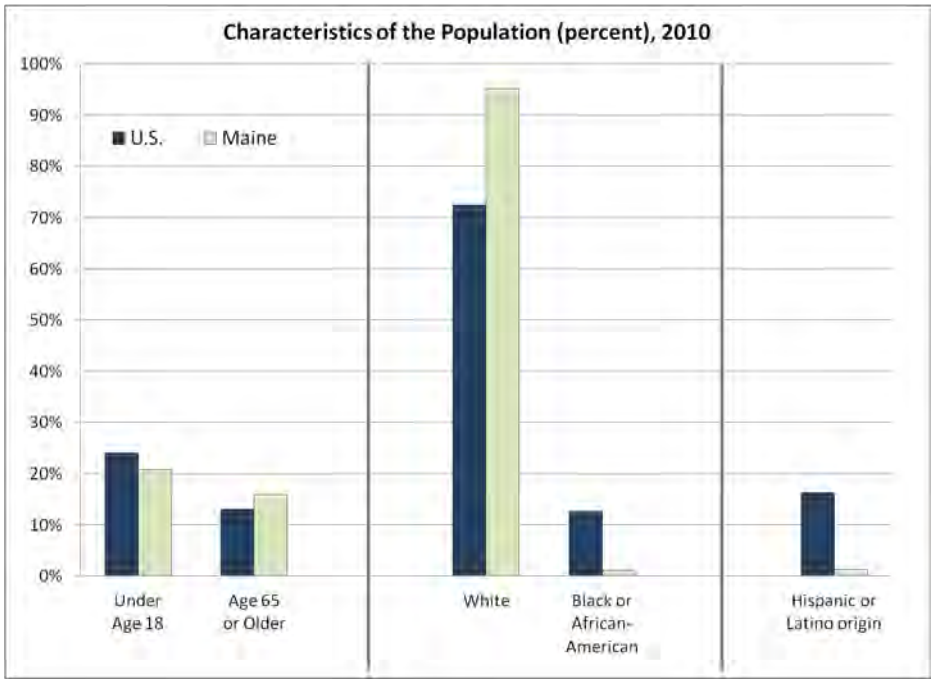
Maine Population Outlook to 2030
Governor's Office of Policy and Management
February 2013
Amanda Rector, State Economist (amanda.rector@maine.gov, 287-2873)

What do business executives, town planners, and university administrators have in common? They all rely on demographic projections for answers to pressing questions. Business executives look at workforce availability when making plans for the future. In addition to information about the makeup of their current workforce, they look at how many working-age people will be available in the coming years. This information can influence location decisions. Town planners use demographic projections to get a sense of the services they may need to provide in the future. They may look at whether the population is expected to grow or shrink and how neighboring communities compare to help determine future needs for roads, housing, fire and police services, and so on. Local governments might use this information to consider innovative ways to collaborate and consolidate services on a regional basis. Especially in cases where towns are experiencing population decline, regionalized services can help reduce costs while ensuring citizens receive a full array of services. University administrators might compare their existing enrollments to the expected size of those cohorts in the future – should they expect a larger or smaller population to draw from? Are there potential course changes that might be suggested by a changing population? An aging population might indicate a growing need for healthcare workers.

While in each of these examples the necessary decisions could be made without population projections, the use of projections provides critical information that can help inform the decision-making process. The more detailed and accurate the projections are, the more help they provide. Overall population trends are helpful – trends in specific age-sex cohorts are more helpful.

What are demographics?
Demographics are the characteristics that describe the population. Demographic data can be general, such as the number of males and females in the population, or very specific, such as the number of non-Hispanic white men between the ages of 40 and 44 living in Washington County. These descriptive characteristics paint a picture of our population. Age, sex, race, and ethnicity are all elements of this picture.



