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**POPULATION PROJECTION  
METHODOLOGY**



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## I. INTRODUCTION

This monograph is an explanation of the methods and procedures employed in generating Ohio's population projections. The report includes the decisions made in data collection, projection method, as well as fertility, mortality, and migration assumptions.

All input data -- base year population by age/sex, institutional population by age/sex, age-specific fertility rates by county, census survival rates by county, estimated and projected migration rates and age/sex proportion of migration by county -- were calculated and prepared using Microsoft Access<sup>®</sup> and Microsoft Excel<sup>®</sup> softwares.

The projections were completed using Microsoft Excel software. All calculations and output were generated on a main template spreadsheet, with input data supplied from individual county files (see Appendix 2). The state level projections were accomplished by aggregating the 88 county projections as the control total, and then performing the state level projection, constraining the calculation results to the control total.

The resulting projection figures are incorporated in Population Projections for Ohio and Counties by Age and Sex: 2000 to 2030. The projection and input files are available at the Ohio Department of Development web site at [www.odod.state.oh.us/research](http://www.odod.state.oh.us/research). Hard copies are available also, for the cost of the diskettes. Also available on the website, in print and diskette are: (1) projected numbers of births, deaths, net migration by sex, and projected sex-specific natural and net increase rates (Appendix 3); (2) projected age-specific birth and fertility rates (Appendix 4); (3) projected age/sex-specific migration numbers and rates (Appendix 5). All of the above information is available by county.

## II. METHODOLOGICAL OVERVIEW

### Projection Model

Populations of 2000-2030 for the State of Ohio and its 88 counties were projected using a demographic based cohort-component projection model. The basic logic of this model is that future population is a function of present (baseline) population plus the three components of demographic change: births, deaths, and migration. Computations are carried out individually to reflect variations in birth, death, and migration rates for each cohort. The base formula used in the projection model to express this function is:

$$\text{Population}^{t+5} = \text{Population}^t + {}^{t+5}\text{Birth}^t - {}^{t+5}\text{Death}^t + {}^{t+5}\text{Net Migration}^t$$

Where t = time, in years.

The birth component is calculated by multiplying the base-year female population age 15-19 through 40-44 by the projected Age-Specific Fertility Rates (ASFRs), summing the six products (six female age groups), then multiplying by five (the period of the projection is five years). The result of this calculation is the number of births projected to occur over the projection period.

The death component is calculated by multiplying each age/sex specific baseline-year cohort population by the projected five-year survival rate. This calculation results in the number of survivors of that cohort to the projected year.

The actual number of projected deaths can be calculated, then, as the difference between the base population minus the survived (or expected) population, although number of deaths do not enter directly into the calculation of projected population.

The migration component is calculated for each county by multiplying the expected population by the appropriate projected county total net migration rate.

The county total net migration rates are projected based on the historical (1960-2000) net migration rates, as well as the most recent (1990-2000) gross migration trend from Internal Revenue Service (IRS) migration data. Both migration data sets are available by county.

The county age/sex-specific migrants are calculated by multiplying each county's 1990-2000 age/sex proportionate rates of migration by the appropriate projected county total net migration.

Use of the following formulas are explained and documented in the following text.

**a. Projected Sex-Specific Population Aged 0-4 Years Old:**

$${}_4\hat{M}_0^{y+5} = (B^t * 0.5115) * {}_4S_0^t * (1 + {}_4M_0^t)$$

$${}_4\hat{F}_0^{y+5} = (B^t * 0.4885) * {}_4S_0^t * (1 + {}_4M_0^t)$$

Where,

${}_4\hat{M}_0^{y+5}$  and  ${}_4\hat{F}_0^{y+5}$  are the projected male and female populations 0-4 years old in the projected year **y+5**;

$B^t$  is total births in the 5-year time interval  $t$ ;

${}_4S_0^t$  is the survival rate for persons age 0-4 (by sex) in the 5-year time interval  $t$ ;

${}_4M_0^t$  is the net migration rate for persons 0-4 years old (by sex) in the 5-year time interval  $t$ ;

0.5115 is the ratio of male-to-total births; and,

0.4885 is the ratio of female-to-total births (birth ratios based on Ohio live births, 1990-1995).

**b. Projected Population Age 5-84 Years Old:**

$${}_5\hat{P}_{i+1}^{y+5} = {}_5P_i^y * {}_5S_i^t * (1 + {}_5M_i^t)$$

Where,

${}_5\hat{P}_{i+1}^{y+5}$  is the projected population of 5-year age interval  $i+1$  (by sex), in the projected year  $y+5$ ;

${}_5P_i^t$  is the population of 5-year age interval  $i$  (by sex), in year  $y$ ;

${}_5S_i^t$  is the survival rate for persons in the 5-year age interval  $i$  (by sex) for the 5-year time interval  $t$ ;

${}_5M_i^t$  is the net migration rate for persons in the 5-year age interval  $i$  (by sex) for the 5-year time interval  $t$ .

### c. Projected Population Age 85 and Over:

$${}_{\infty}P_{85}^{y+5} = ({}_5P_{80}^y + {}_{\infty}P_{85}^y) * {}_{85}S_{80}^t * (1 + {}_{\infty}M_{85}^t)$$

Where,

${}_{\infty}P_{85}^{y+5}$  is the projected population age **85 and over** (by sex) in the projected year **y+5**;

${}_5P_{80}^y$  and  ${}_{\infty}P_{85}^y$  are the total populations age **80-84 and 85 and over** (by sex) in year **y**;

${}_{85}S_{80}^t$  is the survival rate for age group 80 and over surviving to 85 and over in the 5-year time interval **t** (by sex);

${}_{\infty}M_{85}^t$  is the total net migration rate for persons age **85 and over** (by sex) in the five-year time interval **t**.

Appendix 1 shows a flow chart describing the population projection procedure in its entirety.

### Deriving Base-Line Rates

Several tests were done at the state level to determine which fertility and mortality rates should be used in this projection series.

Projected 1990-95 and 1995-2000 county births were forced to align with the 1990-1995 and 1995-2000 registered county births recorded with the Ohio Department of Health (Appendix 7). This was accomplished by adjusting the projected fertility rates until the projected births matched the registered births. The result showed that, for obtaining a better match between the projected and registered births, a linear extrapolation of the Age-Specific Fertility Rates (ASFRs) for 1990-1995 and 1995-2000 could be used to derive projected ASFRs and Total Fertility Rates (TFRs). Therefore, this linear method was used for most of the counties. However, for eleven counties, a percent adjustment was made to the linear extrapolations to get projected ASFRs and TFRs. Those eleven counties are: Clinton, Geauga, Paulding, Preble, Licking, Lawrence, Warren, Mercer\*, Meigs\*, Noble\*, and Van Wert\* counties. In the counties with “\*”, the percent adjustment was used for only part of the age groups or part of the projected years. The state level projected ASFRs and TFRs were used for the counties of Athens, Franklin and Wood.

Projected 1990-1995 and 1995-2000 county deaths were forced to align, respectively, with the 1990-1995 and 1995-2000 registered county deaths, recorded with the Ohio Department of Health (Appendix 8). The projected deaths were calculated by different survival rate methods, such as the census survival rate method and the life table survival rate method. By comparing the projected deaths with the registered deaths, the census survival rate method was chosen because of the better match.

Projected 1995 and 2000 state populations were forced to align, respectively, with 1995 estimates and 2000 Census county population counts produced by the U.S. Bureau of the Census (see Appendix 9). This was accomplished by using different migration rates until the projections matched the state total estimate and census population counts. By comparing the projected population with the estimate and census population, a projected migration model which combined the historical migration rates and the last ten years' (1990-2000) IRS migration trends was chosen because of the better match.

Projecting future trends of these three components from the base year (2000) is an important aspect of the methodology. Assumptions concerning fertility, mortality and migration trends at both state and county levels are discussed separately in this report.

### **III. BASE AND INSTITUTIONAL POPULATIONS**

#### **Base Population**

The base year for the population projections is 2000. Specifically, the base time is April 1, 2000 - the official day of the census enumeration. All projected figures stem from that date.

Five-year age cohorts by sex, ranging from 0-4 years of age to 80-84 and 85+ at the county level were drawn from the 2000 Census of Population and Housing, Summary File 1 {Source: Census of Population and Housing, 2000: SF 1 (Ohio) [machine-readable data files] / prepared by the Census Bureau. Washington, D.C.: the Bureau [producer and distributor], 2001. Tables P12, P12A, P12B, PCT13, PCT13A & PCT13B}.

## **Institutional Population**

The calculation of sub-state projections customarily requires special treatment of institutional populations such as universities, prisons and military installations. It is important to separate these institutional populations from the county residents, since their fertility and migration patterns are vastly different.

These special populations usually are replaced periodically by other individuals of the same age group. For this reason, it is expected that the age and sex composition of these groups will remain approximately the same over the projected period. Not isolating the populations in these institutions would pose several problems:

1. If these individuals are “survived” – i.e., survival rates applied to them so as to age them to the subsequent age group, as they are to county residents, an inaccurate migration and cohort population would result in the next projected period for the subsequent age cohort;
2. Applying standard fertility rates to female university students would produce unrealistically high county birth figures, since births to students are relatively rare.

To circumvent these potential errors, institutional populations of each county were extracted from the 2000 Census counts by age and sex. These populations subsequently were projected separately from the resident population. After calculating mortality, fertility and migration for the county resident population, the institutional populations were added into the county populations by age and sex for each projected period. The assumption was that these groups will remain consistent in age/sex structure composition, unlike the general population.

## **Projected Institutional Population**

The projection of institutional populations within a context of an aging population presented a problematic situation. Institutional populations, to a certain extent, reflect the age structure at that point in time. In 1990, the population most “at risk” of being a student, inmate, or member of the Armed Forces (18-24 years old) was disproportionately large, commonly known as the “baby boom” population. Over the projected time period, this population is replaced by a significantly smaller population.

On the other hand, more recent population information indicates a higher institutional participation rate of the population at risk. The state total institutional population has increased from 261,451 (2.41% of the total) in 1990 to 299,121 (2.63% of the total) in 2000. The increase rate was about 14 percent.

To average both the influences of aging and the increasing institutionalization rate, two assumptions were made, as follows:

1. The projected institutional populations would remain at the 2000 proportionate rates of institutional population to county population, by age and sex, but would not remain at the 2000 proportionate numbers of institutional population to county population, by age and sex. These proportionate rates were applied to the county-level projected populations at each five-year time interval to derive county total institutional population by age and sex. This assumption will result in more projected institutional persons for older age groups than for younger age groups because of the aging of the population.

