



Ohio Population Projection 2010 – 2050 Technical Report: Projection Methodology

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Projection Method - County population projections are by sex and 5-year age groups for ages 0-4 through 95+ for 5-year intervals from 2010 to 2050. We projected each county's population individually, using the *cohort component* technique of population projections to project the population in 5-year cycles. The projections start with 2010 Census population. We then survive the population, in effect, adjusting the initial population for deaths over 5 years; then have the survived population experience migration followed by births. This will produce an estimate of age-sex count of the 2015 population which will be used as the beginning population for the next time period. The 2015 estimated population in turn experiences these components of population change -- deaths, migration, and birth -- in age-sex specific form. The projections continue in this manner through 2050.

We developed and applied rates (for each applicable age-sex group) to affect each component of change with the exception of a limited number of counties where we applied counts of migration. These applied rates (or counts) constitute assumptions about the component of change over the county's future time horizon. With each component, we developed the rates based on the county's recent experience, i.e., the decade ending in 2010 and most often the more recent years of that decade.

Birth Rates - Generally, two assumptions of a county's recent birthing experience shape births during the projection period:

- 1) Each county's recently experienced rates of childbearing by age of mother apply for each year in future projection periods. The rates summarize all forces in a county's (number of) births over the future time horizon except the number and distribution of women by age in the childbearing years. Thus the projection period's number of women and distribution by age in the childbearing years substantially contribute to the period's number of births.
- 2) The male-female ratios at birth also needed to parse births in a projected period into males and females. The sex ratio of a county's births for the years 2006 through 2009 were used to parse projected births in future years; this average sex ratio is part of the county's recent birth experience.

Death Rates – Death rates were calculated at the county level with the assumption that deaths in a county occur in the county's recent age-sex pattern, but change over the future time horizon by tracking the projected national trend. Thus, each county tracks the projected national trend in

deaths while maintaining the county's difference between its and the nation's recent rates. This was accomplished by taking the county-nation ratio of age-sex survival rates for the 2005-2010 period.

Migration Rates - We assumed that each county's recent (2005-2010) age-sex experience of net migration applies for each future projection period. For most counties, we apply rates as recent experience, but for some we used counts. In contrast to the other components of population change where there is much, detailed recent data, counts of county in-migrants and out-migrants by age and sex are not available. Therefore, we develop estimates and, with the available data, estimates of only recent age-sex net migration for counties. Net migration is the count of in-migrants minus the count of out-migrants; we develop rates by dividing the counts by estimates of the *population at risk* of migration. Many patterns of in and out-migration can result in the same net migration; thus, having to use net migration is more tenuous than a circumstance where we could use reliable in and out-migration information. Even the appropriate estimate of population at risk -- the denominator of rates -- can differ among studies of the same place. We apply the most applicable demographic technique to estimate county's recent migration experience and reviewed subsequent projections using rates and using counts of net migration. For most counties, the results were similar or reasonable, but for some the rates implied unreasonable growth or decline over time. Thus, we use counts for these counties. For two counties, we made adjustments to normalize their migration patterns because of extraordinary growth and decline for age groups that we thought is not tenable as assumption of future conditions.

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