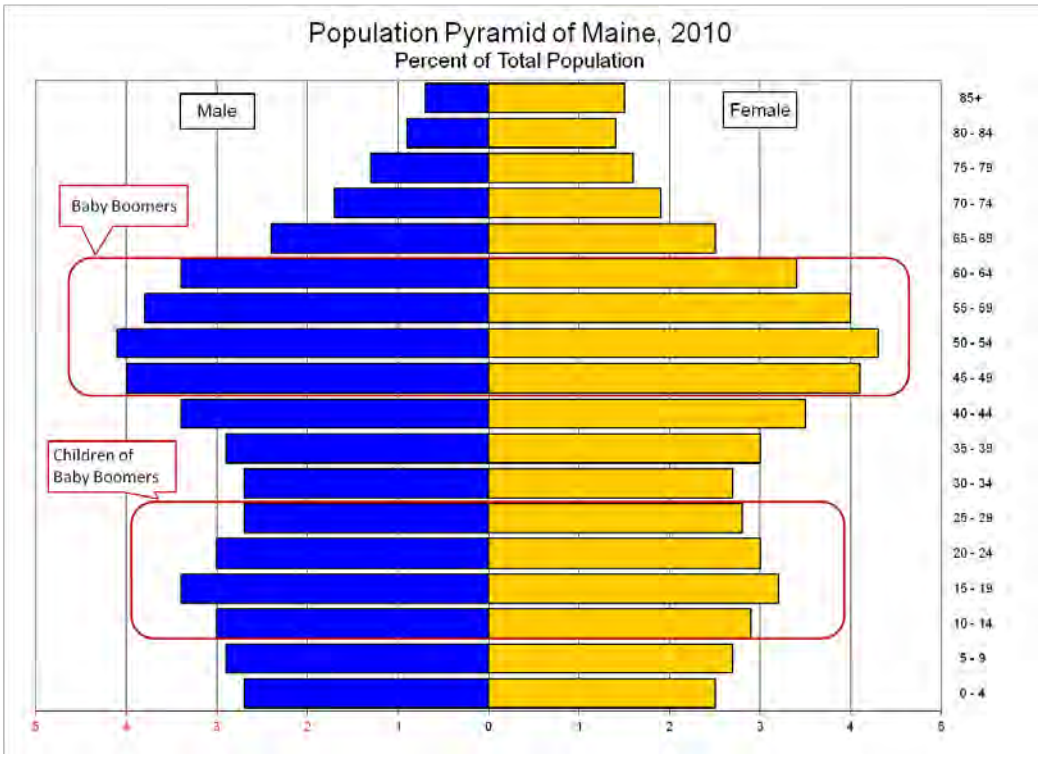
Maine's demographic picture
A few aspects of Maine's demographic picture stand out: an older population with a large number of baby boomers, relatively few children, and low numbers of racial and ethnic minorities. The chart to the left shows a few key demographic comparisons between Maine and the nation.

Maine has the oldest median age in the country – 42.7 years in 2010. Maine also has the highest percentage of non-Hispanic white residents (94.4%). Maine is tied with Vermont for the smallest percentage of residents under 18 years of age (20.7%). These factors all combine to give Maine a rapidly aging population and slow population growth. There are a few reasons for the aging and slow-growing population: the Baby Boom generation, low birth rates, and low rates of in-migration.

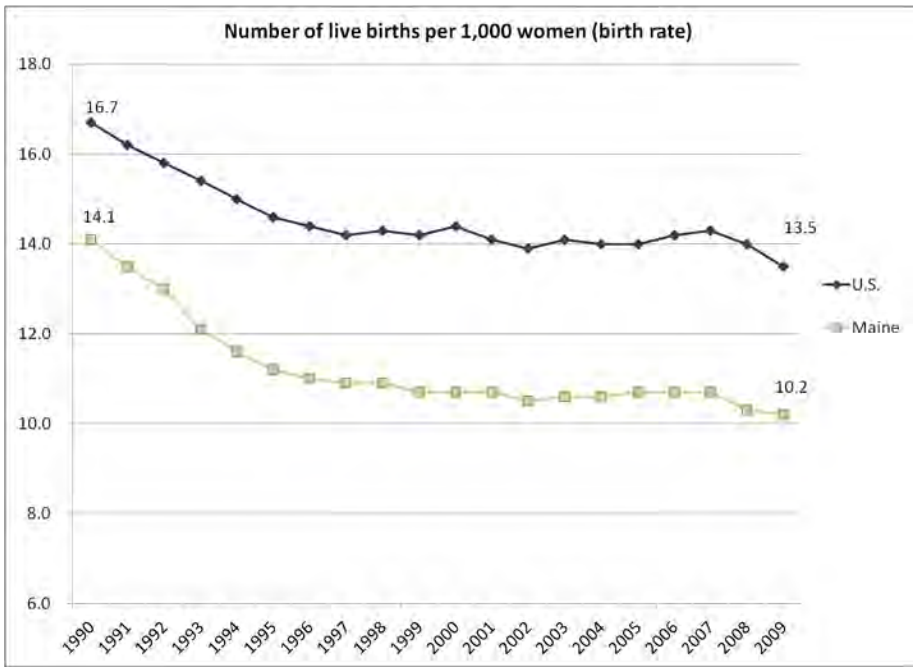
The Baby Boomers
Let us begin by considering the Baby Boom generation. This generation, born between 1946 and 1964, made up 29.4% of Maine's population in 2010, when its members were between the ages of 46 and 64. This is a higher percentage than any