2. It is reasonable to assume that the institutional population will increase by 7 percent (half of the 14 percent) for each five year period throughout the projection period. This assumption would allow for increasing institutional populations in the future.

The following is the formula to project and add the institutional population into the total population by age/sex:

$${}_5TP^{y+5}_i = {}_5UGQ^{y+5}_i + GQ^{2000} * 1.07^n * {}_5GQP^{90-00}_i$$

Where,

${}_5TP^{y+5}_i$  is the projected total population for the year **y+5** and the 5-year age group *i*, where **y** can take a value from 2000 to 2025 and *i* can take a value from 0-4 to 80-84 age group;

${}_5UGQ^{y+5}_i$  is the projected population without institutional population for the year **y+5** and the 5-year age group *i*;

$GQ^{2000}$  is the total institutional population for the year 2000;

**1.07** is the rate of increase in institutional population for each projection period;  
and

**n** represents the number of the projection period, which can change from 1 to 6;

${}_5GQP^{90-00}_i$  is the proportion of institutional population for each age/sex group to the total for the time period 1990-2000.

Adjustments were made to four counties (Athens, Franklin, Portage and Wood) because of the undercounting of, and their disproportionately large, college populations. According to the census definition, college students who are living in non-campus residential housing units were counted as part of the household population of that area, not as institutional populations. Therefore, census institutional population numbers do not reflect the entirety of the college populations. The difference between the number of students and the number of census institutional populations becomes significant when college students account for a large proportion of the total population, like in the above four counties.

The 2000 institutional population for those four counties were estimated based on "Main

Campuses Student Count by Age, Sex, and Race, 2000 Student Inventory Data aggregated by the Ohio Board of Regents", instead of census counts, for age group 20-24. The migration rates for 1990-95 and 1995-00 and the migration proportions for 1990-2000 of these four counties were calculated based on 1990 and 2000 Student Inventory Data (for group quarters) as well as 1990 and 2000 census counts (for total population). The 2000 Student Inventory Data was also used to calculate the age specific fertility rates (ASFR) of those four counties.

The percentage increase in institutional populations for these four counties is dependent on each county's increase during the past ten years (1990-2000), separately. The reason for using the main campus student figures but not total enrollment is that the total enrollment figures are not available by age and sex.

## **IV. FERTILITY**

### **Fertility Assumptions**

Generally speaking, the fertility trend for Ohio from 1990 to 2000 increased slightly in total fertility rates (total fertility rate of 1,941 for 1985-1990 and 1,981 for 1995-2000). This slight increase is due to countervailing increases in fertility rates for the 30-34 and 40-44 age groups, and declines in the fertility rates for the female age groups 15-19 to 25-29 (See Table 1). As a result, Ohio's fertility rates were projected to decrease slightly for the entire 2000 to 2030 projection time frame. Ohio's total fertility rate (births per thousand women age 15 to 49) is projected to decline from 1,975 (2000-2005) to 1,950 (2025-2030) (see Table 1).

TABLE 1  
ESTIMATED & PROJECTED AGE-SPECIFIC  
FERTILITY RATES AND TOTAL FERTILITY RATES:  
OHIO, 1980-1985 TO 2025-2030

	ESTIMATED ASFR				PROJECTED ASFR					
AGE	80-85	85-90	90-95	95-00	00-05	05-10	10-15	15-20	20-25	25-30
15-19	.0494	.0594	.0605	.0514	0.051	0.048	0.044	0.041	0.038	0.035
20-24	.1113	.1215	.1178	.1107	0.107	0.103	0.100	0.096	0.093	0.089
25-29	.1142	.1168	.1114	.1118	0.112	0.112	0.112	0.113	0.113	0.113
30-34	.0625	.0653	.0763	.0811	0.084	0.087	0.090	0.092	0.095	0.098
35-39	.0190	.0206	.0278	.0323	0.035	0.037	0.039	0.041	0.043	0.046
40-44	.0033	.0046	.0043	.0056	0.006	0.007	0.008	0.008	0.009	0.009
TFR	1,798	1,941	1,990	1,964	1,975	1,970	1,965	1,955	1,955	1,950

Data source: Ohio Department of Development, Office of Strategic Research (JH),  
P.O. Box 1001, Columbus, Ohio 43266-0101, March, 2003

The projected total number of Ohio births, however, will increase from 740,343 (2000-2005) to 749,287 (2025-2030) due, in large part, to the assumption that the relatively large female cohort comprised of the children of the “baby boomers” – commonly referred to as the “baby boomlet”-- will continue the recent trend of delaying childbearing until into their thirties. Table 2 below shows Ohio's five-year total births and age-specific births over the projected years.

TABLE 2  
PROJECTED FIVE-YEAR TOTAL & AGE-SPECIFIC BIRTHS:  
OHIO, 2000-2005 to 2025-2030

AGE	00-05	05-10	10-15	15-20	20-25	25-30
15-19	94,519	91,886	90,854	80,945	72,971	65,482
20-24	183,674	176,779	180,007	184,559	171,722	160,878
25-29	205,636	196,168	196,309	207,129	220,772	213,824
30-34	165,118	166,326	164,683	169,414	183,955	200,512
35-39	76,895	73,517	76,465	77,732	82,073	90,853
40-44	14,502	15,215	14,944	15,908	16,504	17,739
TOTAL	740,343	719,890	723,262	735,686	747,997	749,287

Data source: Ohio Department of Development, Office of Strategic Research (JH),  
P.O. Box 1001, Columbus, Ohio 43266-0101, March, 2003

Age-specific fertility rates (ASFR) are used in this series to project future birth rates and births. ASFRs are determined for each five-year female age group between 15-19 to 40-44, and are calculated by dividing the number of live births to women in the appropriate five-year age groups by the number of females within that age group.

A linear extrapolation based on the ASFRs of 1990-95 and 1995-00 was used to produce projected ASFRs:

**Estimated ASFRs:**  ${}_{x+5}ASFR_x^t = {}_{x+5}B_x^t / {}_{x+5}F_x^t$

**Projected ASFRs:**  ${}_{x+5}^5ASFR_x^t = {}_{x+5}^{95}ASFR_x^{90} * [1 + ({}_{x+5}^{00}ASFR_x^{95} - {}_{x+5}^{95}ASFR_x^{90}) / 2 * n]$

Where,

ASFR is the age-specific fertility rate;

**x and x+5** is a five-year female cohort beginning with initial age x, to x+5;

**t** is time in single years;

${}_{x+5}B_x^t$  is the average number of births to a stationary female five-year age cohort (e.g., average births [ ${}_{x+5}B_x^t$ ] to females 20-24 years old in the time period 1990-95 is the average of births to females 20-24 years old in 1991, 1992...1995);

**F** is the female population within the five-year age cohort;

${}_{x+5}^{95}ASFR_x^{95}$  and  ${}_{x+5}^{95}ASFR_x^{90}$  are ~~single-year~~ age-specific fertility rates for the years 1995-2000 and 1990-95 by county;

**n** is the number of projection periods from 2000, 1 being 2005, 2 being 2010, etc..

The 1995-2000 ASFRs were used for the entire projection period for eleven counties: Clinton, Geauga, Paulding, Preble, Licking, Lawrence, Warren, Mercer\*, Meigs\*, Noble\* and Van Wert\*. The 1995-2000 ASFRs for were used for part of female age groups or part of the projected years for the last four counties with the “\*”. The 1995-2000 ASFRs for these counties were so high that a decision was made not to allow them to increase further. The state level ASFRs were used for the counties of Athens, Franklin and Wood because the option to remove an unquantifiable number of 15 to 24 year-old females, in order to bring the ASFRs to reasonable values, may have been more problematic.

Appendix 10 shows the estimated ASFRs and TFRs for the periods 1990-1995 and 1995-2000 by county.

Total births for each five-year period can be projected based on the projected ASFRs and the female populations of each childbearing age group:

$${}^{t+5}B^t = {}^{t+5}_{49}O_{15}^t [({}^{t+5}_{x+5}ASFR_x^t * 5 * {}_{x+5}F_i^y)]$$

Where,

${}^{t+5}B^t$  is the total projected births for the five-year time interval  $t$ ;

${}^{t+5}_{49}O_{15}^t$  is the sum of births for each female childbearing age group (15-19 to 45-49) in the five-year time interval  $t$ ;

${}^{t+5}_5ASFR_x^t$  is the single-year age-specific fertility rate for females age  $x$  to  $x+5$  in the projected five-year time interval  $t$ ; and

${}_5F_i^y$  is the female population within the five-year age cohort  $i$  in year  $y$ ;

multiplication by 5 translates single-year ASFRs to five-year ASFRs.

The input data used to derive county-level ASFRs for 1990-1995 and 1995-2000 include:

1. April 1, 1990 to March 30, 1995 and April 1, 1995 to March 30, 2000 live births, by age of mother, and her county of residence (Ohio Department of Health, 1990 to 2000). County births for 1990-95 are registered counts. All of the registered births were assigned according to the county of the mother's residence as opposed to the county of birth (Ohio Department of Health). This safeguards against over-representation in urban counties with hospitals serving neighboring rural county clients. Although occurring in Ohio, births to mothers who are residents of other states are excluded from the resident data; while births and deaths in other states, of Ohio residents, are included;
2. 1990 Census counts of females and group quarter populations, by county and age groups between 15 and 44 years (STF2B, Ohio, 1990, U.S. Bureau of the Census);
3. 2000 Census counts of females and group quarter populations, by county and age groups between 15 and 44 years (SF 1, Ohio, 2000, U.S. Bureau of the Census);
4. Estimates of females by county and age groups between 15 and 44 years old, for the years 1990-95 (National Cancer Institute Experimental County Estimates: 1990 to 1995, U.S. Bureau of the Census).

Female group quarter populations 15 to 44 years old for the 1990-1995 time period were estimated as the average of 1990 and 2000 census group quarters, then removed from the 1990-1995 female populations for the purpose of calculating ASFRs for 1990-1995 and 1995-2000.

## V. MORTALITY

### **Mortality Assumptions**

In this projection series, age-specific survival rates (ASSR) for 1990-1995 were calculated for each individual county based on recent death and population information. The county ASSRs for 1990-1995 were then used to project deaths for each county over the projection period. County-specific 1990-95 national census survival rates were used for each projection period because these rates are more recent and, therefore, may reflect future survival rates better than survival rates taken from an earlier period.

