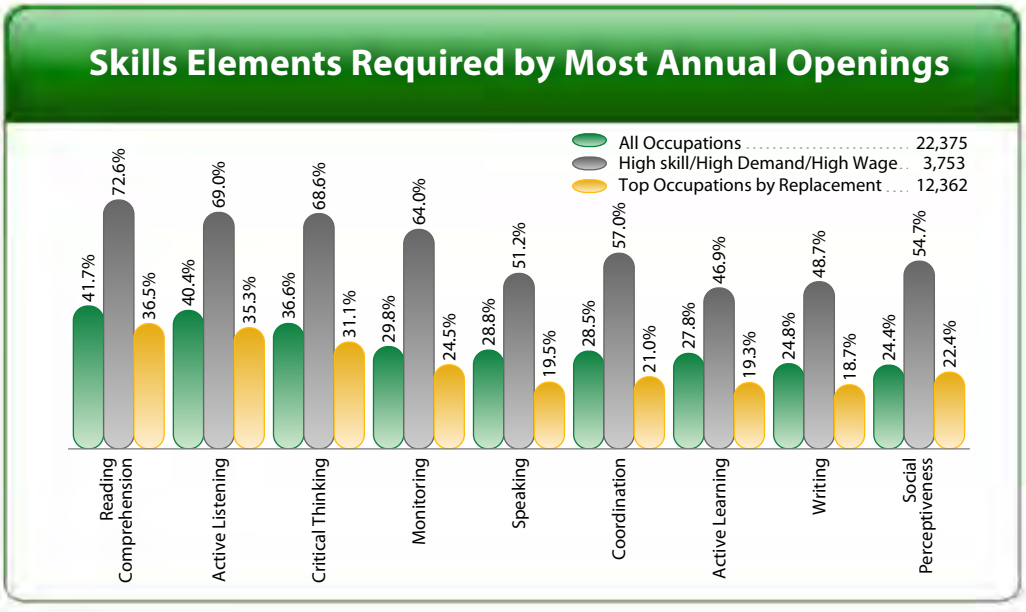
| | High Skill / High Demand / High Wage | | Occupations by Replacement | |
|---|---|---|---|---|
| **"Moderate" Skill Required** (Measure of 3.0+ Importance AND 4.0+ Level) | Occupations Requiring this Skill Element | Total Annual Openings for Occupations Requiring this Skill Element | Occupations Requiring this Skill Element | Total Annual Openings for Occupations Requiring this Skill Element |
| **Total** | **53** | **3,753** | **53** | **12,362** |
| ***Reading Comprehension*** | ***38*** | ***2,724*** | ***21*** | ***4,515*** |
| ***Active Listening*** | ***35*** | ***2,589*** | ***20*** | ***4,366*** |
| ***Critical Thinking*** | ***34*** | ***2,576*** | ***17*** | ***3,848*** |
| ***Monitoring*** | ***31*** | ***2,403*** | ***13*** | ***3,030*** |
| Coordination | 25 | 2,141 | 11 | 2,601 |
| Social Perceptiveness | 23 | 2,054 | 13 | 2,768 |
| Speaking | 33 | 1,921 | 13 | 2,405 |
| Writing | 30 | 1,829 | 13 | 2,310 |
| Active Learning | 28 | 1,761 | 11 | 2,386 |
| Time Management | 27 | 1,732 | 11 | 2,047 |
| Learning Strategies | 24 | 1,605 | 11 | 1,960 |
| Persuasion | 22 | 1,546 | 10 | 1,838 |
| Instructing | 23 | 1,483 | 9 | 1,721 |
| Complex Problem Solving | 24 | 1,389 | 6 | 932 |
| Judgment and Decision Making | 23 | 1,265 | 6 | 886 |
| Service Orientation | 19 | 1,259 | 11 | 2,040 |
| Negotiation | 14 | 841 | 8 | 1,268 |
| Mathematics | 13 | 836 | 5 | 584 |
| Systems Evaluation | 10 | 633 | 1 | 116 |
| Systems Analysis | 8 | 526 | 1 | 116 |
| Troubleshooting | 7 | 509 | 1 | 131 |
| Equipment Selection | 7 | 493 | 2 | 247 |
| Quality Control Analysis | 6 | 468 | | |
| Installation | 5 | 413 | 1 | 131 |
| Operations Analysis | 5 | 413 | 1 | 116 |
| Technology Design | 4 | 362 | | |
| Mgmnt of Personnel Resources | 7 | 260 | 4 | 768 |
| Programming | 3 | 259 | | |
| Management of Financial Resources | 7 | 238 | 2 | 369 |
| Operation and Control | 3 | 175 | | |
| Operation Monitoring | 2 | 126 | | |
| Equipment Maintenance | 2 | 122 | 2 | 347 |
| Management of Material Resources | 2 | 122 | 1 | 116 |
| Science | 2 | 75 | | |
| Repairing | | | 1 | 131 |