other state – Vermont was second at 29.3% and New Hampshire was third at 29.0%. Nationally, around 25% of the population is part of the Baby Boom generation.

The sheer size of this cohort means that they have a lot of influence, both demographically and economically. The chart at right clearly shows the swell of baby boomers and their "echo boom" children, who were around 10-29 years old. When the baby boomers were growing up, they increased school enrollments. When they had kids, there was another (albeit smaller) increase in school enrollments. Over the past few decades, the baby boomers have been swelling the ranks of the workforce. The oldest baby boomers are now reaching retirement age – over the coming decades, as baby boomers retire, the size of the workforce may even shrink.



As people pass through different stages of life, their demands for goods and services change. Younger couples may be purchasing their first homes, family vehicles, and day care. Empty nesters and retirees may downsize from large homes to small homes or apartments, trade in the minivan for something sportier or more fuel efficient, and require more health care services. The Baby Boom generation is so large that as they enter different life stages, the economy changes to accommodate them. Health care will be one of the industries most affected by the aging of the baby boomers. Not only will demand for health care services be increasing, but the available workforce will be decreasing as baby boomers employed in health care retire.

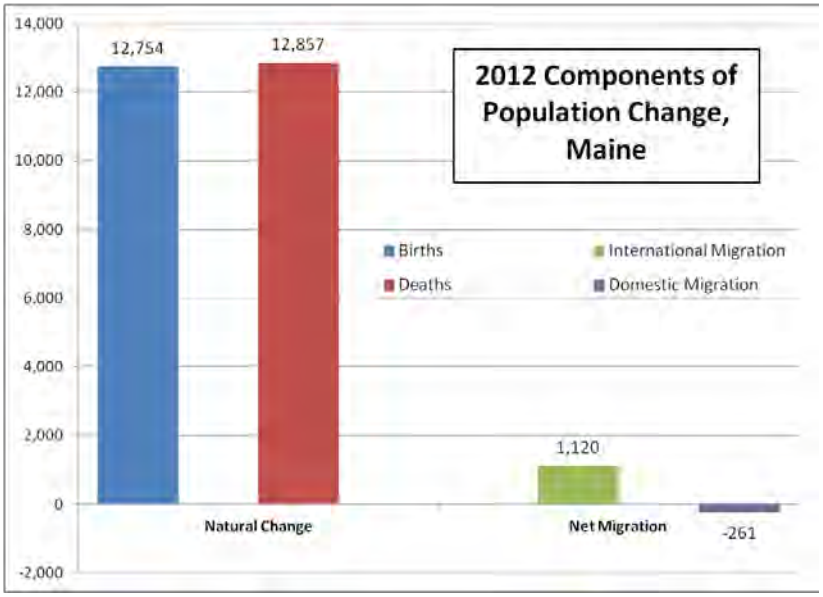


In terms of demographics, the baby boomers have both a direct and indirect effect. First, because there are so many of them, the baby boomers pull the average age of the state up as they grow older. Maine's median age was 42.7 in 2010 – higher than any other state. Contributing to this high median age is the fact that Maine has the smallest percent of its population under the age of 18. There are not enough children in the state to offset the large population of baby boomers.

