

Demographic Forecast Technical Report

ON TO 2050 Plan Update

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Chicago Metropolitan
Agency for Planning

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Introduction

The Chicago Metropolitan Agency for Planning (CMAP) is the official metropolitan planning and regional planning organization for the northeastern Illinois counties of Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will. The agency was charged with development of the region's comprehensive plan ON TO 2050, completed in 2018, and work was conducted to update the plan's key sources, indicators, and results with the best available data and analysis for the ON TO 2050 Plan Update adopted in October 2022.

The ON TO 2050 socioeconomic forecast was previously completed by the firm Louis Berger, Inc. For this comprehensive plan update, CMAP engaged the Applied Population Laboratory (APL) at the University of Wisconsin-Madison to guide efforts to re-create the demographic portion of the socioeconomic forecast in-house, with selected updates to methodology and input data where appropriate. This document provides details of the model results, selected interpretations of the data, as well as additional information on the methodological assumptions and decisions applied to the forecasting process.

Summary:

CMAP region projections, 2020 - 2050

In 2050, the CMAP region's seven-county population is projected to be greater than 10,000,000 residents, a gain of more than 1.45 million people, or 17 percent, from 2020.

Each decade will be marked by distinct demographic patterns:

2020 – 2030:

- Net migration is anticipated to reach nearly 160,000 across the 10 years.
- Births are projected to outpace deaths, providing a solid natural increase component to the region's population growth.
- The total population will grow by 564,000.

2030 – 2040:

- Net migration will continue to be strongly positive, reaching nearly 350,000.
- The leading edge of the Baby Boomer generation reaches their mid- and late-80s during this decade. Even with improvements in life expectancy, the size of the "Boomer" cohort will lead to an inevitable increase in deaths.
- The number of births is predicted to decline slightly from the 2020s, leading to a reduction in the natural increase component to roughly 225,000.
- The total population will grow more than 575,000, slightly greater than the 2020s.

2040 – 2050:

- Migration is predicted to slow compared to the 2030s but will still add a net 233,000 residents to the region.
- Deaths among the Boomers will level off and then decline slightly. However, the Generation X cohort—born approximately from 1965 to 1980—will reach their 70s and early-80s by 2050; nearly one-fourth of deaths in the 2040s are projected to be attributable to this generation.
- The number of births is expected to decrease again from the 2030s.
- Natural increase, while remaining positive, will likely be about 78,000.
- The total population will grow by 312,000 for the decade.

Across the full 30-year projection period

The preschool- and school-aged population (ages 0 through 17) is projected to increase modestly through 2040 but then decline slightly through 2050. Over the 30-year period, the youth population will grow approximately 6 percent, from 1.92 to 2.03 million. However, its share of the region's population is predicted to fall from 22.3% in 2020 to 20.2% in 2050. In comparison, the Census Bureau projects that persons aged 0-17 will constitute 20.1% of U.S. population in 2050.¹

The traditional working-age population (ages 16 through 64) is projected to rise about 7 percent across the 30 years, from 5.58 million in 2020 to 5.95 million in 2050. Its share of the region's population is predicted to fall from 65.0% to 59.4%. By comparison, the working-age population by 2050 as a share of the national population will be slightly higher, at 60.1%.

The elderly population (age 65 and over) will increase rapidly across the three decades, from 1.31 million in 2020 to 2.29 million in 2050, an increase of nearly 75%. Its share of the region's population will rise from 15.3% to 22.9%. At the national level, the elderly population is projected to constitute 22.1% of the population by 2050.

The very elderly population (age 85 and over) will rise steadily from about 165,000 in 2020 to nearly 448,000 in 2050, an increase of over 170%. This age group's share of the regional population will rise from 1.9% to 4.5%. In comparison, the Census Bureau predicts that, nationally, this age group's share will be slightly higher, at 4.8% by 2050.

The region's median age is projected to rise from 38.1 years in 2020 to 42.5 in 2050. In comparison, the Census Bureau projects the national median will rise from 37.9 to 42.4 years across the same period.

Life expectancy at birth for the region's residents is predicted to rise from 77.6 years in the mid-2010s to 80.7 years in 2050 for males and from 82.7 years to 84.9 years for females, respectively. In comparison, the Census Bureau projects the national life expectancies at birth in 2050 will be 82.6 years for males and 86.2 years for females. Life expectancy is impacted by a multitude of factors including race, ethnicity, foreign-born status, and socioeconomic status, all of which may contribute to the difference between the region's projected life expectancy and the nation's projected life expectancy in 2050.²

¹ All national comparative values in this section come from U.S. Census Bureau, [2017 National Population Projections](https://www.census.gov/programs-surveys/popproj/data/tables.html), released March 2018. <https://www.census.gov/programs-surveys/popproj/data/tables.html>

² U.S. Census Bureau, "Living Longer: Historical and Projected Life Expectancy in the United States, 1960 to 2060," released February 2020. <https://www.census.gov/content/dam/Census/library/publications/2020/demo/p25-1145.pdf>

Population change, past and projected

The Chicago Metropolitan Agency for Planning’s seven-county region has experienced variable growth over the past 30 years, from 11.6% in the 1990s to 1.7% in the most recent decade. Projections for the next 30 years predict a solid rebound in overall growth in the 2020s and 2030s—numbering more than 550,000 and greater than 6 percent each decade—before growth slows in the 2040s.

Table 1. CMAP region population, past and projected

CMAP Region’s Population, Actual 1990-2020 and Projected 2030-2050			
Year	Population	Decadal Numeric Change	Decadal Percent Change
1990	7,300,589		
2000	8,146,264	845,675	11.6%
2010	8,431,386	285,122	3.5%
2020	8,577,735	146,349	1.7%
2030	9,142,057	564,322	6.6%
2040	9,717,333	575,276	6.3%
2050	10,028,854	311,521	3.2%

There are two broad demographic measures that contribute to population change: the difference between births and deaths, referred to as natural increase, and the difference between in-migration and out-migration, referred to as net migration.

Table 2. Components of population change, past and projected

CMAP Region’s Population, Components of Change, 1990-2050			
Decade	Population Change	Natural Increase	Net Migration
1990s	845,675	693,816	151,859
2000s	285,122	653,016	-367,894
2010s	146,349	435,000 ³	-288,651
2020s	564,322	404,602	159,720
2030s	575,276	225,757	349,519
2040s	311,521	78,174	233,347

The CMAP region has not had positive net migration since the 1990s. However, positive net migration will be needed to keep pace with the expected demand for workers in the area as projected by employment forecasts. The demographic projections therefore predict a return to positive net migration, with the 2020s level being similar to the 1990s, followed by stronger net migration in the 2030s and 2040s. It is important to note that natural increase tapers across the projection period, indicating that the region will become much more dependent on a positive migration flow to increase its overall population.

³ Estimate derived from in-progress work with the Center for Disease Control’s National Vital Statistics System (NVSS) Project. Additional information: <https://www.cdc.gov/nchs/nvss/index.htm>

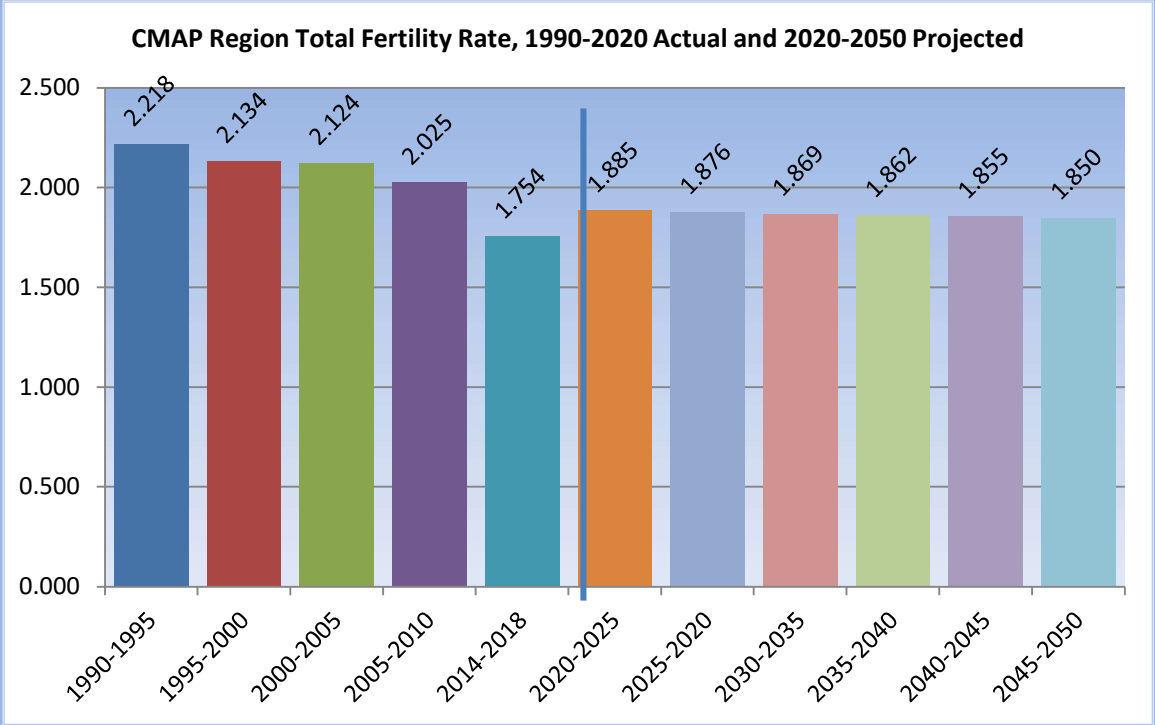
Components of population change: births, deaths, and migration

Births/fertility

The birth, or fertility, rate of a population can be measured and expressed in several ways. A common metric is the **total fertility rate (TFR)**. The TFR is constructed from birth rates specific to women’s ages, often grouped into five-year ranges (ages 15-19, 20-24, and so on through 40-44 or 45-49), called the age-specific fertility rate (ASFR). (In projections, the projected ASFRs are multiplied by the number of projected women in each age range to generate projected total births.)