Using the 1990-95 national census survival rates produces generally lower death rates than using life table survival rates over the next 25 years. These lower mortality rates produce larger expected population numbers, especially for the age group 65 and over, given a non-mobile population. Since Ohio infant mortality rates presently are substantially lower than the national average, there is not as much difference in the initial and terminal survival rates for persons 0-4 years old as might otherwise be expected. Although the 1990-95 national census survival rates are higher than 1990 life table survival rates, the total number of deaths for the state will increase somewhat during the projection period simply because of the growing elderly population. The projected total number of deaths for the state is 578,325 for 2000-2005 and goes up to 728,327 for 2025-2030.

### **1990-1995 Revised Census Survival Rates**

Projected mortality is measured inversely as survival rates. The most recent survival rates available were put into the projection program to calculate the mortality component. Survival rates express survival from a younger age to an older age and, therefore, are defined in terms of two ages, hence two time references--the initial age and date and the terminal age and date. For example, the expected population of persons 5-9 years old in 2000 is the product of persons 0-4 years old in 1995 multiplied by the 5-year survival rate for persons 0-4 years-old. The term "expected population" refers to the number of survivors in a stationary, or non-mobile, population. The most common form of survival rate employed in population studies is a 5-year age group and a 5-year time period.

The general formula used to derive expected populations is:

$${}_{x+5}E_x^{t+5} = {}_xP_{x-5}^t * {}_xS_{x-5}^5$$

Where,

${}_{x+5}E_x^{t+5}$  = expected population of the five-year age cohort, ages x to x+5, in projected year t+5;

${}_xP_{x-5}^t$  = the 5-year age cohort, ages x-5 to x, in initial year t;

${}_xS_{x-5}^5$  = the five-year survival rate for the 5-year age/sex cohort, ages x-5 to x.

There are two ways to calculate survival rates (Shryock, 1976). One method is called Life Table Survival Rates and uses life table functions to produce survival rates (Appendix 11, 12, 13 and 14):

$$\text{Life Table Survival Rates: } {}_5S_x^5 = {}_5L_{x+5} / {}_5L_x$$

For the population 85 and over, the **T** function of the life table is used:

$${}_5S_{80}^5 = {}_{\infty}L_{85} / {}_{\infty}L_{80}$$

Where **L** is a life table function which represents the number of person-years that would be lived within the indicated age interval; **T** is a life table function also and represents the total number of person-years that would be lived after the beginning of the indicated age interval; and **S** is the survival rate which expresses survival from a younger age to an older age.

A complete life table readily permits calculation of survival rates. The 1980, 1990 and 2000 survival rates were calculated by sex and five-year age group from 1980, 1990 and 2000 Ohio life table  $L_x$  functions (see Appendix 11, 12 and 13). All the Life Tables were constructed using the method suggested by T.N.E. Greville (Shryock and Siegel, 1973: 444-445). In the application of this method, the following definitions are used:

$$(1) {}_4m_0 = \text{Deaths}_{\text{infant}} / \text{Births}$$

$$\text{elsewhere, } {}_5m_x = {}_5\text{Deaths}_x / {}_5\text{Population}_x$$

$$(2) {}_4q_0 = {}_4m_0$$

$${}_{\infty}q_{85} = 1.000 \quad \text{elsewhere,}$$

$${}_5q_x = ({}_5m_x) / [1/n + {}_5m_x * (0.5 + n / 12 ({}_5m_x - 0.095))]$$

$$(3) {}_4l_0 = 100000$$

$$\text{elsewhere, } {}_5l_x = {}_5l_{x-5} - {}_5d_{x-5}$$

$$(4) {}_5d_x = {}_5q_x * {}_5l_x$$

$$(5) {}_5L_x = [({}_5l_x + {}_5l_{x-5}) / 2] * 5$$

$$\text{elsewhere, } {}_{\infty}l_{85} = {}_{\infty}d_{85} / {}_{\infty}m_{85}$$

$$(6) {}_5T_x = {}_5T_{x-5} + {}_5l_x$$

Where **x to x+5** is the period of life between two exact ages -- for instance, "20-25"; **q** represents the probability that a person at his **x<sup>th</sup>** birthday will die before reaching his **x+5<sup>th</sup>** birthday; **l** is the number of persons who reach the beginning of the age interval each year; **d** is the number dying during the age interval; **L** is the number of person-years that would be lived within the indicated age interval; **T** is the total number of person-years that would be lived after the beginning of the indicated age interval.

A second series of survival rates, called national census survival rates, employs life table concepts, but does not involve the actual use of life table functions in their calculation. National census survival rates essentially represent the ratio of the population in a given age group in one census to the population in the same age cohort at the previous census. National census survival rates measure mortality, but the population involved must be a closed one, i.e., there is no migration during the intercensal period.

For the purpose of this study, revised national census survival rates were produced. The step-by-step procedures for this method follow:

$$(1) \text{Est}^{1995}_x = \text{Population}^{1990}_x + {}^{1995}\text{Birth}^{1990}_x - {}^{1995}\text{Death}^{1990}_x$$

$$\text{where } \text{Population}^{1990}_x = \text{Census}^{1990}_x - \text{GQ}^{1990}_x$$

$$(2) {}_xS^{90-95} = \text{Est}^{1995}_{x+5} / \text{Population}^{1990}_x$$

Where,

**x** represents a five-year age/sex group;

**Est** is the estimated population;

**Census** represents the census enumerated population;

**GQ** is the census institutional population;

${}_xS^{90-95}$  are survival rates by age/sex group for the period from 1990-1995.

Appendix 14 describes this method in more detail.

National census survival rates cannot be calculated for 1995-2000, simply because there was no census in 1995. The 1990-1995 national census survival rates, therefore, are used in this projection based on a test using life table survival rates and national census survival rates. This test consisted of projecting Ohio's 1990 population by age/sex forward to 2000, using both survival rate methods separately, then comparing the resulting figures to the enumerated 2000 cohort populations. The results show that the projected 2000 populations derived from the national census survival rates are closer to the 2000 Census figures than projections using the life table survival rates.

Therefore, the projected deaths by age/sex groups for each five-year period were produced with the following equation:

$${}_{x+5}D_x = {}_{x+5}P_x - ({}_{x+5}P_x * {}_{x+5}S_x)$$

Where,

${}_{x+5}D_x$  is the number of deaths for the age/sex group x to x+5;

${}_{x+5}P_x$  represents the population of the age/sex group x to x+5; and

${}_{x+5}S_x$  is the survival rate for the age/sex group x to x+5.

## VI. MIGRATION

In this projection series, the migration projections were done for Ohio and each county separately. Projected migration trends are based on the most current migration data available and four critical assumptions. This section of the documentation is an explanation of the assumptions and methods employed in making migration projections. This section includes two parts: the first part outlines our migration assumptions; the second part describes the methods employed in projecting migration rates.

### **Migration Assumptions**

Ohio experienced a net loss of 63,777 persons through migration between 1990 and 2000. The migratory loss between 1980 and 1990 was 621,000 persons, which is the

second largest migratory loss in Ohio's history. The largest migratory loss was 635,700 between 1970 and 1980. The smaller migration losses reflect Ohio's improved economic and employment conditions in the early 1990's. Therefore, projected Ohio and county net migration continue an improving trend over the projected time period. The projected state migration rates change from -0.3 percent for 2000-2005 period to 0.9 percent for the 2025-2030 period (see Table 3 and Figure 1).

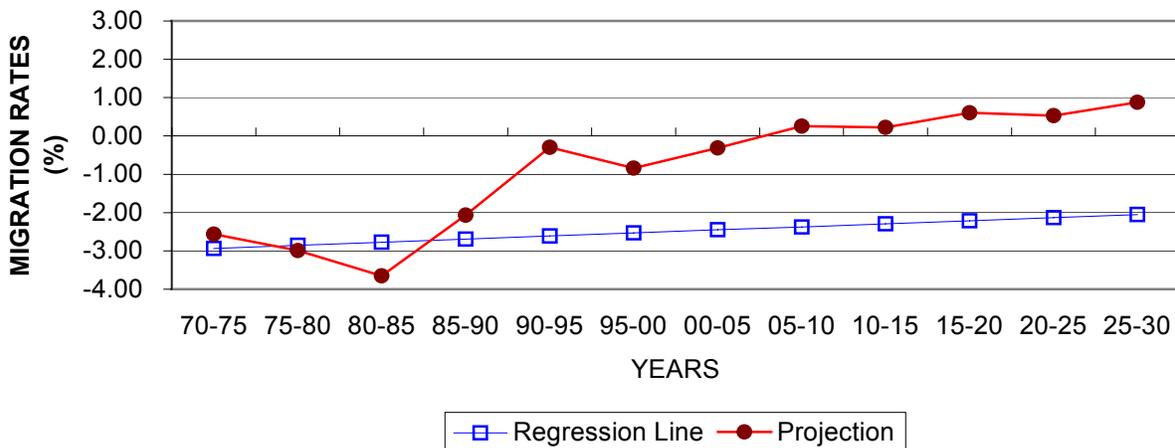
**TABLE 3**  
**PROJECTED NET MIGRATION & RATE:**  
**OHIO, 2000-2005 TO 2025-2030**

YEAR	NET MIGRATION	RATE
00-05	-34,916	-0.31 %
05-10	28,646	0.25%
10-15	25,590	0.22%
15-20	70,058	0.61%
20-25	62,093	0.53%
25-30	103,145	0.88%

Data source: Ohio Department of Development, Office of Strategic Research (JH),

**FIGURE 1**

**ESTIMATE & PROJECTED MIGRATION RATES**  
**1970 - 2030**



Assumptions concerning migration trends from 2000 to 2030 for both state and county levels are discussed below. There were four basic assumptions made for projecting future migration trends.

Assumption 1: Ohio and counties' future migration rates will follow recent historical (1970-2000) and the most current migration trends.

This is a standard projection assumption, based on the logic that the best predictor of short-term future events are the most recent past events. The use of annual Internal Revenue Service data, which provide county-to-county matched filer records for the years 1990-91 through 1999-2000 allows for the development of a recent migration trend line, to which derived residual migration rates can be applied to provide estimates of age/sex mobility. (Internal Revenue Service, Department of the Treasury, Washington, D.C.) (Appendix 15).