Birth rates

One of the reasons Maine has so few children is because our birth rate is so low. The low birth rate is an indirect effect of having so many baby boomers: the baby boomers are now mostly beyond their child-bearing years. The fact that Maine

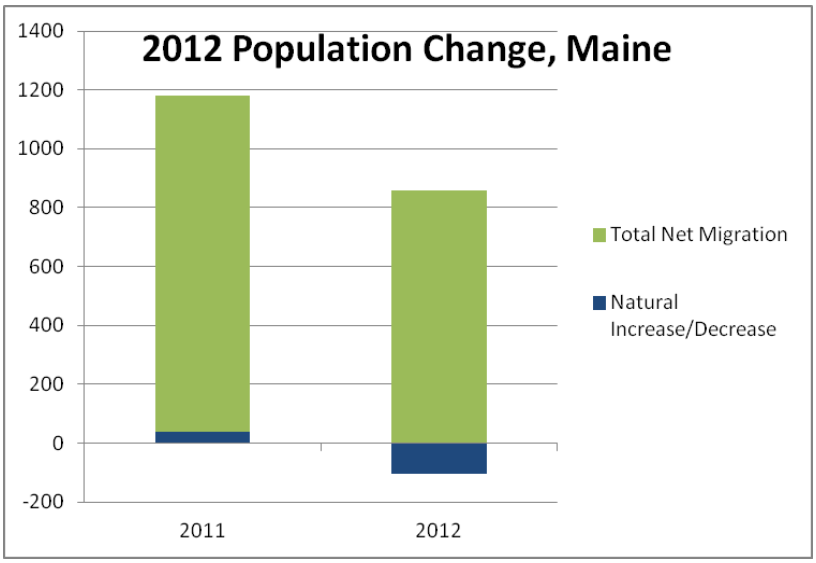
has the largest percent of non-Hispanic white residents also contributes to the low birth rate. Non-Hispanic whites tend to have lower birth rates than racial and ethnic minorities, and Maine's relatively homogenous population means a relatively low overall birth rate. The chart above compares Maine's birth rate to that for the U.S., which is consistently higher than Maine's rate.



The low birthrate contributes not only to an increased median age, but also to slow population growth. Population growth comes from two sources: natural increase and migration. Natural increase is the difference between births and deaths in the population. An older population, such as Maine has, will tend to have fewer births and more deaths. In fact, the 2012 population estimates for Maine from the U.S. Census Bureau show natural decrease – Maine had an estimated 103 more deaths than births that year, as seen in the chart to the right.

The need for migration

Without the capacity to grow our population through births, Maine must rely on migration to provide population growth. If more people move into a state than from it, that state will experience net in-migration (and population growth). If more people move out of a state than into it, however, that state will experience net out-migration. The chart below shows annual migration and natural change for Maine for the past two years. Given that Maine is unlikely to experience a surge in natural increase in the coming years, any population growth will have to come from migration (both from other states and abroad).



Implications

There are many implications both for aging populations and slow-growing ones. With an aging population, more people retire each year, making it harder for employers to find workers to fill jobs. An older population requires more health care services, increasing demand for nurses and physicians. Birth rates go down, meaning fewer children to fill the schools. At the same time, many retirees in good health seek out additional recreational and cultural experiences and may have more time for volunteering.

Populations experiencing slow growth may find it more difficult to attract businesses. Population growth generally goes hand-in-hand with economic growth. Companies looking to relocate or expand want to do so in places where the population is growing. Population growth is an indication that companies will be able to find the workers they need. At the same time, places that experience rapid population growth often struggle to keep up with infrastructure demands. Schools exceed capacity, housing becomes expensive and difficult to find, and service providers of all sorts find themselves unable to keep up with demand.

Maine's particular demographic challenges in the coming years will center around the aging population and slow population growth. As the baby boomers begin to retire, employers will be faced with the possibility of more job openings than people to fill them. In addition, the skill sets of the younger generations may not match the openings available. A larger and larger elderly population will depend on a smaller and smaller working population, unless migration trends

bring more workers to the state. In order for Maine's population to grow and firms to find the employees they need, in-migration to Maine must increase. As plans for the future are made, everyone should keep Maine's demographics in mind.