In short, the TFR is a synthesized one-number estimate of the average number of children a woman would bear if she completed her reproductive period at the current or projected age-specific rates. The TFR measure is useful for sketching a geographic area’s fertility rate at particular points in time, or as a comparison among geographies (e.g., different counties, regions, states, or the nation).

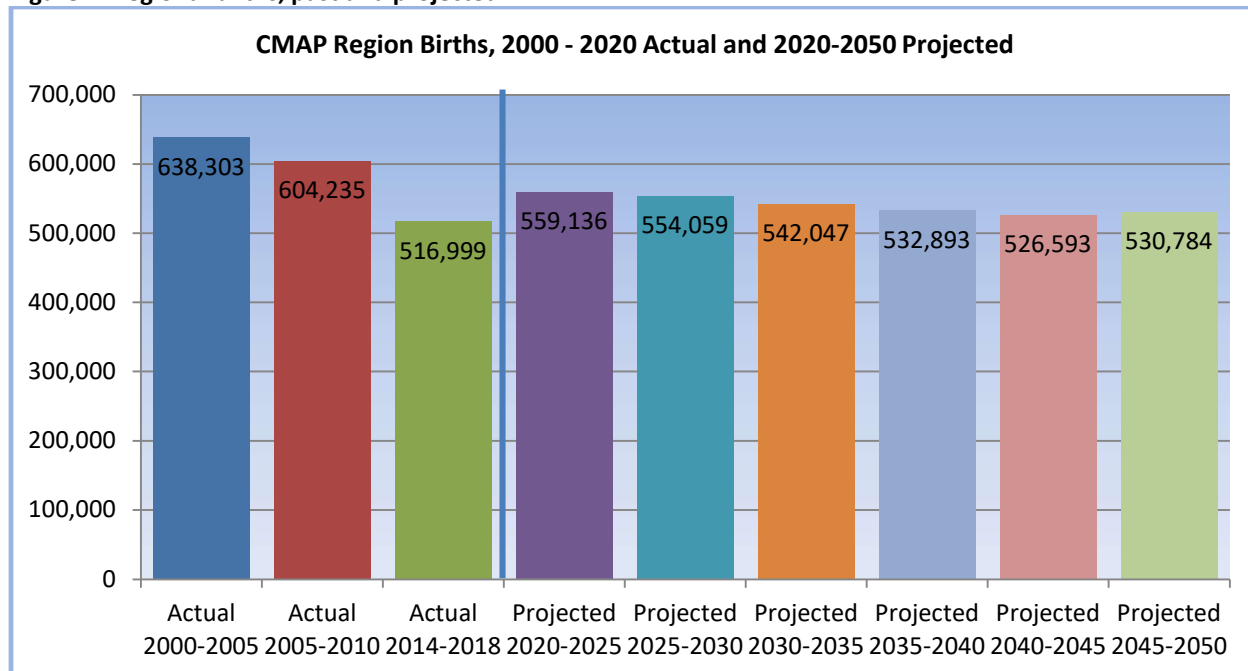
Figure 1. Regional Total Fertility Rate (TFR), past and projected



Through the 1990s and 2000s, the CMAP region’s TFR declined moderately, then fell sharply from 2005-2010 to 2014-2018 as fertility patterns in the United States changed following the 2007-2009 Great Recession. Across the 2020-2050 forecast period, based on changes in the age-specific fertility rates from 1990 to 2010, the total fertility rate is projected to recover slightly from the low value of 1.754 in 2014-2018 to 1.885 in 2020-2025 in response to improving economic conditions, then decline gradually to 2045-2050 to reflect the observed long-term trend of declining birth rates in the United States (Figure 1, above). See the *Methodology* section of this report for additional information.

Births are a product not only of the fertility rate but also of the number of women in their reproductive years. Similar to the projected fertility rate, the number of births is expected to rebound in the near-term, decline modestly through 2025-2040, then stabilize through 2045-2050 (Figure 2). Due to variance in the age-specific fertility rate, the projected number of births have a slightly different trajectory than the total fertility rate.

Figure 2. Regional births, past and projected



Deaths/mortality

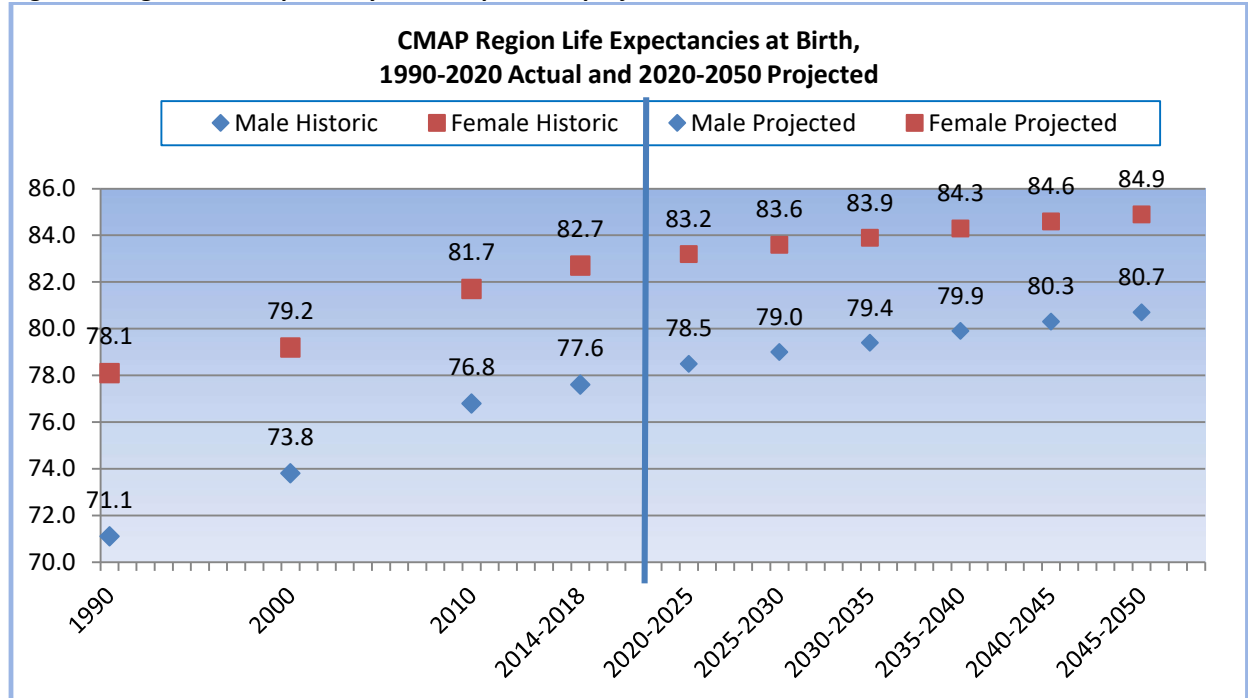
Like fertility, there are useful summary measures for discussing mortality. The most common single-number metric is **life expectancy at birth**, which is usually calculated separately for men and women because each sex faces different mortality risks across their lifetimes. Similar to the total fertility rate, life expectancy is a synthesized one-number estimate based on the mortality rates (or, conversely, survival rates) of age-specific cohorts over a period of time such as one year, five years, or a decade; life expectancy contributes to the understanding of a geographic area’s mortality patterns through time or in comparison among geographies.

From 1990 through 2010, life expectancy in the CMAP region showed strong gains, increasing 5.7 years for males and 3.6 years for females, while the gap between males and females shrank from 7.0 years to 4.9 years. Even from 2010 to the 2014-2018 period—the most recent period age- and sex-specific death data could be collected from county health departments—life expectancy improved for both men and women.

Following national mortality patterns predicted by the Social Security Administration across the 2020 – 2050 time period, average life expectancies in the CMAP region are expected to continue to increase,

albeit more modestly than in recent decades.⁴ Male life expectancy at birth may reach 80.7 years in the 2045-2050 period, while female life expectancy may reach 84.9 years. As with recent history, the projections indicate that the male-female life expectancy gap will continue to shrink, from 5.1 years in 2014-2018 to 4.2 years by 2050 (Figure 3).