Past migration trends for Ohio and each Ohio county are represented by a linear regression line between the initial and terminal periods, calculated by using the migration rates from the previous three decades for each particular county. For Ohio and the forty-seven Ohio counties with small or moderate changes in migration, future migration rates were adjusted on the past thirty years' (1970-2000) migration trends. For counties with rapid increases or decreases in net migration, forty-year (1960-2000) migration trends were used for adjustment. Forty-one counties belong to this category.

Assumption 2: Population movement occurs within a complex socio-economic environment, and economic conditions create impetus for people to move. Ohio and counties' future net migration rates will vary in curvilinear fashion, in a pattern consistent with an assumed 10-year economic cycle.

Changes in migratory flow to and from Ohio coincided with the national economic cycle over the last several decades. Out-migration from Ohio tends to increase during the lowest "trough" years of recession, then lessens during the years of recovery and expansion. Compared with out-migration, in-migration has remained quite stable. Since the 1960s decade, state out-migration has, with rare exception, surpassed in-migration, resulting in a sustained net negative migration.

The association between a near decade-long economic cycle and changing out-migration volume is assumed to continue throughout the projected time period. The assumed resulting effect is that the state's net migration rate will change in a non-linear fashion.

The effect or the degree of the effect of economic cycles, however, has varied by county. Some Ohio county migratory flows have been affected strongly by the economic dynamics, while others have experienced little or no migratory change due to cyclic economic change. Future net migration rates, therefore, are projected to change in curvilinear fashion for the first group of counties, but projected to change in a linear fashion

for the group of counties with migratory flows minimally affected by economic dynamics.

Assumption 3: Projected migration rates will be more similar to most recent, rather than historical, migration trends for most Ohio counties.

After a long period (about thirty years) of migratory loss, a bottoming-out phenomenon has occurred in Ohio, especially among the counties in metropolitan areas of Ohio. In those areas, most counties had smaller migratory losses and, in some cases, migratory gains. This trend has been confirmed by the Census Bureau's county population estimates for the 1990s. Based on this data, migration rates have been projected to follow from the most recent, 1990s migration rates.

Migration rates for sixty-two Ohio counties have been adjusted by using the IRS's annual "migration" data for the 1990s. Among those sixty-two counties, the migration rates of forty-nine counties have been adjusted to above the linear regression line (which reflect the long term or historical migration trends). The migration rates of the other thirteen counties were judged to be so high as to be unsustainable and, so, were lowered to below the regression line.

Assumption 4: Ohio will have fewer out migrants because of the decreased supply of both young and female laborers.

Over the last two decades, two factors drove the enormous growth in the size of Ohio's labor force: the entry of the full, 20-year-wide baby boom cohort into the work force, and the increasing participation of women in the labor force. Slower growth lies ahead as the smaller "baby bust" generation enters its working years, and as female labor force participation rates approach those of men.

The number of young people and females who will be available to replace the growing number of older retirees will be reduced over the projected years, creating a higher potential for in-state employment. The "baby boomers" also age out of the most mobile 20-39 year-old age groups. If the smaller cohorts temporally following the baby boom migrate *at similar rates*, the absolute number of migrants will decline. So, it is expected that there will be fewer out migrants over the projection period.

### **Migration Projection Methodology**

The migration component was calculated for each county by multiplying the total county base-year population by the appropriate projected county total net migration rate. Ohio and counties' projected migration rates were based on 1990-2000 gross migration information, as well as the recent historical net migration rates for each county (1970-1990

for most of the Ohio counties and 1960-1990 for the remainder of counties). The projected net migration rates, however, will vary in a curvilinear pattern consistent with an assumed ten-year economic cycle.

Each age-sex group's net migration was held constant in proportion to the county's net migration. This proportion was established on the proportion of cohort migrants to county total migrants during 1990-2000 (Ohio and Counties Net Migration by Age and Sex, 1990-2000, The Office of Strategic Research).

The migration projections were done for the state and each Ohio county separately. Appendix 16 is a sample of the numerical and graphical migration projections for Ohio and its counties. A step-by-step procedure, consistent with the above assumptions, is outlined below:

1. Obtain a regression line. In this study, the relationship between independent variable  $x$  (projected year) and dependent variable  $y$  (migration rate) is expressed in the linear regression formula :  $Y = a + bX$

To obtain migration rates ( $y$  values) for each projected year ( $x$  values),  $a$  and  $b$  values must be calculated first by using previous migration rates. The six previous migration rates (the rates for 1970-1975, 1975-1980 ...1995-2000) were employed to calculate  $a$  and  $b$  values. The migration rates for 1960-1965 and 1965-1970 also went into the calculation for counties with relatively extreme increases or decreases in net migration.

Next, each  $x$  value (interval between the base and the projected years) was put into the regression equation to obtain the  $y$  values (migration rates). For example, the projected migration rate for 2000-2005 is obtained by setting  $x$  equal to 30 (2000-1970=30 years) into the regression equation.

In this study, the  $b$  value (regression coefficient) indicates how much the dependent variable (migration rate) changes as the independent variable (years) changes. As used, the regression line estimates the direction (up or down) of the migration trend as well as the degree of migration rate change (slope of the line).

2. Obtain projected migration rates. Since the future migration rates for Ohio and most of Ohio's counties are assumed to change in a non-linear fashion, the projected migration rates will be distributed above the regression line in those five-year periods corresponding to assumed economic cycle peaks, and below in those five-year periods corresponding to economic cycle troughs.

Most of Ohio's counties experienced high out-migration to low in-migration (a larger negative value or smaller positive value) for the period 1990-1995, associated with the early-'90s recession. As the economy recovered and began its mid-'90s expansion, these counties experienced low out-migration to high in-migration (a smaller negative value or

larger positive value).

Therefore, the estimated migration rates for 1990-1995 and 1995-2000 were used as the high (90-95) and low (95-00) points. The third point is the projected migration rate for the period 2025-2030 (the last y value). A line was drawn between the high point (the y value for 1990-95) and the third point. The y values for each x values for 2000-2005, 2010-2015 and 2020-2025 are located on this line, which shows the migration rates for the projected economic peak years. Another straight line was drawn between the low point (the y value of 1995-00) and the third point. The y values for each x values for 2005-2010 and 2015-2020 are located on this line, which show the migration rates for the projected recession years.

3. An adjustment of the migration rates was done based on gross migration rates from the end of the 1990s. The projected 2000-2005 county migration rates were forced to align with the net migration rates of the late 1990's and the estimated 2001 migration rates from the U.S. Bureau of Census. This was accomplished by adjusting the projected target (2025-2030) migration rates until the projected 2000-2005 migration rates matched the most recent migration rates, as well as the estimated 2001 migration rates.

4. Projected migration rates were then reviewed to assure that none surpassed the maximum negative migration rates from the past thirty years. The migration rates for 1990-1995 and 1995-2000 are assumed the largest ones; migration rates of the subsequent projected years are then attenuated, positioned closer and closer to the regression line as time periods move forward. This manner of adjusting the projected rates is the operationalization of our third assumption that future migration rates for Ohio counties will change in a curvilinear fashion, but more and more close to the mean of the trend (the regression line).

5. Age-Sex Cohort Net Migration. Age and sex group migration is dependent on the changing values of the county net migration rates. Each age-sex group's net migration was held constant in proportion to the county's net migration, based on the proportion of cohort migrants to county total migrants during 1990-2000 (Ohio and Counties Net Migration by Age and Sex, 1990-2000, The Office of Strategic Research, Ohio Department of Development).

6. The "plus-minus" adjustment method was used for those counties with extremely high migration proportions for some age groups or/and extremely high and low migration rates for the years of projection. The "plus-minus" method is a proportionate adjustment of a distribution to meet a control total, conforming to a least-squares adjustment of the original frequencies. The marginal total, in this case, is the county's total net migration figure. A procedure that minimizes the adjustment requires the use of two factors, one for the positive items and one for the negative items.

The formulas for the factors are as follows:

Factors for the positive migration values of  $n_i$ :  $\{ \sum |n_i| + (N - n) \} / \sum |n_i|$

Factors for the negative migration values of  $n_i$ :  $\{ \sum |n_i| - (N - n) \} / \sum |n_i|$

where  $\sum |n_i|$  represents the sum of the absolute values (i.e., without regard to sign) of the original distribution, N is the assigned total (i.e., the projected total net migration), and n is the algebraic sum of the original observations (Shryock, Pg. 546). Appendix 6 is a work sheet illustrating the adjustment procedure of the "plus-minus" method.

The "plus-minus" method was used to adjust the cohort migration proportions for the following six counties: Hardin, Jefferson, Lake, Morgan, Portage and Washington.

The state level 1990-2000 age/sex proportionate rates of migration were used for four counties -- Athens, Delaware, Franklin and Warren -- because the migration proportions for some age groups for these four counties are so high or so low that even the "plus-minus" method does not sufficiently correct them.