Projections

The Office of Policy and Management has prepared population projections for counties. Populations are projected for 2015 through 2030 in five-year intervals and will be updated every two years. County-level projections are given for five-year age cohorts by sex. This demographic detail can be especially useful as the population ages. Some parts of the state will be faced with an older population sooner than others, and these projections can help identify those faster-aging regions. Town-level projections are currently only available for the total population.

It is important to note that the projections presented here are not exact. Any estimation errors in recent population estimates will be incorporated into future projections. The county-level model assumes that past birth, death and migration rates within each cohort will persist into the foreseeable future. The model cannot account for unprecedented future events that may dramatically alter a county's demographic composition, such as future military base closings; large factory openings and closures; or changes in technologies, personal choices, or environmental conditions in the next 20 years that may alter migration behavior or birth and death rates. As such, population projections are more accurate for the near future than distant years and should be updated regularly.

Methodology

The county projections are the basis for the state and town projections and thus are the first piece completed. The methodology used for the county projections is the cohort-component method. This widely-used methodology utilizes births, deaths, and migrations to advance each age-sex cohort through the projection period. It allows for specific survival and migration rates to be calculated for each age-sex cohort. Using this methodology provides a detailed projection of the county population.

Of course, as with any projections, these are only an estimate of one possible scenario. While the best data and methodology available at the time are used, there are many factors that could change the projections. These projections are based on past trends of birth, survival, and migration rates. The projections do not take into account any future changes in these rates. In addition, life expectancy is held constant during the time period.

The population is divided into 18 age cohorts: 17 five-year cohorts, beginning with 0-4 and continuing through 80-84, and one open-ended cohort, 85+. When divided among males and females, this gives a total of 36 age-sex cohorts. Because the cohorts are in five-year intervals, it is necessary to advance the projections five years at a time. So the population of 20-24 year olds in 2010 will be 25-29 in 2015. These projections go out to 2030, for four projection data points (2015, 2020, 2025, and 2030).

There were three key inputs to the county projections: the number of births by the age of the mother for each year from 2000 to 2010, the number of deaths by age and sex for each year from 2000 to 2010, and the population estimate by age and sex as of July 1 of each year from 2000 to 2010. The births and deaths data came from the Office of Data, Research, and Vital Statistics in the Maine Department of Health and Human Services while the population estimates came from the U.S. Census Bureau.

The operational birth rate for females in each age cohort is calculated as the five-year average birth rate from 2006-2010, multiplied by five and averaged between the current and the next age cohort. The averaging over two cohorts is done because the average female can expect to spend half of the next five years in her current age cohort and half of the next five years in the next age cohort. For example, the operational birth rate for 25-29 year olds is the average of the 25-29 five-year rate and the 30-34 five-year rate.

Operational survival rates are calculated for each age-sex cohort. The average survival rate for each cohort is calculated as the average number of deaths from 2006 to 2010 divided by the 2008 cohort population and then subtracted from one. To get the five-year rate, the average survival rate is raised to the fifth power: mortality being a permanent condition, the probability of surviving more than one year compounds exponentially. As with the birth rates, survival rates are averaged across the current and the subsequent age cohorts. For example, the operational survival rate for 65-69 year olds is the 65-69 five-year rate raised to the 0.5 power multiplied by the 70-74 five-year rate raised to the 0.5 power.

The oldest and youngest age cohorts are treated somewhat differently. For the youngest age cohort, 0-4 year olds, the operational survival rate is simply the one-year survival rate raised to the 2.5 power. For the oldest age cohort, 85 and older, the operational survival rate is simply the five-year survival rate because there is no further age cohort for them to age into.

Migration is the most complicated element of the projections. Out-migration and in-migration are calculated separately and applied to different populations to obtain the migration rates.