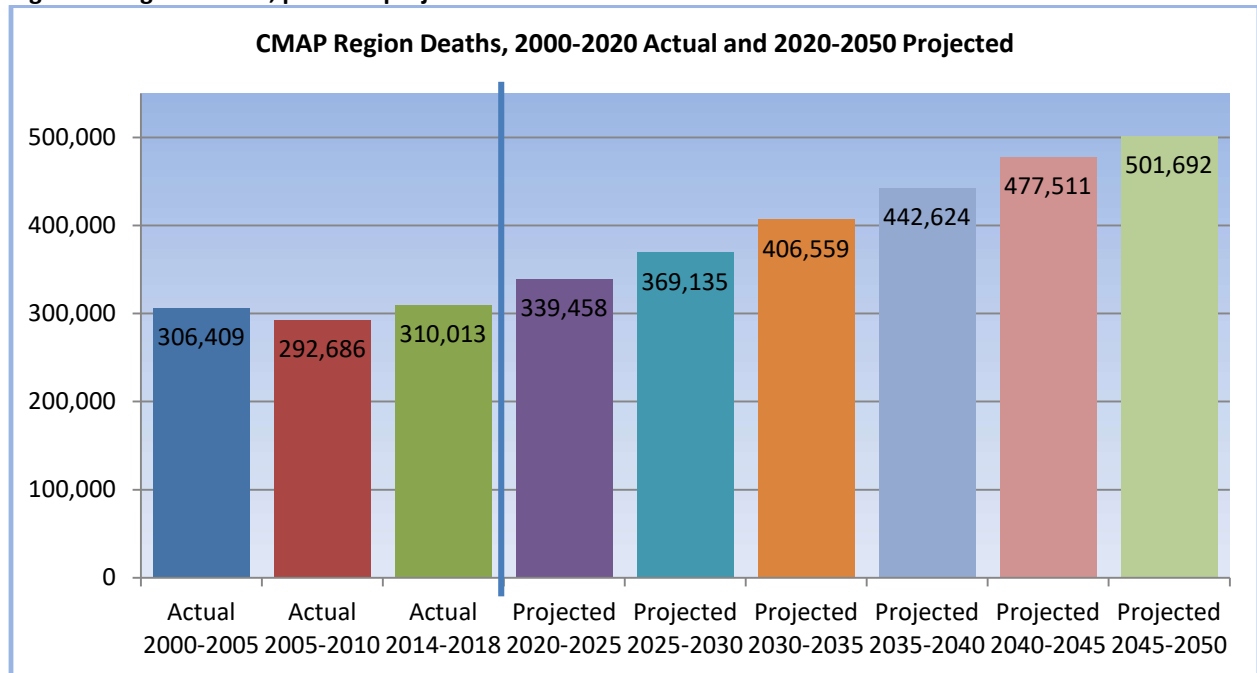
Figure 3. Regional life expectancy at birth, past and projected



While overall life expectancy is likely to continue rising, the large Baby Boomer generation (born 1946-1964) of the CMAP region will reach the age where mortality rates increase substantially (see Figure 4 below). The oldest of the Boomers reached age 75 in 2021. As a result, the number of deaths in the CMAP region will climb steadily through the projection period. By 2045-2050, total deaths are projected to be 62% higher in that five-year period compared to recent data from the 2014-2018 period.

⁴ Social Security Administration, 2019 Trustees Report, <https://www.ssa.gov/oact/HistEst/PerLifeTables/2019/PerLifeTables2019.html>

Figure 4. Region deaths, past and projected



Natural increase

This demographic inevitability—the aging and eventual mortality of the Baby Boomer generation—will impact the numeric and percentage growth of the CMAP region.

Population growth consists of two broad elements: **natural increase**—births minus deaths—and migration (discussed in the following section). Across the 30-year forecast period, births are projected to remain fairly constant, averaging 541,000 every five years, but deaths will rise. As a result, natural increase in the CMAP region will likely decline from approximately 220,000 in the 2020-2025 projection period to barely more than 29,000 in 2045-2050 (Figure 5).

In short, the contribution of natural increase to the region’s growth will diminish across time, from nearly 80% in the first five-year projection period to just more than 20% in 2045-2050. Over time, migration into the region will need to pick up the slack left behind by lower natural increase, eventually driving three-quarters of the region’s growth by 2045-2050 (Figure 6).

Figure 5. Region births and deaths, past and projected

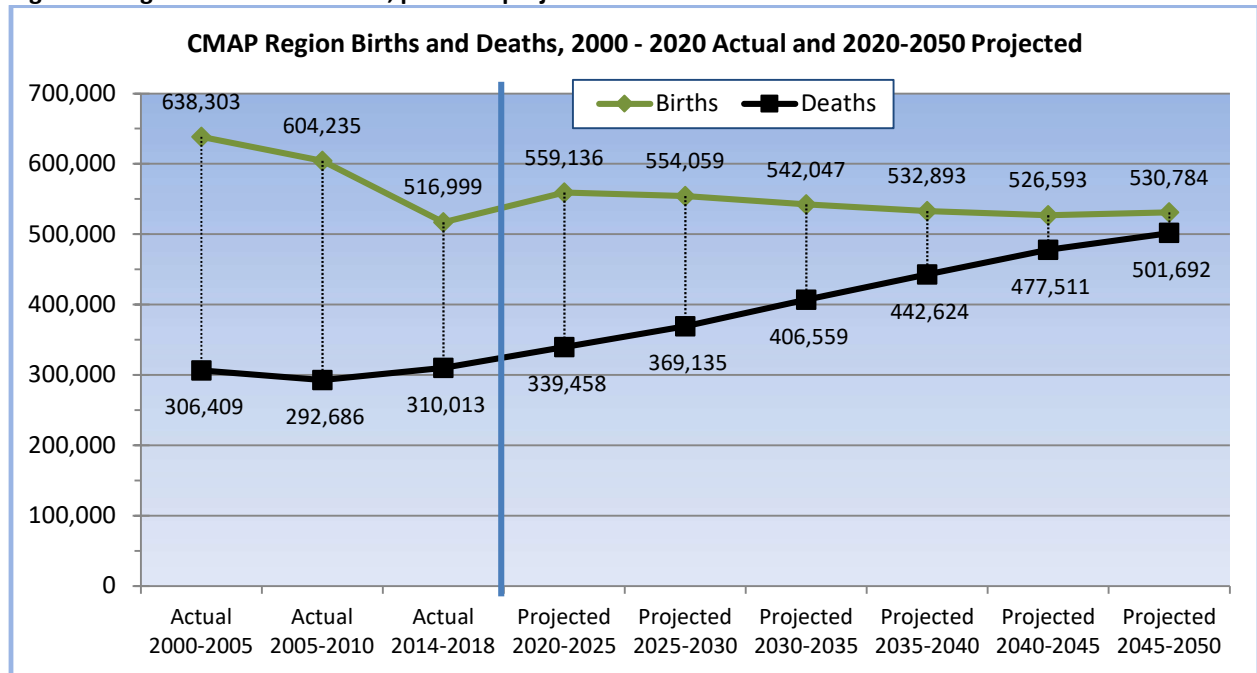
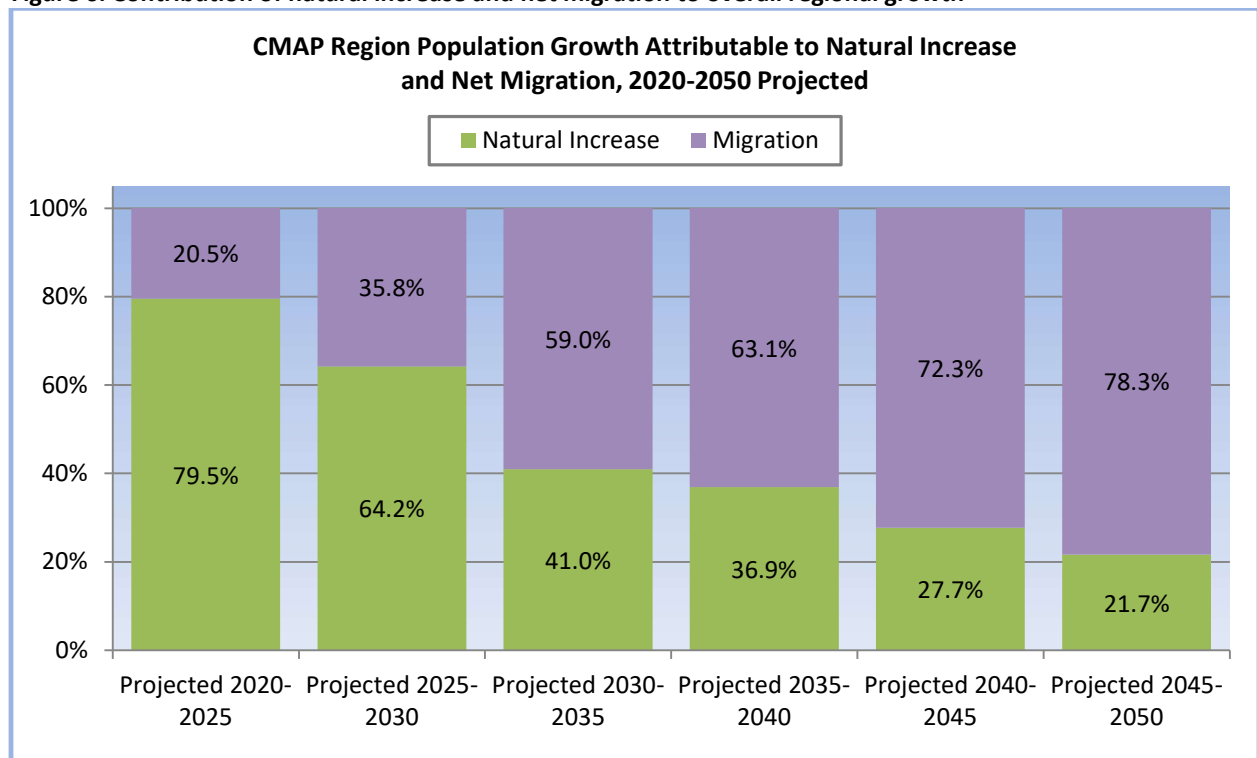