## VII. DATA SOURCES

The following data were used as input to the calculation program:

- 1990 and 2000 male and female population in five-year age groups, Census of Population and Housing, 1990 and 2000, U.S. Bureau of the Census;
- 1990 and 2000 male and female institutional population in five-year age groups, Census of Population and Housing, 1990 and 2000, U.S. Bureau of the Census;
- 1995 estimated population by age, sex, and county, 1996, Population Division, U.S. Bureau of the Census;
- "Student Inventory Data", 1990 and 2000, Ohio Board of Regents, Columbus, Ohio;
- Live resident births from 1990-2000 by single year, county and sex, Vital Statistics (Births), 1990-2000, Systems File Specification, Ohio Department of Health, Data Services Division;
- 1990-1995 and 1995-2000 Age-Specific Fertility Rates by county, The Office of Strategic Research, Ohio Department of Development, Columbus, Ohio, 2002;
- Resident deaths, 1990-2000 by single year, county, and sex Vital Statistics (Deaths), 1990-2000, Systems File Specification, Ohio Department of Health, Data Services Division;
- Revised National Census 1990-1995 Age/Sex-Specific Survival Rates by county, The Office of Strategic Research, Ohio Department of Development, Columbus, Ohio, 2002;
- IRS state and county migration flows, 1990-2000, Internal Revenue Service (IRS), U.S. Bureau of the Census;
- Estimated 1990-2000 age/sex-specific net migration rates and proportion of migrants, "Net Migration: Ohio and Counties, By Age, Sex and Race: 1990-2000", The Office of Strategic Research, Ohio Department of Development, Columbus, Ohio, 2002;
- "Ohio and Counties, Net Migration By Age and Sex: 1980 to 1990", Ohio Data Users Center, Ohio Department of Development, Columbus, Ohio, 1985;
- "Ohio and Counties, Net Migration By Age and Sex: 1970 to 1980", Ohio Data Users Center, Ohio Department of Development, Columbus, Ohio, 1985;
- "Net Migration of the Population, 1960-70, by Age, Sex, and Color: Part 2-- North

Central States", Economic Research Service, U.S. Department of Agriculture, Institute for Behavioral Research, University of Georgia and Research Applied to National Needs, National Science Foundation, The University of Georgia Printing Department, Athens, Georgia, 1975;

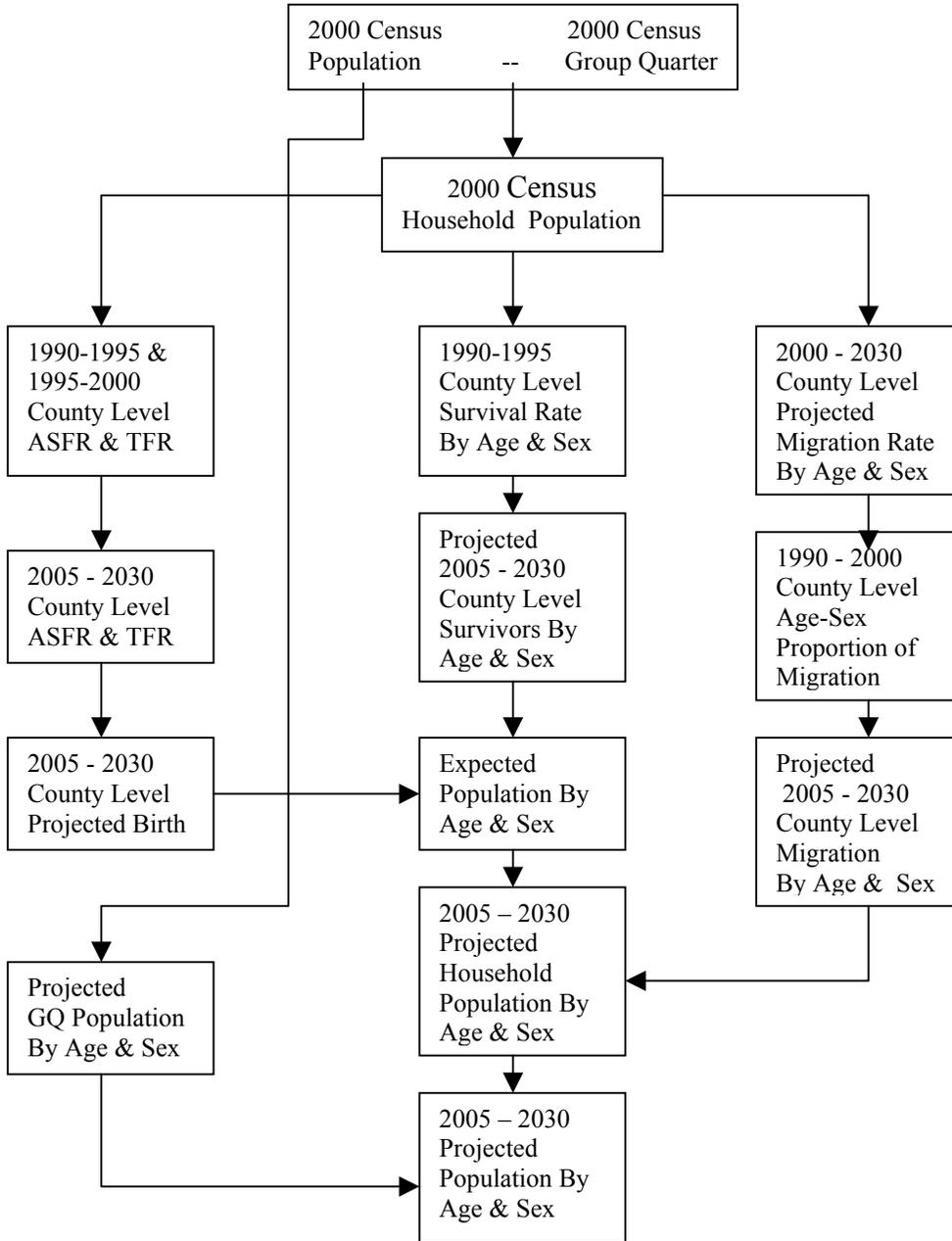
-- "Net Migration of the Population, 1950-1960", Economic Research Service, U.S. Department of Agriculture, Research Foundation, Oklahoma State University and Area Redevelopment Administration, U.S. Department of Commerce, Washington, D.C., U.S. Government Printing Office, 1965;

Projected 2000-2005 to 2025-2030 Net Migration Rates by County, The Office of Strategic Research, Ohio Department of Development, Columbus, Ohio, 2002.

# **APPENDIX**

# APPENDIX 1

## Basic Population Projection Flow Chart: 2000-2030



## APPENDIX 2

### PROJECTION INPUT DATA: OHIO

AGE COHORTS	Total Population (2000)		Group Quarter (2000)		Migration-Prop. (1990-2000)		Survival Rate (adjusted) (1990-1995)		AGE	Age-specific Fertility Rate		Mortality Proportion: (1990-2000)	
	Male	Female	Male	Female	Male	Female	Male	Female		1990-95	1995-00	Male	Female
0-4	385,231	369,699	387	374	0.021	0.013	0.9916	0.9933	15-19	0.0605	0.054	0.0041	0.0032
5-9	417,023	399,323	357	292	-0.169	-0.165	0.9958	0.9967	20-24	0.1178	0.111	0.0064	0.0049
10-14	424,906	402,905	1,345	667	-0.396	-0.352	0.9987	0.9992	25-29	0.1114	0.112	0.0026	0.0019
15-19	416,085	400,783	29,062	29,301	0.306	0.274	0.9966	0.9985	30-34	0.0763	0.082	0.0018	0.0010
20-24	363,689	365,239	33,694	22,164	0.999	0.489	0.9937	0.9977	35-39	0.0278	0.032	0.0040	0.0016
25-29	366,452	369,130	13,023	1,976	0.313	-0.110	0.9922	0.9973	40-44	0.0043	0.006	0.0067	0.0025
30-34	390,689	393,623	12,116	2,248	-0.358	-0.236	0.9915	0.9967				0.0075	0.0030
35-39	435,881	447,890	12,677	2,572	-0.275	-0.148	0.9899	0.9958				0.0075	0.0034
40-44	454,202	467,343	11,461	2,568	-0.168	0.011	0.9868	0.9936	YEAR	Migration		0.0079	0.0044
45-49	411,052	423,779	7,972	2,222	-0.070	0.070	0.9823	0.9903		Rate		0.0091	0.0055
50-54	357,926	373,627	5,345	2,028	-0.022	0.125	0.9720	0.9832	90-95	-0.0030		0.0124	0.0081
55-59	265,926	287,248	3,379	1,982	0.115	0.163	0.9547	0.9722	95-00	-0.0084		0.0198	0.0128
60-64	214,641	241,091	2,825	2,204	0.091	0.128	0.9248	0.9546	00-05	-0.0031		0.0351	0.0216
65-69	183,727	218,941	2,934	3,198	0.124	0.118	0.8878	0.9312	05-10	0.0025		0.0524	0.0339
70-74	169,083	218,501	3,884	5,440	0.128	0.091	0.8372	0.8996	10-15	0.0022		0.0632	0.0437
75-79	130,350	195,118	5,010	10,281	0.077	0.069	0.7527	0.8421	15-20	0.0061		0.0719	0.0551
80-84	77,227	138,014	5,485	15,269	-0.019	-0.021	0.6449	0.7601	20-25	0.0053		0.0704	0.0659
85+	48,172	128,624	7,713	35,666	-0.113	-0.103	0.3597	0.4165	25-30	0.0088		0.1327	0.2122
SUB TOTAL	5,512,262	5,840,878	TOTAL G.Q:		299,121								
TOTAL		11,353,140	G.Q.PROPORTION:		2.63%								

**APPENDIX 3  
PROJECTIONS OF BIRTHS, DEATHS, AND NATURAL INCREASE BY SEX,  
AGE-SPECIFIC BIRTHS AND FERTILITY RATES AND TOTAL FERTILITY RATES\*\***

**OHIO**

YEAR	BIRTHS			DEATHS		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
00-05	740,343	380,084	360,258	578,325	289,491	288,835
05-10	719,890	369,585	350,306	605,266	303,430	301,837
10-15	723,262	371,316	351,947	623,513	315,504	308,010
15-20	735,686	377,694	357,992	641,828	329,551	312,277
20-25	747,997	384,014	363,983	679,069	352,661	326,408
25-30	749,287	384,677	364,611	728,387	379,198	349,188

YEAR	NATURAL INCREASE RATE			NET MIGRANTS	TOTAL POPULATION*	NET INCREASE
	TOTAL	MALE	FEMALE			
00-05	1.5%	1.7%	1.3%	-34,916	11,501,180	1.3%
05-10	1.0%	1.2%	0.8%	28,646	11,666,854	1.4%
10-15	0.9%	1.0%	0.8%	25,590	11,816,166	1.3%
15-20	0.8%	0.9%	0.8%	70,058	12,005,732	1.6%
20-25	0.6%	0.6%	0.6%	62,093	12,164,199	1.3%
25-30	0.2%	0.1%	0.3%	103,145	12,317,612	1.3%

\*: The Total population numbers in this column may be slightly different from the numbers in the projection sheet due to rounding.