Among all occupations, about two out of every five openings are in occupations requiring high levels and importance in reading comprehension, active listening, and critical thinking skills. Less than one-third required high skills in monitoring. Among occupations with the largest number of replacements, about a third require a high skill level in the top three basic skills.

Differences become obvious when compared to the high skill/high demand/high wage occupations, where seven out of ten openings are in occupations for which these skills have both a high level of competence and importance to job performance required.

In general, for all occupations, the skills analysis shows that the skills most commonly in demand were the same, no matter the type of occupation. In addition to the four skills mentioned above, Speaking, Coordination, Active learning and Writing were all ranked among the skills most commonly in demand. Social perceptiveness made the list of the nine most common skills in demand among all occupations. However, this skill ranked fifth in demand among the occupations with high number of openings due to replacement and sixth in demand among the high skill/high demand/high wage occupations. This difference in ranking suggest that the Social perceptiveness is a slightly more important skill among occupations in demand (high skill or replacement) than among all occupations.

**When an individual is assessed for services, it is critical that these nine most in demand skill elements are assessed in order to determine if the person needs additional training in any of these skill areas. In addition, all educational programs should contain elements that enhance these skill elements no matter the area of education.**



## Knowledge elements in demand

The number of knowledge elements meeting the set criteria for any occupation differed substantially between the high demand/high skill/high wage occupations and the occupations generating the most openings due to replacement. Among all occupations, all 33 knowledge elements appeared whereas among the high skill/high demand/high wage occupations, only 30 knowledge elements met the set criteria. Fine Arts, Food Production and Foreign language were the three knowledge elements where no occupations met the criteria for level and importance.[20] In contrast, only 19 knowledge elements met the criteria among the occupations with most annual openings generated due to replacement.

| | High Skill / High Demand / High Wage | | Occupations by Replacement | |
|---|---|---|---|---|
| **"Moderate" Knowledge Required (Measure of 3.0+ Importance and 4.0+ Level)** | **Occupations Requiring this Skill Element** | **Total Annual Openings for Occupations Requiring this Skill Element** | **Occupations Requiring this Skill Element** | **Total Annual Openings for Occupations Requiring this Skill Element** |
| **Total** | **53** | **3,753** | **53** | **12,362** |
| ***Customer and Personal Service*** | ***32*** | ***2,107*** | ***22*** | ***5,744*** |
| English Language | 32 | 1,810 | 8 | 1,297 |
| Education and Training | 21 | 1,807 | 7 | 1,812 |
| Psychology | 17 | 1,505 | 4 | 1,042 |
| Computers and Electronics | 21 | 1,072 | 5 | 715 |
| Therapy and Counseling | 10 | 999 | 2 | 727 |
| Medicine and Dentistry | 7 | 962 | 2 | 727 |
| Mathematics | 17 | 767 | 4 | 794 |
| Clerical | 12 | 681 | 8 | 1,563 |
| Administration and Management | 13 | 489 | 6 | 1,224 |
| Sales and Marketing | 8 | 410 | 7 | 1,854 |
| Geography | 4 | 323 | 1 | 256 |
| History and Archeology | 2 | 276 | 1 | 256 |
| Personnel and Human Resources | 7 | 274 | 3 | 406 |
| Engineering and Technology | 6 | 239 | | |
| Design | 4 | 178 | 1 | 131 |
| Law and Government | 5 | 159 | | |
| Telecommunications | 2 | 126 | | |
| Sociology and Anthropology | 4 | 120 | | |
| Chemistry | 3 | 111 | | |
| Biology | 3 | 107 | | |
| Economics and Accounting | 3 | 101 | 3 | 406 |
| Production and Processing | 2 | 96 | | |
| Mechanical | 2 | 89 | 1 | 131 |
| Building and Construction | 2 | 84 | 1 | 131 |
| Public Safety and Security | 2 | 84 | | |
| Communications and Media | 2 | 59 | | |
| Physics | 1 | 36 | | |
| Transportation | 1 | 36 | 1 | 216 |
| Philosophy and Theology | 1 | 23 | | |