Figure 6. Contribution of natural increase and net migration to overall regional growth



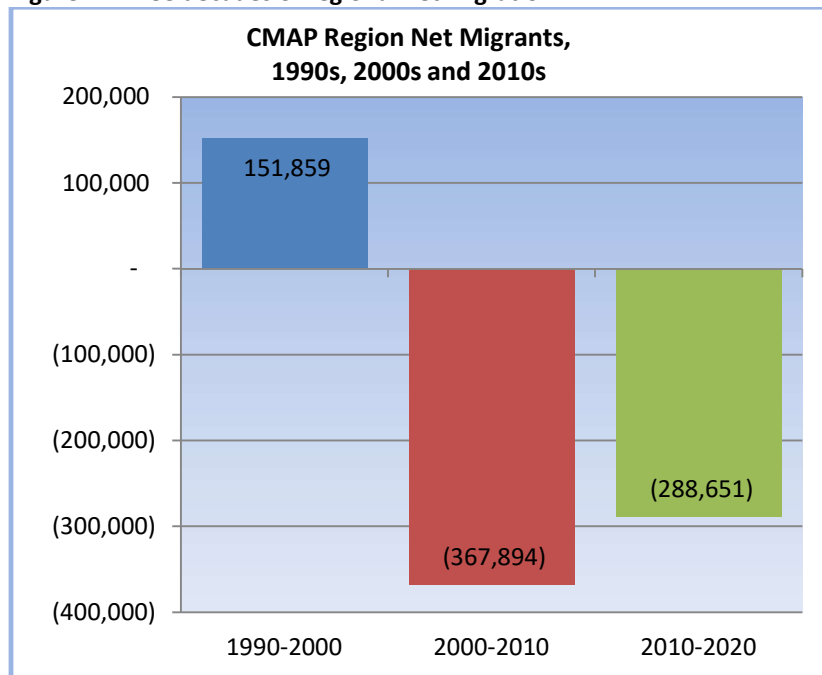
Migration

The measurement of **migration** is best understood as a “net” process. That is, people migrate into an area over a period of time, and others move out of that same area; the net gain or loss due to migration is the result of the in-flow minus the out-flow. These latter gross measures (in- and out-migration) are difficult to ascertain, unlike births and deaths that are recorded as official vital events. Thus, for the purposes of population projections, net migration is calculated through a residual process: it is estimated as the difference between the total population change and natural increase.

Migration itself consists of two streams: domestic (movement within the United States) and international. Like gross in- and out-migration, obtaining accurate records or estimates of these domestic and international components is difficult. For CMAP’s projections, only total net migration values are calculated.

The CMAP region’s net migration, in total, has varied extensively across the past three decades. After a decade of positive net migration in the 1990s, the region has experienced net out-migration over the 2000s and 2010s (Figure 7).

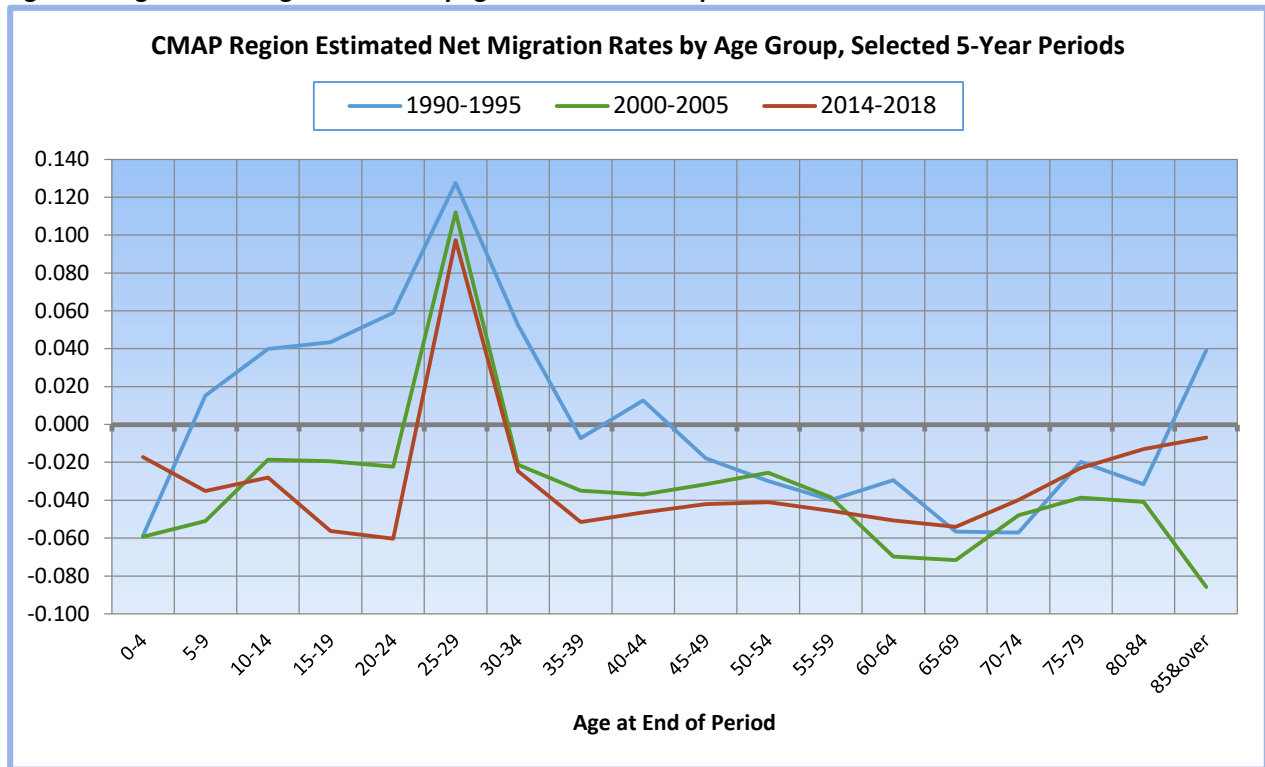
Figure 7. Three decades of regional net migration



Net migration also follows particular patterns based on age and sex; these age- and sex-specific rates in turn inform projected migration rates by age and by sex. For the 2014-2018 base period, estimates of the CMAP region’s net migration were calculated using local county data for births and deaths. The Census Bureau’s Population Estimates Program provided total estimated population by age and by sex.

The CMAP region consistently receives strong in-migration of persons aged 25-29, a trait which is also observed in other large metropolitan areas. Other age groups’ estimated migration rates are more variable over time (Figure 8).

Figure 8. Regional net migration rates by age for selected time periods



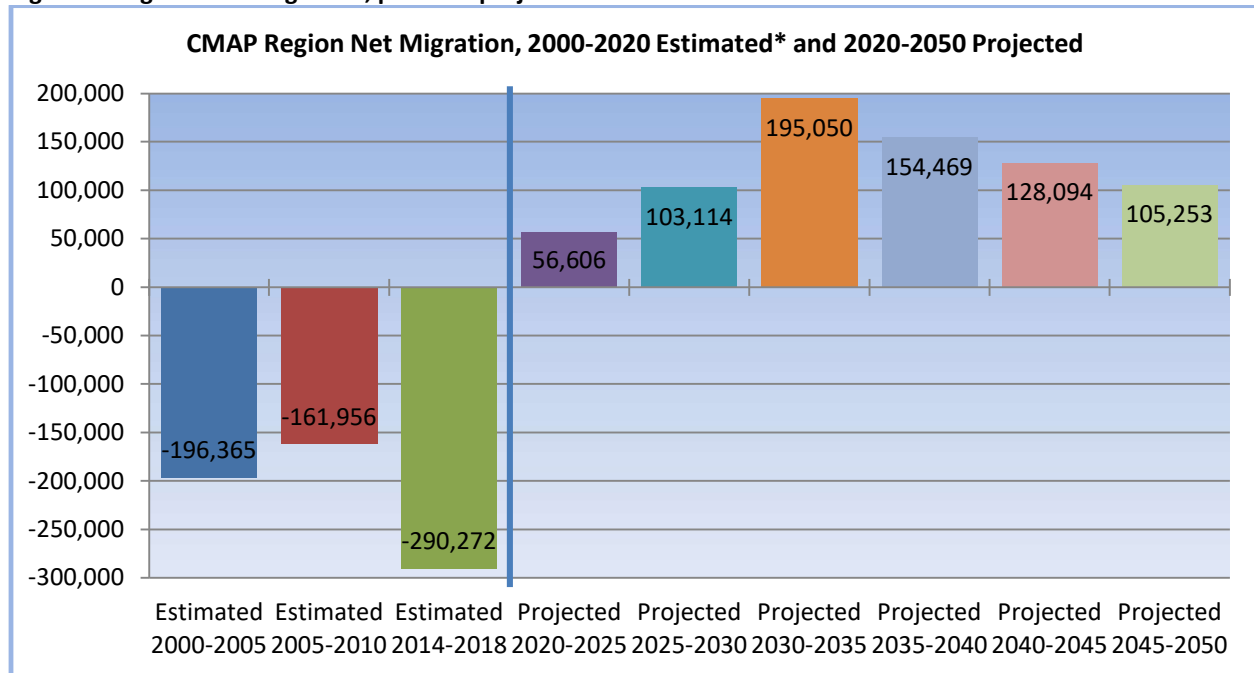
To project net migration rates, a two-step process is applied for the CMAP region:

- 1) For each five-year projection period, a rough target of total net migrants is selected using results from the regional employment forecast. As one of the nation’s leading economic centers, employment in the CMAP region is diverse and projected to grow, which translates into labor demand and the need for additional workers beyond what the current population can provide.
- 2) Using net migration rate data from the recent past, an allocation process is applied to adjust the specific age and sex net migration rates so that, when multiplied by the existing resident population, the target net migrants are achieved for that five-year span. This estimation process affects primarily the projections for the working-age population but, as many of these workers are of parenting age, there is a follow-on increase in the youth population as well. Additional adjustments to account for additional considerations, such as the decreased mobility of older populations, are also applied.