**APPENDIX 4  
PROJECTED AGE-SPECIFIC FERTILITY RATES AND BIRTHS: OHIO, 2000-2030:**

PROJECTED AGE-SPECIFIC FERTILITY RATES:

AGE	Projected Year:					
	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025	2025-2030
15-19	0.051	0.048	0.044	0.041	0.038	0.035
20-24	0.107	0.103	0.100	0.096	0.093	0.089
25-29	0.112	0.112	0.112	0.113	0.113	0.113
30-34	0.084	0.087	0.090	0.092	0.095	0.098
35-39	0.035	0.037	0.039	0.041	0.043	0.046
40-44	0.006	0.007	0.008	0.008	0.009	0.009
TFR**	395	394	393	392	391	390

PROJECTED AGE-SPECIFIC BIRTHS:

AGE	Projected Year:					
	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025	2025-2030
15-19	94,519	91,886	90,854	80,945	72,971	65,482
20-24	183,674	176,779	180,007	184,559	171,722	160,878
25-29	205,636	196,168	196,309	207,129	220,772	213,824
30-34	165,118	166,326	164,683	169,414	183,955	200,512
35-39	76,895	73,517	76,465	77,732	82,073	90,853
40-44	14,502	15,215	14,944	15,908	16,504	17,739
TOTAL	740,343	719,890	723,262	735,686	747,997	749,287

NOTE: The ASFRs and TFRs are for single year; The Age-Spec. Births are for five years.

\*\* : The total fertility rate (TFR) is the sum of the age-specific fertility rates times 1000.

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P.O. Box 1001, Columbus, Ohio 43266-0101, March, 2003

## APPENDIX 5

### PROJECTED MIGRATION BY AGE AND SEX: 2005-2030

#### OHIO

AGE COHORTS	2000-2005		2005-2010		2010-2015		2015-2020		2020-2025		2025-2030	
	NET MIGRANTS MALE	NET MIGRANTS FEMALE										
0-4	-1,226	-790	-1,022	-659	-1,032	-665	-889	-573	-915	-590	-783	-505
5-9	11,505	11,287	13,166	12,917	13,086	12,839	14,249	13,979	14,040	13,775	15,113	14,828
10-14	27,020	24,017	30,922	27,485	30,735	27,319	33,465	29,745	32,976	29,311	35,496	31,551
15-19	-18,127	-16,224	-15,114	-13,527	-15,259	-13,657	-13,151	-11,770	-13,529	-12,108	-11,583	-10,367
20-24	-59,214	-28,986	-49,371	-24,168	-49,845	-24,400	-42,959	-21,029	-44,192	-21,633	-37,835	-18,521
25-29	-18,583	7,507	-15,494	8,591	-15,643	8,539	-13,482	9,297	-13,869	9,161	-11,874	9,861
30-34	24,422	16,080	27,948	18,402	27,779	18,291	30,246	19,915	29,804	19,624	32,082	21,124
35-39	18,787	10,112	21,500	11,573	21,370	11,502	23,268	12,524	22,928	12,341	24,680	13,284
40-44	11,483	-626	13,142	-522	13,062	-527	14,222	-454	14,014	-467	15,085	-400
45-49	4,781	-4,180	5,471	-3,486	5,438	-3,519	5,921	-3,033	5,835	-3,120	6,281	-2,671
50-54	1,475	-7,416	1,688	-6,183	1,677	-6,242	1,827	-5,380	1,800	-5,534	1,937	-4,738
55-59	-6,828	-9,645	-5,693	-8,042	-5,748	-8,119	-4,954	-6,997	-5,096	-7,198	-4,363	-6,163
60-64	-5,418	-7,606	-4,518	-6,342	-4,561	-6,403	-3,931	-5,518	-4,044	-5,677	-4,462	-4,860
65-69	-7,331	-6,988	-6,112	-5,827	-6,171	-5,882	-5,318	-5,070	-5,471	-5,215	-4,684	-4,465
70-74	-7,593	-5,416	-6,331	-4,516	-6,392	-4,559	-5,509	-3,929	-5,667	-4,042	-4,852	-3,461
75-79	-4,587	-4,067	-3,824	-3,391	-3,861	-3,423	-3,327	-2,950	-3,423	-3,035	-2,931	-2,599
80-84	1,302	1,457	1,490	1,668	1,481	1,658	1,613	1,805	1,589	1,778	1,711	1,914
85+	7,682	7,018	8,791	8,032	8,738	7,983	9,514	8,692	9,375	8,565	10,091	9,220
<b>SUBTOTAL</b>	<b>-20,450</b>	<b>-14,466</b>	<b>16,640</b>	<b>12,006</b>	<b>14,856</b>	<b>10,734</b>	<b>40,804</b>	<b>29,254</b>	<b>36,157</b>	<b>25,936</b>	<b>60,111</b>	<b>43,034</b>
<b>TOTAL</b>		<b>-34,916</b>		<b>28,646</b>		<b>25,590</b>		<b>70,058</b>		<b>62,093</b>		<b>103,145</b>

AGE COHORTS	2000-2005		2005-2010		2010-2015		2015-2020		2020-2025		2025-2030	
	MIGRATION RATE MALE	MIGRATION RATE FEMALE										
0-4	-0.3%	-0.2%	-0.3%	-0.2%	-0.3%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.1%
5-9	3.0%	3.1%	3.5%	3.6%	3.6%	3.7%	3.9%	4.0%	3.8%	3.8%	4.0%	4.1%
10-14	6.5%	6.0%	7.8%	7.3%	7.9%	7.4%	8.9%	8.3%	8.7%	7.5%	9.2%	8.6%
15-19	-4.3%	-4.0%	-3.4%	-3.2%	-3.6%	-3.4%	-3.2%	-3.0%	-3.3%	-3.2%	-2.8%	-2.7%
20-24	-15.4%	-7.8%	-12.3%	-6.3%	-11.8%	-6.0%	-10.6%	-5.4%	-11.0%	-5.8%	-9.6%	-4.9%
25-29	-5.7%	2.2%	-4.8%	2.5%	-4.5%	2.4%	-3.6%	2.4%	-3.9%	2.3%	-3.4%	2.7%
30-34	7.0%	4.4%	9.1%	5.3%	9.1%	5.3%	9.1%	5.4%	8.4%	5.1%	9.3%	5.6%
35-39	5.0%	2.6%	5.8%	3.0%	6.5%	3.1%	7.1%	3.4%	6.4%	3.3%	6.5%	3.3%
40-44	2.7%	-0.1%	3.4%	-0.1%	3.4%	-0.1%	4.1%	-0.1%	4.0%	-0.1%	4.0%	-0.1%
45-49	1.1%	-0.9%	1.3%	-0.8%	1.4%	-0.9%	1.5%	-0.8%	1.6%	-0.8%	1.8%	-0.7%
50-54	0.4%	-1.8%	0.4%	-1.4%	0.4%	-1.5%	0.5%	-1.4%	0.5%	-1.5%	0.6%	-1.3%
55-59	-2.0%	-2.7%	-1.5%	-2.0%	-1.4%	-1.9%	-1.2%	-1.7%	-1.4%	-1.8%	-1.2%	-1.7%
60-64	-2.2%	-2.8%	-1.5%	-1.9%	-1.3%	-1.7%	-1.1%	-1.4%	-1.1%	-1.4%	-1.0%	-1.4%
65-69	-3.9%	-3.1%	-2.9%	-2.4%	-2.3%	-1.9%	-1.8%	-1.5%	-1.7%	-1.6%	-1.5%	-1.3%
70-74	-5.0%	-2.8%	-4.2%	-2.3%	-3.7%	-2.1%	-2.5%	-1.5%	-2.3%	-1.5%	-1.8%	-1.1%
75-79	-3.7%	-2.3%	-3.5%	-2.1%	-3.5%	-2.1%	-2.7%	-1.7%	-2.1%	-1.7%	-1.6%	-1.0%
80-84	1.6%	1.0%	1.9%	1.3%	2.2%	1.4%	2.4%	1.5%	2.0%	1.5%	1.7%	1.1%
85+	19.0%	7.8%	18.8%	8.1%	18.1%	7.9%	21.0%	9.1%	21.0%	8.2%	21.0%	9.3%
<b>SUBTOTAL</b>	<b>-0.4%</b>	<b>-0.3%</b>	<b>0.3%</b>	<b>0.2%</b>	<b>0.3%</b>	<b>0.2%</b>	<b>0.7%</b>	<b>0.5%</b>	<b>0.6%</b>	<b>0.4%</b>	<b>1.0%</b>	<b>0.7%</b>
<b>TOTAL</b>		<b>-0.3%</b>		<b>0.3%</b>		<b>0.2%</b>		<b>0.6%</b>		<b>0.5%</b>		<b>0.9%</b>

Note: The cohort totals may not add to total population due to rounding. Technical documentation is available upon request.  
 Issued by: Ohio Department of Development, Office of Strategic Research (JH), P.O. Box 1001, Columbus, Ohio 43266-0101, March, 2003

**APPENDIX 6**

**MIGRATION PROPORTION ADJUSTMENT (PLUS-MINUS METHOD)**

County: MORGAN

**Migration Adjustment (Plus-Minus Method):**

	Migration 1990-2000		absolute 1990-2000		Migration 2000-2005		Migration 2005-2010		Migration 2010-2015		Migration 2015-2020		Migration 2020-2025		Migration 2025-2030	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
<b>Input Data:</b>	*	*														
<b>0-4</b>	12	26	12	26	11	23	10	22	12	26	11	25	12	27	12	26
<b>5-9</b>	34	79	34	79	31	71	29	68	34	78	33	77	35	81	35	80
<b>10-14</b>	49	62	49	62	44	56	42	53	49	61	47	60	50	64	49	63
<b>15-19</b>	-17	-40	17	40	-19	-44	-19	-46	-17	-40	-18	-41	-17	-39	-17	-40
<b>20-24</b>	-196	-236	196	236	-216	-260	-223	-269	-197	-238	-202	-243	-190	-229	-194	-233
<b>25-29</b>	-141	-98	141	98	-155	-108	-160	-111	-142	-98	-145	-101	-136	-95	-139	-97
<b>30-34</b>	78	61	78	61	70	55	67	53	77	61	75	59	80	63	79	62
<b>35-39</b>	89	46	89	46	80	41	77	40	88	46	86	45	92	47	90	46
<b>40-44</b>	49	44	49	44	44	40	42	38	49	44	47	43	50	46	49	45
<b>45-49</b>	66	35	66	35	59	31	57	30	66	35	64	34	68	36	67	35
<b>50-54</b>	82	58	82	58	74	52	71	50	81	57	79	56	84	60	83	58
<b>55-59</b>	65	48	65	48	58	43	56	41	64	47	63	46	67	49	66	48
<b>60-64</b>	97	72	97	72	87	65	84	62	97	71	94	70	100	74	98	73
<b>65-69</b>	95	70	95	70	85	63	82	60	94	70	92	68	98	72	96	71
<b>70-74</b>	42	23	42	23	38	21	36	20	42	23	41	22	43	24	42	23
<b>75-79</b>	9	-3	9	3	8	-3	8	-3	9	-3	9	-3	9	-3	9	-3
<b>80-84</b>	-8	8	8	8	-9	7	-9	7	-8	8	-8	8	-8	9	-8	8
<b>85 +</b>	-67	-4	67	4	-74	-5	-76	-5	-68	-4	-69	-4	-65	-4	-66	-4
<b>Subtotal:</b>					215	147	172	111	330	245	300	220	373	282	351	262
<b>Total:</b>	587	589		2208		362		283		574		520		655		613