20. It needs to be reiterated that secondary school teachers are not separated by subject matter, so foreign language teachers in high school are not listed separately, hence a knowledge assessment cannot capture the high level of competence and importance required of foreign language teachers. In addition, postsecondary teachers were combined as a minor occupational group in the 2008-2018 projections and therefore excluded from this analysis.

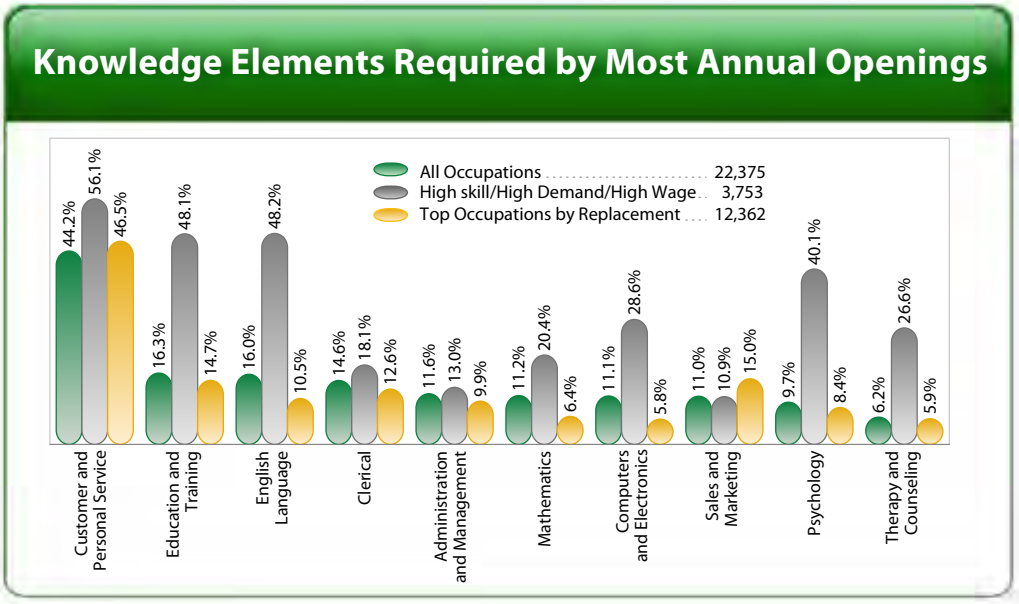
The most important knowledge element among all occupations is:

- Customer and personal service.

This knowledge element is required by more than half of the high demand/high skill/high wage openings and in close to half of the openings among the occupations with most annual openings due to replacement. Customer and personal service is slightly more important among occupations with most annual openings due to replacement, than among all occupations. This reflects that most jobs over the next ten years will be generated in the service-providing field and not in the production environment. It is also indicative of the strong projected growth in the healthcare and personal care field. But when examining the occupations meeting the criteria for Customer and personal service, occupations outside these fields are included. Among the list of high demand/high skill/high wage occupations, many computer-related occupations also require Customer and personal service at a moderately high level and importance.

**It is important to be aware of this finding, as a large portion of the unemployed were laid off from the production field, in which most occupations did not require knowledge in Customer and personal service. Job counselors need to assess whether the jobseekers have sufficient knowledge of Customer and personal service.**

Some might be hesitant about whether Customer and personal service can be taught in a classroom or whether it is something that the individual acquires on-the-job. According to the O*NET definition, this knowledge element is based on principles and processes for providing customer and personal services and it includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction. Hence these are all principles and processes that should be included in the curricula of both the healthcare and Information Technology educational fields.