Current employment projections suggest that the CMAP region will begin to experience enough growth to generate a positive net in-migration in the 2020-2025 period, with strong increases predicted through 2030-2035, then a tapering through 2045-2050 (Figure 9).⁵

⁵ EBP, Chicago Region Employment Forecast: 2021 Update, available on the CMAP Data Hub <https://datahub.cmap.illinois.gov/>

Figure 9. Regional net migration, past and projected



*Net migration for historic periods is estimated because mid-decadal populations are estimated.

Age distribution of the population

Although the CMAP region’s total population is expected to grow by 17 percent—and more than 1.45 million residents—over the 30-year projection period, the change will be much greater in certain age groups and much lower in others. In particular, shifts in the age distribution will be heavily concentrated in the older age categories.

Table 3. Regional population by age group, 2020 (est.) and 2050 projected

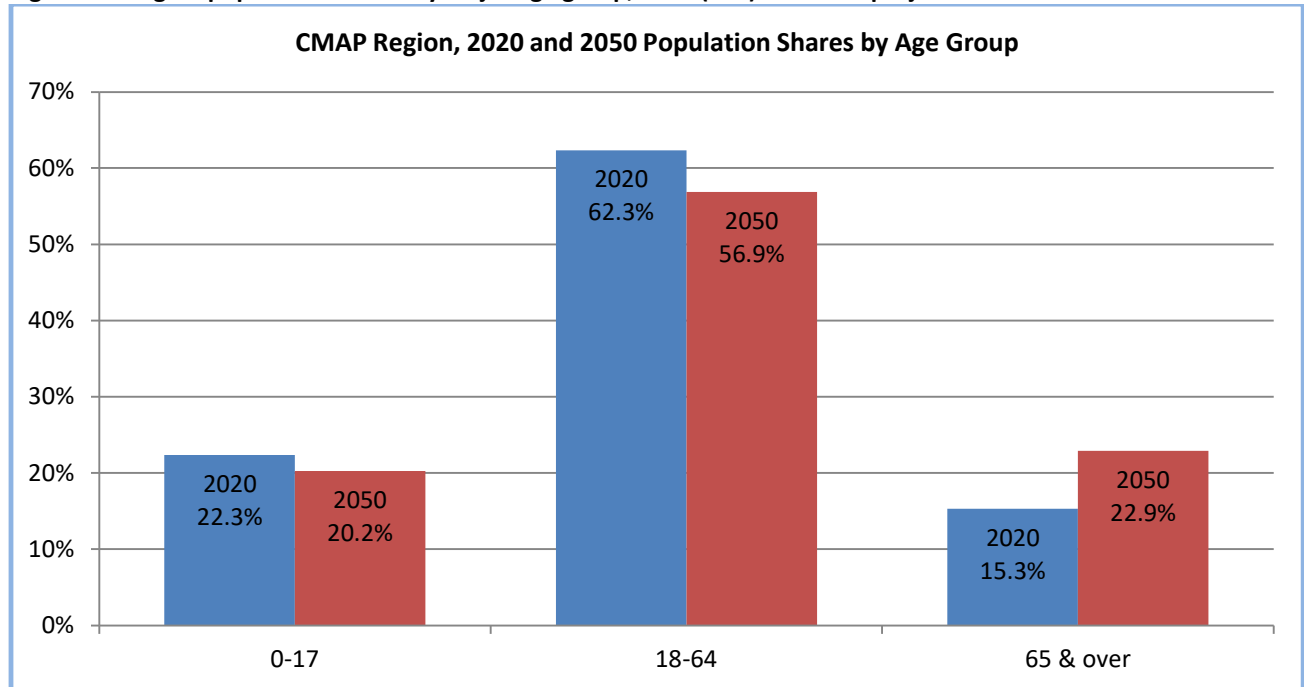
Age Group	Census 2020*	Projected 2050	Numeric Change	Percent Change
0-4	501,945	528,877	26,932	5.4%
5-17	1,414,967	1,501,052	86,086	6.1%
18-24	757,136	879,221	122,084	16.1%
25-44	2,392,250	2,353,373	-38,877	-1.6%
45-64	2,198,060	2,471,687	273,627	12.4%
65-84	1,148,321	1,847,042	698,721	60.8%
85 & over	165,056	447,602	282,546	171.2%
TOTAL	8,577,735	10,028,854	1,451,119	16.9%

*Census 2020 age groups are estimated because the Census Bureau had not yet released detailed age results by time of publication.

Table 3 (above) illustrates the Census 2020 and projected 2050 residents by selected age categories, and the projected numeric and percentage change of each group. Growth in the youth population is projected to be around 6 percent, while the post-high school, college-aged cohort is expected to increase by 16 percent. The number of working-age adults will increase by approximately 12 percent. The greatest numeric and percentage changes will occur for the cohorts ages 65 and older. The “young elderly” (ages 65-84) population will rise 61 percent, and the “old elderly” (ages 85 and over) will increase by more than one and one-half.

Finally, consolidating the age groups into three broad categories (0 – 17, 18 – 64, and 65 and older) allows a comparison of the proportion of the population that each group formed in 2020 and is projected to form in the year 2050 (Figure 10).

Figure 10. Region population shares by major age group, 2020 (est.) and 2050 projected



The share of the population ages 0–17 is projected to decline a few percentage points and, numerically, grow only slightly from 1.9 million to 2.0 million. The share of 18–64-year-olds is projected to drop more than five percentage points and, numerically, grow from 5.3 million to 5.7 million. Finally, the share of the population age 65 and over will gain more than seven percentage points and, numerically, increase from 1.3 million to 2.3 million. The number of elderly CMAP region residents is forecast to exceed the number of children between 2040 and 2045.

Methodology

CMAP's population projections for 2020 – 2050 are founded on an established demographic technique called the cohort component method. In short, this method analyzes the historical patterns of the primary elements of population change—fertility, mortality, and migration—and extends them into the future either by trending these past indicators or harnessing them to predictions at a larger geographic scale, such as a state or the nation.

In addition to the cohort component technique, CMAP applies a labor force model to supplement net migration assumptions. This model incorporates an externally produced economic forecast for the region, and then reconciles the working-age population (labor supply) with the projected labor force demand.

In sum, it is important to remember that population projections are not a statement of what will happen, but an inference of what might happen if past patterns and probable future trends hold true.

Selecting a base period

All projections require the selection of a base period from which rates can be calculated with reasonable certainty, providing a firm basis for projecting rates beyond the base period.

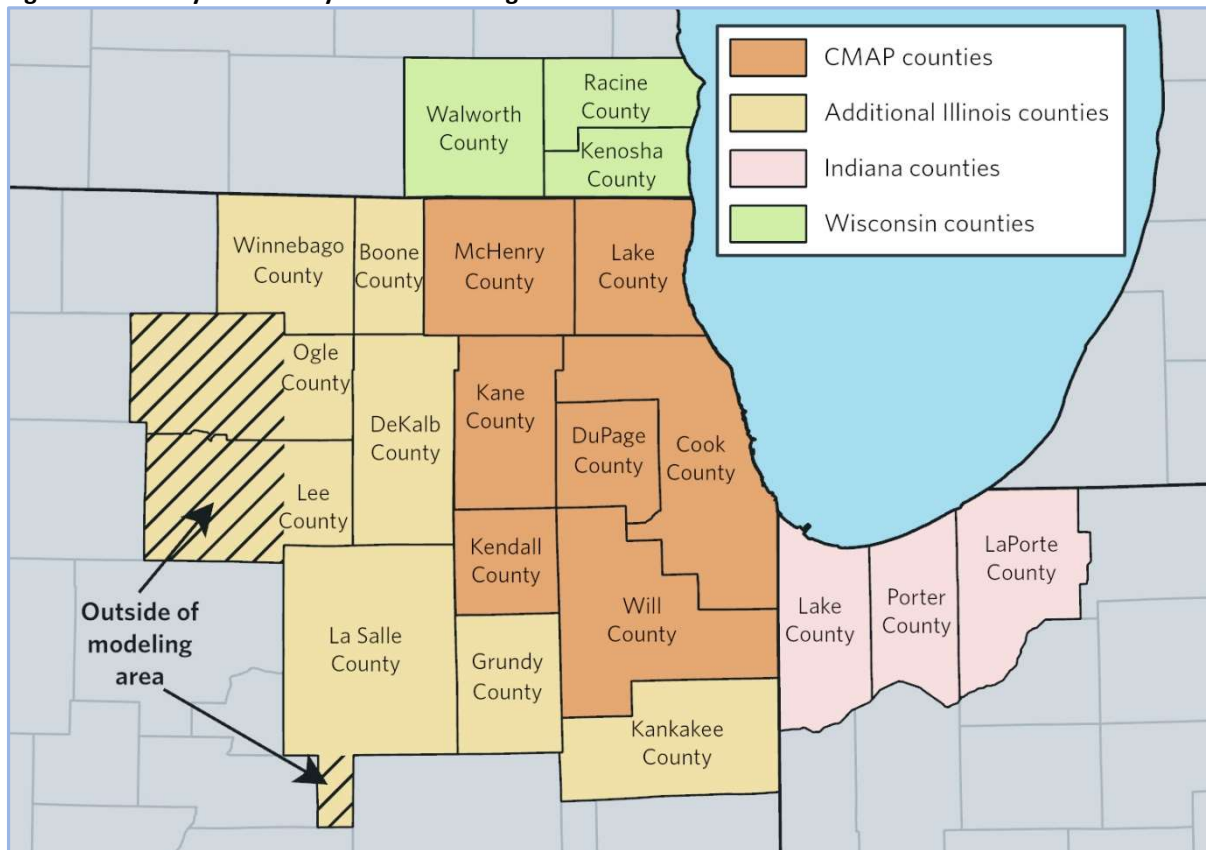
Preparation of this vintage of CMAP projections began in late 2020. At the time, the COVID-19 pandemic had interrupted the Census Bureau's collection and processing of Census 2020 data. Ideally, long-range projections would make use of the results of at least the two most recent decennial Censuses and the intercensal vital events (births and deaths). Because of concerns that 2020 results would not be available in time, CMAP staff established 2014-2018 as the base period, a span of time in which final birth and death data were available from the public health departments of Illinois, Indiana, and Wisconsin. Census Bureau age-sex estimates were used as the starting and ending populations for this period.