Projection Years:                    00-05   05-10   10-15   15-20   20-25   25-30

Projected total migration:	365	286	576	522	657	615
(Proj. total - Real Total(-1) ):	-224	-303	-13	-67	68	26
factor for "+" items:	0.89831	0.86255	0.99432	0.96969	1.031	1.0119
factor for "-" items:	1.10169	1.13745	1.00568	1.03031	0.969	0.9881

**APPENDIX 7**

**TOTAL BIRTHS OF 1980-1985, 1985-1990, 1990-1995, 1995-2000  
OHIO AND COUNTIES**

<b>County Name</b>	<b>Births 1980-85</b>	<b>Births 1985-90</b>	<b>Births 1990-95</b>	<b>Births 1995-00</b>	<b>County Name</b>	<b>Births 1980-85</b>	<b>Births 1985-90</b>	<b>Births 1990-95</b>	<b>Births 1995-00</b>
<b>OHIO</b>	<b>814,670</b>	<b>802,130</b>	<b>804,899</b>	<b>762,003</b>	LAWRENCE	4,748	4,239	4,176	3,771
UNKNOW			1	41	LICKING	9,140	8,934	9,010	9,652
ADAMS	1,899	1,799	1,827	1,868	LOGAN	3,066	3,036	3,325	3,201
ALLEN	8,929	8,648	8,158	7,566	LORAIN	20,387	19,761	20,587	19,352
ASHLAND	3,612	3,226	3,288	3,343	LUCAS	37,432	38,850	37,551	32,622
ASHTABULA	7,514	7,375	6,950	6,568	MADISON	2,493	2,485	2,688	2,510
ATHENS	3,878	3,360	3,295	3,050	MAHONING	19,316	17,243	17,864	15,514
AUGLAIZE	3,828	3,562	3,307	3,025	MARION	5,152	4,829	4,584	4,100
BELMONT	5,262	4,486	4,042	3,499	MEDINA	8,597	8,234	8,801	9,449
BROWN	2,592	2,565	2,702	2,772	MEIGS	1,713	1,548	1,422	1,339
BUTLER	20,189	20,572	21,792	22,752	MERCER	3,644	3,396	3,213	2,950
CARROLL	1,805	1,821	1,613	1,560	MIAMI	6,647	6,415	6,382	6,252
CHAMPAIGN	2,528	2,356	2,420	2,508	MONROE	1,070	947	819	759
CLARK	11,044	10,473	10,293	9,551	MONTGOMERY	44,412	44,852	43,521	39,005
CLERMONT	11,995	11,978	12,706	12,986	MORGAN	1,126	1,026	932	873
CLINTON	2,714	2,570	2,563	2,933	MORROW	2,000	1,951	2,023	1,942
COLUMBIANA	8,047	7,440	7,149	6,548	MUSKINGUM	6,590	6,109	5,951	5,768
COSHOCTON	2,800	2,545	2,354	2,218	NOBLE	964	818	714	664
CRAWFORD	3,687	3,480	3,122	3,010	OTTAWA	2,780	2,475	2,327	2,121
CUYAHOGA	106,713	108,434	109,714	96,522	PAULDING	1,706	1,444	1,253	1,107
DARKE	4,060	3,857	3,595	3,496	PERRY	2,595	2,296	2,426	2,519
DEFIANCE	3,264	2,920	2,590	2,619	PICKAWAY	3,026	3,080	3,193	3,055
DELAWARE	3,967	4,337	4,770	6,396	PIKE	1,788	1,777	1,862	1,822
ERIE	5,743	5,463	5,317	4,878	PORTAGE	9,968	9,339	9,384	8,961
FAIRFIELD	6,685	6,648	7,223	8,217	PREBLE	2,743	2,713	2,471	2,553
FAYETTE	2,052	1,934	1,883	1,879	PUTNAM	3,209	3,011	2,794	2,469
FRANKLIN	71,219	77,178	82,175	81,071	RICHLAND	9,480	8,983	8,860	8,434
FULTON	3,079	2,872	2,837	2,820	ROSS	4,703	4,441	4,533	4,639
GALLIA	2,333	2,115	2,091	1,968	SANDUSKY	5,088	4,583	4,426	4,177
GEAUGA	5,584	5,987	5,974	5,957	SCIOTO	6,365	5,457	5,298	5,300
GREENE	9,261	8,684	8,671	8,369	SENECA	4,944	4,375	4,164	3,727
GUERNSEY	3,340	2,754	2,766	2,726	SHELBY	3,796	3,500	3,623	3,545
HAMILTON	70,211	71,301	67,838	61,045	STARK	26,885	25,735	25,935	24,163
HANCOCK	5,029	5,009	5,016	4,706	SUMMIT	36,539	35,879	38,190	36,224
HARDIN	2,324	2,048	2,040	2,042	TRUMBULL	16,734	15,340	15,112	13,745
HARRISON	1,142	932	949	852	TUSCARAWAS	6,514	5,922	5,881	5,930
HENRY	2,354	2,214	2,044	1,939	UNION	2,351	2,331	2,422	2,774
HIGHLAND	2,559	2,503	2,615	2,807	VAN WERT	2,273	2,068	1,970	1,798
HOCKING	1,856	1,768	1,771	1,760	VINTON	835	817	907	858
HOLMES	3,382	3,664	3,897	4,277	WARREN	7,606	8,174	8,982	10,590
HURON	4,493	4,548	4,565	4,480	WASHINGTON	4,656	4,168	4,139	3,760
JACKSON	2,344	2,192	2,128	2,204	WAYNE	8,224	8,055	8,042	7,975
JEFFERSON	5,508	4,700	4,393	3,911	WILLIAMS	2,961	2,687	2,544	2,357
KNOX	3,288	2,921	3,157	3,256	WOOD	7,631	7,360	7,056	6,796
LAKE	14,782	14,604	14,431	13,470	WYANDOT	1,878	1,604	1,510	1,416

Data Source: Vital Statistics, Annual Report, Births and Deaths: 1980-2000, Ohio Department of Health.

**APPENDIX 8**

**TOTAL DEATHS OF 1980-1985, 1985-1990, 1990-1995, 1995-2000  
OHIO AND COUNTIES**

<b>County Name</b>	<b>Deaths 1980-85</b>	<b>Deaths 1985-90</b>	<b>Deaths 1990-95</b>	<b>Deaths 1995-00</b>	<b>County Name</b>	<b>Deaths 1980-85</b>	<b>Deaths 1985-90</b>	<b>Deaths 1990-95</b>	<b>Deaths 1995-00</b>
OHIO	483,624	495,598	503,997	530,815	LAWRENCE	3,170	3,254	3,305	3,432
UNKNOWN			12	37	LICKING	5,266	5,354	5,703	6,251
ADAMS	1,303	1,290	1,340	1,452	LOGAN	2,023	2,072	2,191	2,346
ALLEN	4,863	5,081	5,051	5,318	LORAIN	9,857	10,612	11,372	12,060
ASHLAND	1,966	2,089	2,160	2,447	LUCAS	23,028	22,546	22,239	22,576
ASHTABULA	4,756	5,093	5,245	5,403	MADISON	1,427	1,434	1,476	1,679
ATHENS	2,210	2,184	2,191	2,376	MAHONING	15,107	15,163	15,393	16,007
AUGLAIZE	1,930	1,935	2,032	2,248	MARION	2,908	3,132	3,089	3,192
BELMONT	4,525	4,557	4,505	4,543	MEDINA	3,557	3,849	4,293	4,938
BROWN	1,517	1,578	1,724	1,892	MEIGS	1,195	1,307	1,256	1,370
BUTLER	9,695	10,812	11,128	12,498	MERCER	1,584	1,539	1,736	1,765
CARROLL	1,091	1,075	1,224	1,274	MIAMI	3,910	4,023	4,076	4,417
CHAMPAIGN	1,552	1,511	1,693	1,810	MONROE	776	848	803	911
CLARK	7,347	7,365	7,574	8,021	MONTGOMERY	24,224	25,554	25,808	27,585
CLERMONT	4,292	4,866	5,437	6,139	MORGAN	766	785	791	834
CLINTON	1,665	1,715	1,645	1,778	MORROW	997	1,031	1,110	1,164
COLUMBIANA	5,787	5,614	5,615	5,934	MUSKINGUM	4,273	4,180	4,185	4,481
COSHOCTON	1,762	1,778	1,857	2,011	NOBLE	617	566	528	564
CRAWFORD	2,482	2,375	2,499	2,598	OTTAWA	1,904	1,945	2,053	2,098
CUYAHOGA	78,634	77,978	76,563	75,996	PAULDING	796	877	803	890
DARKE	2,521	2,642	2,686	2,671	PERRY	1,538	1,526	1,509	1,685
DEFIANCE	1,465	1,631	1,575	1,630	PICKAWAY	1,701	1,818	1,951	2,161
DELAWARE	2,018	2,172	2,266	2,674	PIKE	1,196	1,180	1,283	1,525
ERIE	3,480	3,646	3,746	4,079	PORTAGE	4,322	4,506	4,812	5,307
FAIRFIELD	3,714	3,972	4,271	4,652	PREBLE	1,548	1,640	1,706	1,747
FAYETTE	1,438	1,528	1,622	1,699	PUTNAM	1,246	1,345	1,373	1,444
FRANKLIN	33,749	35,771	36,640	39,844	RICHLAND	5,464	5,672	5,823	6,379
FULTON	1,470	1,549	1,593	1,760	ROSS	3,113	3,050	3,312	3,448
GALLIA	1,398	1,496	1,482	1,600	SANDUSKY	2,658	2,691	2,882	3,035
GEAUGA	2,346	2,528	2,732	3,091	SCIOTO	4,747	4,717	4,703	4,796
GREENE	3,980	4,500	5,009	5,562	SENECA	2,556	2,592	2,728	2,745
GUERNSEY	2,317	2,145	2,184	2,269	SHELBY	1,665	1,766	1,678	1,910
HAMILTON	42,240	42,076	41,579	42,241	STARK	17,169	17,821	18,165	18,819
HANCOCK	2,655	2,757	2,788	3,055	SUMMIT	24,523	24,303	24,818	26,025
HARDIN	1,497	1,493	1,516	1,553	TRUMBULL	10,385	10,764	11,164	11,908
HARRISON	948	1,006	1,033	997	TUSCARAWAS	4,439	4,399	4,446	4,584
HENRY	1,269	1,302	1,282	1,364	UNION	1,213	1,303	1,319	1,387
HIGHLAND	1,835	1,850	1,855	2,091	VAN WERT	1,406	1,492	1,412	1,532
HOCKING	1,206	1,235	1,250	1,348	VINTON	544	567	611	647
HOLMES	990	1,130	1,193	1,258	WARREN	3,303	3,817	4,103	4,870
HURON	2,271	2,449	2,440	2,554	WASHINGTON	2,906	2,940	3,024	3,294
JACKSON	1,801	1,615	1,700	1,772	WAYNE	3,615	4,022	4,136	4,677
JEFFERSON	4,864	4,922	4,757	5,015	WILLIAMS	1,505	1,636	1,662	1,728
KNOX	2,217	2,357	2,413	2,698	WOOD	3,658	3,856	4,076	4,313
LAKE	7,603	8,301	8,804	9,838	WYANDOT	1,150	1,135	1,180	1,199