The outmigration and inmigration rates use the 5-year estimates of movers to and from counties produced by the U.S. Census Bureau as part of the American Community Survey. For each cohort, the total preliminary number of outmigrants is divided by the estimated total number living in the county one year ago. This is the preliminary outmigration rate. Multiply this by the 2010 total population of each age cohort to get the estimated number of outmigrants for each cohort. Finally, multiply this number by the percentage of total outmigrants that were male and female to get the estimated number of outmigrants for each age-sex cohort.

The preliminary inmigration rate is calculated by dividing the total preliminary number of inmigrants by the estimated total number currently living in the county for each age cohort. As with outmigration, multiply the 2010 population of each cohort by the preliminary inmigration rate to get the total estimated inmigrants for each age cohort. Multiply this number by the percentage of total inmigrants that were male and female to get the estimated number of inmigrants by age and sex.

Next, to calculate the survived population at-risk of migration, take the 2010 cohort population, subtract from it the number of inmigrants and add the number of outmigrants. Then calculate the outmigration rate by dividing the number of outmigrants by the survived population at-risk.

Since the entire U.S. population is at-risk of inmigration, begin with the 2010 cohort population for the U.S. to calculate inmigration. Subtract from this the survived population at-risk for the county (since they were already living in the county, they cannot be at-risk of moving into the county). Divide the number of inmigrants by the rest-of-nation population at-risk to get the inmigration rate.

Calculate the survived population for 2015 by multiplying the 2010 population for each cohort by the corresponding operational survival rate. Calculate the stayers in county by multiplying the survived population by one minus the outmigration rate. Calculate the number of outmigrants by subtracting the stayers in county 2010-2015 from the survived population for 2015.

Take the 2015 cohort population from the U.S. Census Bureau's national population projections and subtract from it the 2015 survived population. Multiply by the inmigration rate to get the number of inmigrants. Add the number of inmigrants to the stayers in county 2010-2015 to get the 2015 population. Keep in mind that this is the population of the next age cohort for 2015. People who were 20-24 in 2010 are 25-29 in 2015.

For the oldest cohort, add together the calculated 2015 population for the oldest and next-oldest age cohorts. The 85+ cohort contains those who were 85+ in the previous period as well as those who were 80-84 and have aged into the 85+ cohort.

The youngest cohort, those born during the 5-year period, is more complicated to project. Begin with the 2010 population and 2015 survived population for female cohorts. Subtract the 2015 survived population from the 2010 population to get the number of deaths in each cohort. Calculate the population at-risk of giving birth by adding the stayers in county 2010-2015 to the inmigrants and half of the deaths during the period. Then multiply this figure by the operational birth rate to get the number of births. Add all the births across the cohorts and multiply by the average percentage of the population that is female/male to get the number of female/male births. Multiply each of these by the respective operational survival rates to get the 2015 0-4 cohort population. Note that migration is addressed through the mothers' movements. State-level projections were obtained by adding together the county projections.

Town projections use linear regression analysis to estimate a constant rate of growth for each town's share of their county population between 1990 and 2010 or 2000 and 2010, whichever historical time period produces the regression with the slope closest to zero. This growth rate is then extrapolated into the future, using county population projections to project the population for each town in 2015, 2020, 2025, and 2030. The town population projections thus rest on the assumption (among many others, including those upon which the county population projections are based) that relative growth rates of towns in a given county will continue into the future.

Projections

Due to recent population trends, the projections show most counties declining in population over the next two decades. Only four counties are projected to see population increase between 2010 and 2015: Androscoggin, Cumberland, Knox, and York. By 2030, these four counties plus Penobscot, which begins seeing population growth following 2015, are the only ones to have experienced population growth compared to 2010.

When the counties are aggregated to a statewide level, Maine is projected to grow through 2020, after which point the population is expected to decline. As discussed earlier, these projections are highly dependent on current life expectancy and migration rates. Increases in life expectancy and in-migration could result in higher population counts in the future.

By 2030, the baby boomers will be between 66 and 84 years old. The population pyramids below compare the 2010 population with the 2030 population projection. As the baby boomers continue to age, the population pyramid will become top-heavy, with a larger elderly population and smaller youth population. In addition, because women statistically live longer than men, Maine's female-to-male ratio will increase over time.