Regionalization of counties

In prior releases, CMAP produced projections at a county level for its core seven-county region and the fourteen adjoining counties in Illinois, Indiana, and Wisconsin, then aggregated the results. Forecasts for the adjoining areas are required for agency travel demand modeling but are not a part of the official CMAP forecast. The counties within each region are:

- CMAP: Cook, DuPage, Kane, Kendall, Lake, McHenry, Will
- External IL: Boone, DeKalb, Grundy, Kankakee, LaSalle, Lee, Ogle, Winnebago
- External IN: Lake, LaPorte, Porter
- External WI: Kenosha, Racine, Walworth

Figure 11. Twenty-one county CMAP modeling area



Hatched areas are not covered by CMAP travel models but are included in the forecast summaries in this document.

For this vintage of projections, CMAP aggregated vital events to the regional levels for the base period to establish starting rates and make projections by region. Some refinement in calculations is lost in a regional rather than county approach. For example, Cook County’s fertility rate is roughly seven percent lower than the surrounding six suburban counties. However, the relatively large populations of these four regions means that differences among counties have little effect on the potential projections. Furthermore, regionalizing calculations helps to smooth out possible fluctuations in lower-population counties, where one high or low year of births or deaths might have an adverse effect on their base period rates.

Base and projected rates

Fertility rates have fallen precipitously, both in the CMAP area and nation-wide, since the 2007-2009 Great Recession. As illustrated in the fertility section of this document, the total fertility rate in the CMAP region fell from 2.025 in 2005-2010 to 1.754 in 2014-2018. (This 13% decline is nearly identical to the national decrease over the same period.)

For projecting fertility rates for CMAP and the three outlying regions, the initial desire was to trend the base period rates in concert with those provided by the U.S. Census Bureau in its latest vintage of

projections.⁶ However, the Bureau’s projections displayed some peculiar patterns that did not mesh with recent age-specific changes: for example, the Bureau has rates for younger mothers trending upward and rates for older mothers trending downward, while recent history has indicated the opposite. As an alternative, the age-specific fertility rates from 1990, 2000 and 2010 were trended using a logarithmic function.

Mortality rates were calculated for the 2014-2018 base period, using age- and sex-specific deaths separately for the CMAP region and three outlying regions. To project these rates, they were trended in accordance with the age-sex specific changes indicated in the Social Security Administration’s life tables released in 2019.⁷

Net migration rates by age and sex for the base period were calculated by multiplying the starting 2014 populations by the survival rates for the period, generating an expected (or surviving) population in 2018. Subtracting the expected populations from the total 2018 populations produced estimated net migrants; dividing these net migrants by the expected populations produced the base net migration rates.

Creating the projected net migration rates in the demographic cohort component model first requires setting total net migrant “targets” for each five-year projection period, which are based roughly on the difference between the estimated labor force (projected employment) and estimated working-age population (a subset of total population). These target totals are allocated to several broad age-sex groups based on recent observed patterns. The numeric difference between the projected migrant targets and those calculated for the prior five-year period are divided by the projected period’s expected population to generate a rate adjustment, which is added to the rates of the prior period. This process is repeated for each subsequent five-year projection period. Additional adjustments are performed to preserve the observed long-term net migration tendencies of the region, such as strong in-migration rates of working-age young adults and low out-migration of older adults.

To generate a target number of total net migrants, a labor force model is applied. This model incorporates employment forecasts for the region, and then reconciles the working-age population with the projected labor force need. Age-specific Labor Force Participation Rates are applied to the non-Group Quarters population to determine the labor force. A national non-military 16+ unemployment rate and an adjustment to account for out-of-region workers are applied to determine an estimate of the total number of workers. The demand for additional labor beyond what is provided by natural increase is translated into increased migration rates (primarily but not exclusively among working-age cohorts) to maintain an approximate labor demand/supply equilibrium.

Population by race and ethnicity

Keeping in line with Louis Berger’s approach for the ON TO 2050 report, the forecast update projects the percent composition of the population for five noncongruent race/ethnicity combinations: Hispanics of

⁶ U.S. Census Bureau, 2017 National Population Projections, released March 2018. <https://www.census.gov/programs-surveys/popproj/data/tables.html>

⁷ Social Security Administration, 2019 Trustees Report, <https://www.ssa.gov/oact/HistEst/PerLifeTables/2019/PerLifeTables2019.html>

any race, non-Hispanic White persons, non-Hispanic Black persons, non-Hispanic Asian persons, and non-Hispanic persons of other races or a combination of races. These percentages are applied to the total population to determine the projected number of individuals of that category in the CMAP region.

Like the ON TO 2050 forecast, a mixed log-linear, age-specific rate projection approach was used to project the total population by the five major race/ethnicity categories. This approach balances the recent rapid growth of certain race/ethnicity and age categories and the flattening or slow decline of others. Decennial census data from 1990, 2000, and 2010 were used to perform the age-specific rate projections. Due to the timing of the forecast work and the delayed release of the 2020 Census redistricting data, summary race and ethnicity data from 2020 could not be included in the rate projections.

Recent Census Bureau research has indicated that changes in survey design and preferences for self-identification has a major impact on the ways people respond to the Census, especially for multiracial populations.⁸ Additional study is necessary to better understand demographic trends in race and ethnicity in the CMAP region.

Group quarters population

The group quarters (GQ) population describes those in group living arrangements that are ‘owned or managed by an organization providing housing and/or services for the residents.’ This includes dormitories, prisons, military barracks, nursing facilities, residential treatment centers, and other arrangements.⁹ The GQ population is further categorized into two groups: institutionalized and non-institutionalized. For clarity, institutionalized facilities include those that provide ‘formal supervised custody or care.’

Prior to 2010, decennial GQ data was summarized into three age groupings (<18, 18-64, 65+). For the ON TO 2050 forecast, Louis Berger extrapolated 1990 and 2000 data to create proportional estimates for these three broad age groupings. For this forecast update, 2010 decennial GQ data was used to calculate the proportions of people in group quarters arrangements relative to the 2010 total population by sex and 5-year age groups. The one exception to this process is the military group quarters population, which was held constant out to 2050 as there are no known plans for expansion or closure of the Naval Station Great Lakes base in North Chicago, IL.

Tying the group quarters population to age groupings results in varying rates of growth across different GQ types. For example, the forecasted increase in the Institutional Group Quarters population is largely driven by the increase in the number of adults over the age of 65. This assumes an increased demand for assisted-living and elder care communities, which will drive construction of these facilities within the CMAP region—if development of these facilities does not occur, changing housing and/or migration patterns for this age group may be observed.

⁸ U.S. Census Bureau, “2020 Census Illuminates Racial and Ethnic Composition of the Country,” 12 Aug 2021, <https://www.census.gov/library/stories/2021/08/improved-race-ethnicity-measures-reveal-united-states-population-much-more-multiracial.html>

⁹ Census Bureau, *2020 Census Group Quarters*. <https://www.census.gov/newsroom/blogs/random-samplings/2021/03/2020-census-group-quarters.html>

Households and household population

To estimate the number of households, 2010 Census data were used to determine age-specific headship rates, which were held constant and applied to the projected total population for each 5-year projection period. This method ensures that changes in the age distribution of the total population will be reflected in the total number of households.

Total headship, or the total number of heads of household, is analogous to the total number of households. The use of age-specific headship rates helps account for changing household formation patterns, particularly as the United States continues to observe shrinking household sizes over time.¹⁰

Dividing the household population by the number of households results in the household size, or average number of persons per household.

Table 4. Total household population, historic and projected

Year	Households	Population in Households	Average Household Size
2010	3,089,686	8,294,271	2.68
2020*	3,328,342	8,434,092	2.53
2025	3,489,358	8,704,375	2.49
2030	3,639,601	8,984,745	2.47
2035	3,788,170	9,305,968	2.46
2040	3,903,663	9,537,950	2.44
2045	4,003,495	9,701,981	2.42
2050	4,108,756	9,829,133	2.39

**Due to the limited availability of 2020 Decennial Census data at time of analysis, households in the year 2020 were estimated using 2010 Census age-specific headship rates.*

Workforce

Although employment prospects are not the only reason one would choose to move, this analysis assumes that employment is a primary driver for new residents entering the region. This assumption guides projections for the “target” net migration value for each forecasted 5-year period, while the specific numbers of migrants by age and by sex are allocated and modified by recent net migration data (see **Migration**, p. 12). This method seeks to roughly match the demand (employment) with supply (workers), though it is recognized that there will never be a 1:1 balance.