Among the high demand/high skill/high wage occupations, three other knowledge elements are in demand. These are:

- Education and training,
- English language,
- Psychology.

Among the high demand/high skill/high wage occupations close to half of the annual openings are generated from either the Healthcare practitioners and technical occupations or from the Education, training and library occupations. Hence a high knowledge level for Education and training as well as English language is a work requisite in close to half of all openings among the high demand/high skill/high wage occupations.

Occupations requiring Moderate Knowledge of Customer and personal service

**High Skill/ High Demand/High Wage Occupations**

| SOC Code | Occupational Title |
|---|---|
| 112022 | Sales Managers |
| 113021 | Computer and Information Systems Managers |
| 119021 | Construction Managers |
| 119111 | Medical and Health Services Managers |
| 119151 | Social and Community Service Managers |
| 131073 | Training and Development Specialists |
| 131111 | Management Analysts |
| 132051 | Financial Analysts |
| 132052 | Personal Financial Advisors |
| 151032 | Computer Software Engineers, Systems Software |
| 151051 | Computer Systems Analysts |
| 151081 | Network Systems and Data Communications Analysts |
| 172051 | Civil Engineers |
| 192041 | Environmental Scientists/Specialists, Incl. Health |
| 193021 | Market Research Analysts |
| 211012 | Educational, Vocational, and School Counselors |
| 212011 | Clergy |
| 252022 | Middle School Teachers, Ex. Special Ed/Voc Ed |
| 252042 | Special Education Teachers, Middle School |
| 252043 | Special Education Teachers, Secondary School |
| 259031 | Instructional Coordinators |
| 273031 | Public Relations Specialists |
| 291051 | Pharmacists |
| 291071 | Physician Assistants |
| 291111 | Registered Nurses |
| 291122 | Occupational Therapists |
| 291123 | Physical Therapists |
| 291127 | Speech-Language Pathologists |
| 292021 | Dental Hygienists |
| 292061 | Licensed Practical and Licensed Vocational Nurses |
| 413021 | Insurance Sales Agents |
| 419022 | Real Estate Sales Agents |

**Occupations with Most Annual Openings Due to Replacements**

| SOC Code | Occupational Title |
|---|---|
| 111011 | Chief Executives |
| 111021 | General and Operations Managers |
| 151041 | Computer Support Specialists |
| 252022 | Middle School Teachers, Ex. Special Ed/Voc Ed |
| 291111 | Registered Nurses |
| 292061 | Licensed Practical and Licensed Vocational Nurses |
| 311012 | Nursing Aides, Orderlies, and Attendants |
| 353011 | Bartenders |
| 353031 | Waiters and Waitresses |
| 393091 | Amusement and Recreation Attendants |
| 411011 | Supervisors/Managers, Retail Sales Workers |
| 411012 | Supervisors/Managers, Non-Retail Sales Workers |
| 412031 | Retail Salespersons |
| 413021 | Insurance Sales Agents |
| 414011 | Sales Reps, Wholesale and Mfg, Tech/Science Prods |
| 414012 | Sales Reps, Wholesale and Mfg, Ex.Tech/Science Prods |
| 431011 | Supervisors/Managers, Office/Admin Support Workers |
| 433071 | Tellers |
| 434051 | Customer Service Representatives |
| 434171 | Receptionists and Information Clerks |
| 436014 | Secretaries, Except Legal, Medical, and Executive |
| 439061 | Office Clerks, General |

It might be somewhat surprising that Psychology is more commonly required at a high level and importance than Mathematics and Computer and electronics. But when considering that the health and education field generates the most openings among the high demand/high skill/high wage occupations, it becomes apparent why knowledge of Psychology is important for these jobs.

Among the occupations generating the most openings due to replacements, Customer and personal service is the only knowledge element required by a substantial share of the annual openings.

Customer and personal service, English language, and Psychology are interdependent knowledge elements. The ability to communicate with customers, patients, and clients involves all three elements. Understanding the needs of the customer/ patient /client is the single most important aspect of most service-providing jobs and these knowledge areas link back to the skill of Active listening.