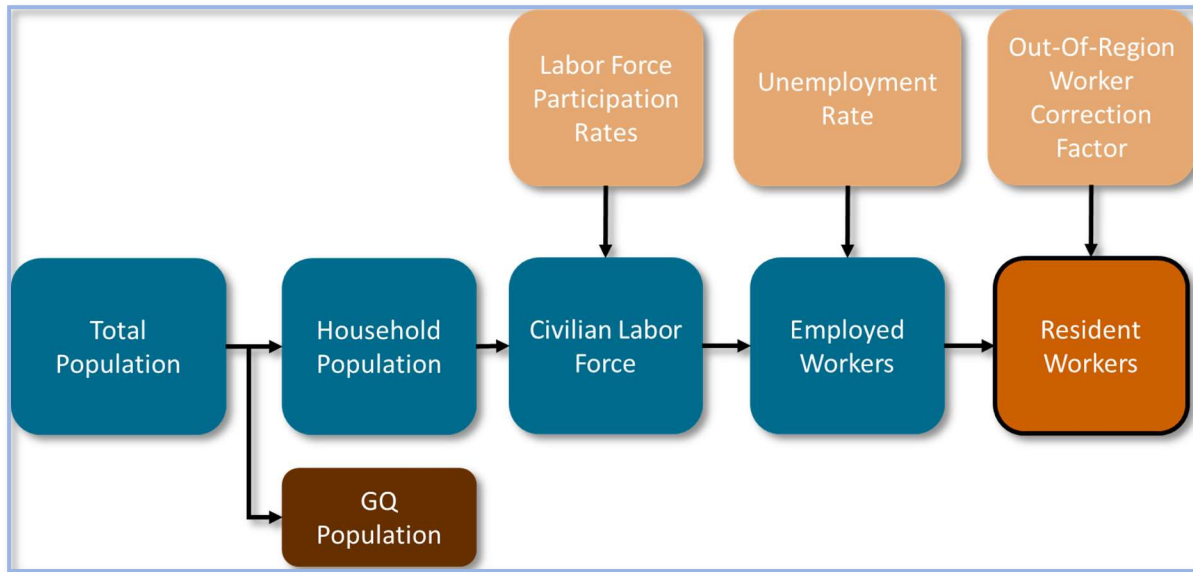
The number of workers in households is estimated using several inputs: total population by age and sex (Census and CMAP Projection), estimates of Group Quarter populations by age and sex (Census and CMAP Projection), Congressional Budget Office (CBO) national age and sex specific Labor Force Participation Rates,¹¹ and national annual non-military 16+ Unemployment rates (CBO, held constant

¹⁰ Pew Research Center, “U.S. household growth over last decade was the lowest ever recorded.” 12 October 2021. <https://www.pewresearch.org/fact-tank/2021/10/12/u-s-household-growth-over-last-decade-was-the-lowest-ever-recorded/>

¹¹ Congressional Budget Office, “The 2021 Long-Term Budget Outlook.” <https://www.cbo.gov/publication/57038>

post-2030).¹² Additionally, a correction factor (derived by Berger in the ON TO 2050 report) to account for workers that reside outside the region was applied.

Figure 12. Conceptual model for workforce estimation process



Recognizing that many workers work multiple jobs, a multiple-job-holder correction factor (also from Berger’s ON TO 2050 report) was also applied, however only to the *employment* side of the balance. This provides an estimate of “primary employment” in the region.

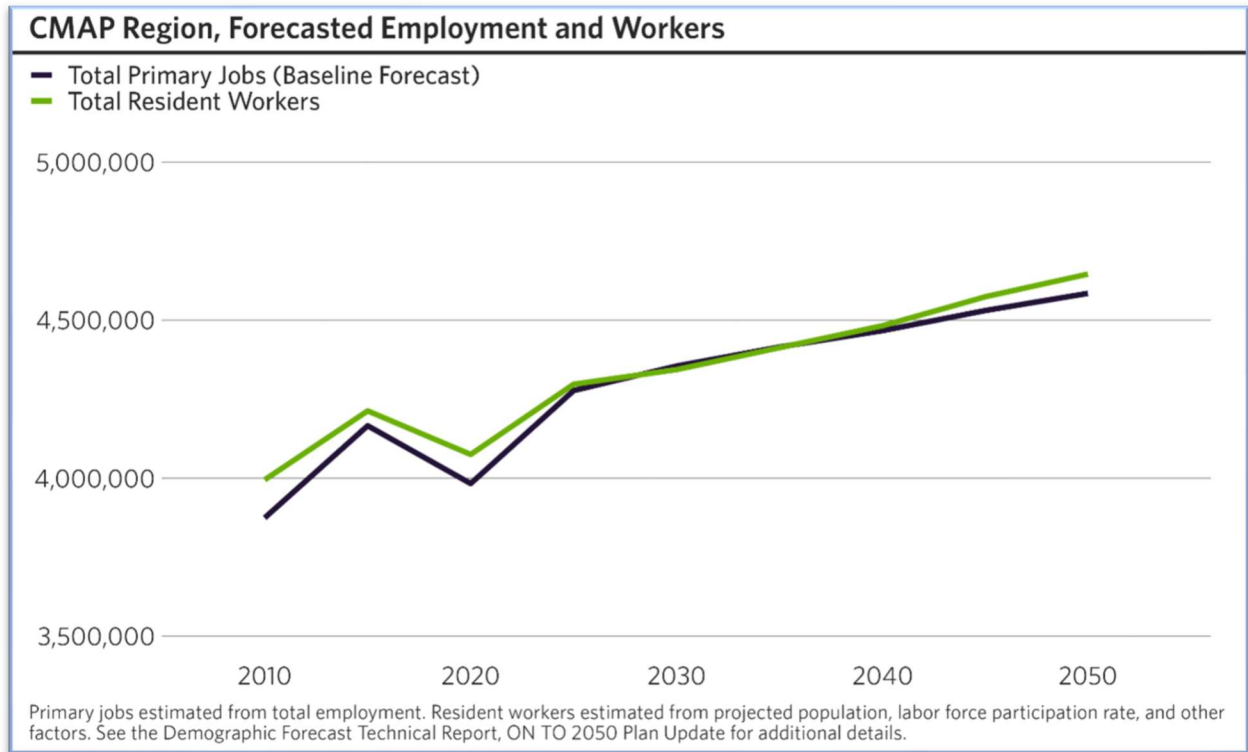
For each year of the forecast, the estimated number of resident workers was compared to the estimated total employment for the region. In recent years, the CMAP region has observed a ratio of roughly 102 resident workers to 100 primary jobs. For each forecast period, the target net migration was increased until the number of resident workers reached that ratio within a margin of 3%.

Table 5. Workers and jobs, historic and projected

Year	Total Population	Resident Workers	Total Employment	Primary Employment	Workers-to-Primary Employment Ratio
2010	8,431,386	3,995,041	4,064,635	3,874,771	1.031
2015	8,527,395	4,213,002	4,370,168	4,166,032	1.011
2020	8,577,735	4,075,210	4,178,398	3,983,220	1.023
2025	8,854,019	4,297,363	4,486,939	4,277,349	1.005
2030	9,142,057	4,343,541	4,568,258	4,354,869	0.997
2035	9,472,595	4,412,941	4,631,479	4,415,137	1.000
2040	9,717,333	4,482,340	4,685,656	4,466,784	1.003
2045	9,894,509	4,573,993	4,752,338	4,530,351	1.010
2050	10,028,854	4,645,385	4,809,114	4,584,475	1.013

¹² Congressional Budget Office, “An Update to the Budget and Economic Outlook: 2021 to 2031.” <https://www.cbo.gov/publication/57339>

Figure 13. Jobs and workers, historic and projected



Impacts of COVID-19

These projections do not attempt to make an allowance for excess mortality related to the COVID-19 pandemic, which first began generating measurable deaths in the midwestern United States in April 2020. The pandemic has accelerated the death rates in 2020, 2021 and presumably will continue to do so into 2022. At a state level, in 2020 across Illinois, Indiana and Wisconsin, deaths were 14% to 17% higher than might be expected in the absence of COVID.

Everyone faces mortality over their lifetimes. While it may seem callous, from a long-range demographic point of view, those who have lost their lives in the past two years will not “be available” to die in the future. Thus, deaths may not be as great in number as projected within future five-year projection periods.

The net effect is that, in this vintage of projections, deaths will likely be understated for the 2020-2025 period; as a result, the population projected for the year 2025 may be overstated. However, as time progresses, projected deaths may be overstated. The projected deaths should even out by 2050.

Population projections

Total population, CMAP region

**Census 2020 age groups are estimated because the Census Bureau had not yet released detailed age results.*

Table 6. Total population by five-year age groups

Age Group	Census 2020*	2030	2040	2050
0-4	501,945	577,956	567,322	528,877
5-9	548,427	584,978	583,769	551,079
10-14	524,815	521,789	617,521	576,058
15-19	549,181	529,154	619,727	600,914
20-24	549,680	532,342	524,451	652,222
25-29	539,795	590,243	555,839	638,326
30-34	637,196	588,277	583,391	545,924
35-39	617,998	627,881	595,037	573,635
40-44	597,261	610,504	594,332	595,488
45-49	557,725	598,224	646,908	606,470
50-54	549,318	556,566	627,428	604,682
55-59	562,088	536,896	604,283	648,102
60-64	528,929	520,954	546,218	612,433
65-69	430,675	513,607	509,121	571,373
70-74	338,566	459,080	466,825	492,792
75-79	229,090	347,421	422,871	428,387
80-84	149,990	241,131	335,109	354,490
85+	165,056	205,054	317,181	447,602
Total	8,577,735	9,142,057	9,717,333	10,028,854
Median Age	38.1	39.9	41.6	42.5

Table 7. Male population by five-year age groups

Age Group	Census 2020*	2030	2040	2050
0-4	256,091	296,540	290,080	270,153
5-9	267,872	267,289	317,947	294,293
10-14	279,391	271,859	319,386	307,751
15-19	280,625	269,637	270,849	336,711
20-24	271,351	294,012	278,481	329,308
25-29	320,398	292,841	290,522	277,311
30-34	312,035	315,348	295,937	286,758
35-39	297,958	307,922	295,483	296,417
40-44	277,363	297,419	324,003	300,867
45-49	269,806	300,482	300,020	281,175
50-54	270,263	275,712	315,360	299,725
55-59	273,894	263,047	299,494	323,818
60-64	253,211	252,518	267,326	304,633
65-69	200,727	243,033	243,139	276,807
70-74	153,501	212,335	219,386	234,756
75-79	98,860	155,733	193,048	198,434
80-84	60,715	103,142	147,398	159,707
85+	56,284	74,478	124,184	182,005
Total	4,200,345	4,493,347	4,792,043	4,960,629

Table 8. Female population by five-year age groups

Age Group	Census 2020*	2030	2040	2050
0-4	245,854	281,416	277,242	258,724
5-9	256,943	254,500	299,574	281,765
10-14	269,790	257,295	300,341	293,163
15-19	269,055	262,705	253,602	315,511
20-24	268,444	296,231	277,358	309,018
25-29	316,798	295,436	292,869	268,613
30-34	305,963	312,533	299,100	286,877
35-39	299,303	302,582	298,849	299,071
40-44	280,362	300,805	322,905	305,603
45-49	278,621	284,496	283,749	269,904
50-54	279,055	280,854	312,068	304,957
55-59	288,194	273,849	304,789	324,284
60-64	275,718	268,436	278,892	307,800
65-69	229,948	270,574	265,982	294,566
70-74	185,065	246,745	247,439	258,036
75-79	130,230	191,688	229,823	229,953
80-84	89,275	137,989	187,711	194,783
85+	108,772	130,576	192,997	265,597
Total	4,377,390	4,648,710	4,925,290	5,068,225

Table 9. Total population change by period and cumulatively

	Census 2020	2025	2030	2035	2040	2045	2050
Total Population	8,577,735	8,854,019	9,142,057	9,472,595	9,717,333	9,894,509	10,028,854
5-year Num. Change		276,284	288,038	330,538	244,738	177,176	134,345
5-year Pct. Change		3.2%	3.3%	3.6%	2.6%	1.8%	1.4%
Cumulative Num. Change		276,284	564,322	894,860	1,139,598	1,316,774	1,451,119
Cumulative Pct. Change		3.2%	6.6%	10.4%	13.3%	15.4%	16.9%

Table 10. Total population change by components of change

Component	2020- 2025	2025- 2030	2030- 2035	2035- 2040	20340- 2045	2045- 2050
Births	559,136	554,059	542,047	532,893	526,593	530,784
Deaths	339,458	369,135	406,559	442,624	477,511	501,692
Natural Increase	219,678	184,924	135,488	90,269	49,082	29,092
Net Migration	56,606	103,114	195,050	154,469	128,094	105,253
Total Change	276,284	288,038	330,538	244,738	177,176	134,345

Table 11. Total population by race and ethnicity

Year	Non-Hispanic White	Hispanic, Any Race	Non-Hispanic Black	Non-Hispanic Asian	Non-Hispanic Other
2010	4,486,557	1,823,609	1,465,417	513,694	142,109
2015	4,417,221	1,925,501	1,444,801	605,011	134,861
2020	4,340,122	2,007,716	1,422,410	664,838	142,648
2025	4,394,656	2,128,970	1,442,527	735,671	152,194
2030	4,454,990	2,253,063	1,464,567	807,399	162,038
2035	4,533,600	2,389,240	1,492,693	884,226	172,837
2040	4,568,211	2,505,718	1,506,422	954,695	182,286
2045	4,568,940	2,606,180	1,509,045	1,019,719	190,626
2050	4,548,372	2,696,364	1,504,683	1,081,180	198,255

Household population, CMAP region

Table 12. Total household population & household size, 2020 - 2050

	2020	2030	2040	2050
Total Population	8,577,735	9,142,057	9,717,333	10,028,854
Household Population	8,434,092	8,984,745	9,537,950	9,829,133
Total Households	3,328,342	3,639,601	3,903,663	4,108,756
Average Household Size	2.53	2.47	2.44	2.39

Table 13. Household population by age group, 2020 - 2050

Age Group	2020*	2030	2040	2050
0-4	501,249	577,154	566,535	528,143
5-9	524,233	584,329	583,121	550,467
10-14	548,253	520,905	616,475	575,083
15-19	525,761	505,987	593,269	575,135
20-24	512,559	505,385	497,771	620,545
25-29	628,885	582,468	548,414	629,917
30-34	611,986	582,572	577,727	540,546
35-39	592,203	622,554	590,005	568,769
40-44	552,400	604,641	588,661	589,803
45-49	542,524	591,755	639,892	599,918
50-54	543,074	550,222	620,230	597,788
55-59	555,812	530,891	597,492	640,794
60-64	523,208	515,301	540,274	605,739
65-69	425,296	507,177	502,739	564,197
70-74	332,550	450,913	458,512	484,010
75-79	222,874	338,016	411,436	416,813
80-84	143,383	230,583	320,502	339,088
85+	147,841	183,892	284,896	402,378
Total	8,434,093	8,984,745	9,537,951	9,829,133

*Census 2020 age groups are estimated because the Census Bureau had not yet released detailed age results.

Group quarters population, CMAP region

Table 14. Total group quarters population by age, 2020 - 2050

Age Group	2020*	2030	2040	2050
0-4	697	802	787	734
5-9	582	649	648	612
10-14	928	884	1,046	975
15-19	23,918	23,167	26,458	25,779
20-24	27,236	26,957	26,680	31,677
25-29	8,311	7,775	7,425	8,409
30-34	6,012	5,705	5,664	5,378
35-39	5,058	5,327	5,032	4,866
40-44	5,325	5,863	5,671	5,685
45-49	5,903	6,469	7,016	6,552
50-54	6,243	6,344	7,198	6,894
55-59	6,276	6,005	6,791	7,308
60-64	5,721	5,653	5,944	6,694
65-69	5,378	6,430	6,382	7,176
70-74	6,016	8,167	8,313	8,782
75-79	6,216	9,405	11,435	11,574
80-84	6,607	10,548	14,607	15,402
85+	17,215	21,162	32,285	45,224
Total	143,642	157,312	179,382	199,721

*Group Quarters population by age groups for 2020 are estimated because the Census Bureau had not yet released detailed age results at time of analysis.

Table 15. Total group quarters population by type, 2020 - 2050

	2020	2030	2040	2050
Institutional Facilities				
Adult Correctional	18,236	18,296	18,550	19,547
Juvenile	2,068	2,019	2,324	2,257
Nursing	51,458	63,969	80,526	94,672
Other	1,881	2,088	2,314	2,466
Total	73,643	86,372	103,714	118,942
Non-Institutional Facilities				
College/University				
Student Housing	34,798	33,823	36,070	39,530
Military Quarters	12,171	12,171	12,171	12,171
Other	23,030	24,946	27,427	29,078
Total	69,999	70,940	75,668	80,779

Outlying Region Projections, 2020 - 2050

Across the entire 30-year period, the outlying region of surrounding counties in Illinois, Indiana, and Wisconsin (see reference map that follows), which are economically linked to the CMAP region, is projected to increase from 2.05 million in 2020 to 2.33 million in 2050, a gain of 274,000 or 13%. Thus, in percentage terms, the outlying counties are predicted to grow more slowly than the core CMAP region (17%).

The strongest numeric gain for these outlying counties is expected in the 2020s (150,000), with growth in the 2030s (86,000) and 2040s (37,000) being much lower.

Similarly, net migration for the outlying regions is predicted to taper from 106,000 in the 2020s to 70,000 in the 2030s and 41,000 in the 2040s.

Table 16. Total population projections for adjacent sub-regions

Region	2020 Population	2050 Population	Numeric Change	Percent Change	Natural Increase	Net Migration
External IL	794,845	904,025	109,180	13.7%	23,573	85,607
External IN	784,334	840,125	55,791	7.1%	7,597	48,194
External WI	473,354	582,015	108,661	23.0%	24,436	84,225
TOTALS	2,052,533	2,326,165	273,632	13.3%	55,606	218,026

External IL: Boone, DeKalb, Grundy, Kankakee, LaSalle, Lee, Ogle, and Winnebago Counties

External IN: Lake, LaPorte, and Porter Counties

External WI: Kenosha, Racine, and Walworth Counties