Data Source: Vital Statistics, Annual Report, Births and Deaths: 1980-2000, Ohio Department of Health.

**APPENDIX 9**  
**TOTAL, GROUP QUARTER, AND HOUSEHOLD POPULATIONS**  
**OHIO AND COUNTIES: 1990 AND 2000**

County Name	Total Population	Group Quarter	Household Population	Total Population	Group Quarter	Household Population	County Name	Total Population	Group Quarter	Household Population	Total Population	Group Quarter	Household Population
	1990	1990	1990	2000	2000	2000		1990	1990	1990	2000	2000	2000
<b>OHIO</b>	<b>10,847,115</b>	<b>261,451</b>	<b>10,585,664</b>	<b>11,353,140</b>	<b>299,121</b>	<b>11,054,019</b>	LAWRENCE	61,834	683	61,151	62,319	618	61,701
ADAMS	25,371	373	24,998	27,330	342	26,988	LICKING	128,300	3,297	125,003	145,491	3,255	142,236
ALLEN	109,755	5,032	104,723	108,473	6,113	102,360	LOGAN	42,310	529	41,781	46,005	585	45,420
ASHLAND	47,507	1,938	45,569	52,523	2,228	50,295	LORAIN	271,126	5,963	265,163	284,664	8,484	276,180
ASHTABULA	99,821	1,892	97,929	102,728	1,765	100,963	LUCAS	462,361	7,937	454,424	455,054	8,896	446,158
ATHENS	59,549	8,646	50,903	62,223	8,238	53,985	MADISON	37,068	4,221	32,847	40,213	4,426	35,787
AUGLAIZE	44,585	551	44,034	46,611	1,101	45,510	MAHONING	264,806	4,607	260,199	257,555	7,247	250,308
BELMONT	71,074	1,042	70,032	70,226	3,148	67,078	MARION	64,274	2,641	61,633	66,217	4,658	61,559
BROWN	34,966	443	34,523	42,285	453	41,832	MEDINA	122,354	1,281	121,073	151,095	1,519	149,576
BUTLER	291,479	11,205	280,274	332,807	11,247	321,560	MEIGS	22,987	257	22,730	23,072	232	22,840
CARROLL	26,521	464	26,057	28,836	366	28,470	MERCER	39,443	515	38,928	40,924	519	40,405
CHAMPAIGN	36,019	596	35,423	38,890	680	38,210	MIAMI	93,182	836	92,346	98,868	1,399	97,469
CLARK	147,548	3,977	143,571	144,742	3,917	140,825	MONROE	15,497	167	15,330	15,180	144	15,036
CLERMONT	150,187	1,265	148,922	177,977	1,465	176,512	MONTGOMER	573,809	11,089	562,720	559,062	15,607	543,455
CLINTON	35,415	843	34,572	40,543	1,002	39,541	MORGAN	14,194	251	13,943	14,897	185	14,712
COLUMBIANA	108,276	1,063	107,213	112,075	3,764	108,311	MORROW	27,749	250	27,499	31,628	371	31,257
COSHOCTON	35,427	505	34,922	36,655	464	36,191	MUSKINGUM	82,068	1,890	80,178	84,585	2,474	82,111
CRAWFORD	47,870	540	47,330	46,966	609	46,357	NOBLE	11,336	156	11,180	14,058	2,214	11,844
CUYAHOGA	1,412,140	24,081	1,388,059	1,393,978	30,178	1,363,800	OTTAWA	40,029	554	39,475	40,985	637	40,348
DARKE	53,619	951	52,668	53,309	954	52,355	PAULDING	20,488	136	20,352	20,293	125	20,168
DEFIANCE	39,350	743	38,607	39,500	605	38,895	PERRY	31,557	307	31,250	34,078	293	33,785
DELAWARE	66,929	2,719	64,210	109,989	2,727	107,262	PICKAWAY	48,255	5,830	42,425	52,727	6,497	46,230
ERIE	76,779	1,223	75,556	79,551	1,868	77,683	PIKE	24,249	455	23,794	27,695	484	27,211
FAIRFIELD	103,461	2,497	100,964	122,759	2,591	120,168	PORTAGE	142,585	8,777	133,808	152,061	7,552	144,509
FAYETTE	27,466	523	26,943	28,433	650	27,783	PREBLE	40,113	391	39,722	42,337	489	41,848
FRANKLIN	961,437	25,317	936,120	1,068,978	22,106	1,046,872	PUTNAM	33,819	392	33,427	34,726	460	34,266
FULTON	38,498	382	38,116	42,084	430	41,654	RICHLAND	126,137	3,639	122,498	128,852	6,460	122,392
GALLIA	30,954	1,060	29,894	31,069	945	30,124	ROSS	69,330	5,667	63,663	73,345	5,429	67,916
GEAUGA	81,129	844	80,285	90,895	1,047	89,848	SANDUSKY	61,963	1,014	60,949	61,792	1,017	60,775
GREENE	136,731	6,394	130,337	147,886	7,781	140,105	SCIOTO	80,327	3,436	76,891	79,195	3,425	75,770
GUERNSEY	39,024	809	38,215	40,792	507	40,285	SENECA	59,733	1,970	57,763	58,683	1,658	57,025
HAMILTON	866,228	20,349	845,879	845,303	18,974	826,329	SHELBY	44,915	751	44,164	47,910	665	47,245
HANCOCK	65,536	1,217	64,319	71,295	1,728	69,567	STARK	367,585	7,913	359,672	378,098	8,933	369,165
HARDIN	31,111	1,855	29,256	31,945	1,915	30,030	SUMMIT	514,990	7,926	507,064	542,899	9,144	533,755
HARRISON	16,085	270	15,815	15,856	271	15,585	TRUMBULL	227,813	2,260	225,553	225,116	4,088	221,028
HENRY	29,108	556	28,552	29,210	579	28,631	TUSCARAWAS	84,090	1,047	83,043	90,914	1,163	89,751
HIGHLAND	35,728	442	35,286	40,875	426	40,449	UNION	31,969	1,838	30,131	40,909	2,181	38,728
HOCKING	25,533	626	24,907	28,241	725	27,516	VAN WERT	30,464	438	30,026	29,659	464	29,195
HOLMES	32,849	966	31,883	38,943	911	38,032	VINTON	11,098	112	10,986	12,806	140	12,666
HURON	56,240	505	55,735	59,487	579	58,908	WARREN	113,909	4,251	109,658	158,383	6,384	151,999
JACKSON	30,230	358	29,872	32,641	438	32,203	WASHINGTON	62,254	1,546	60,708	63,251	1,727	61,524
JEFFERSON	80,298	1,645	78,653	73,894	2,104	71,790	WAYNE	101,461	3,017	98,444	111,564	3,261	108,303
KNOX	47,473	3,126	44,347	54,500	3,462	51,038	WILLIAMS	36,956	383	36,573	39,188	1,083	38,105
LAKE	215,499	2,190	213,309	227,511	2,900	224,611	WOOD	113,269	8,367	104,902	121,065	7,781	113,284
							WYANDOT	22,254	441	21,813	22,908	445	22,463

Source: Census of Population: 1990 and 2000, U.S. Department of Commerce, Bureau of the Census.

## APPENDIX 10

### ESTIMATED ASFR\*s AND TFR\*\*s: OHIO & COUNTIES, 1990-1995

County Name	ASFR 15-19	ASFR 20-24	ASFR 25-29	ASFR 30-34	ASFR 35-39	ASFR 40-44 (5 year)	TFR	County Name	ASFR 15-19	ASFR 20-24	ASFR 25-29	ASFR 30-34	ASFR 35-39	ASFR 40-44 (5 year)	TFR
<b>OHIO</b>	<b>0.0605</b>	<b>0.1178</b>	<b>0.1114</b>	<b>0.0763</b>	<b>0.0278</b>	<b>0.0043</b>	<b>1991</b>	LAWRENCE	0.0697	0.1564	0.0936	0.0435	0.0149	0.0020	1900
ADAMS	0.0823	0.1632	0.0952	0.0474	0.0127	0.0029	2019	LICKING	0.0513	0.1351	0.1146	0.0670	0.0237	0.0031	1974
ALLEN	0.0775	0.1523	0.1195	0.0690	0.0212	0.0036	2215	LOGAN	0.0694	0.1760	0.1207	0.0615	0.0190	0.0028	2247
ASHLAND	0.0503	0.1434	0.1200	0.0680	0.0257	0.0071	2073	LORAIN	0.0633	0.1280	0.1140	0.0764	0.0266	0.0042	2062
ASHTABULA	0.0624	0.1543	0.1082	0.0601	0.0223	0.0038	2056	LUCAS	0.0763	0.1242	0.1109	0.0762	0.0281	0.0042	2099
ATHENS	0.0622	0.0538	0.0880	0.0550	0.0213	0.0056	1429	MADISON	0.0636	0.1647	0.1183	0.0655	0.0240	0.0033	2197
AUGLAIZE	0.0461	0.1532	0.1382	0.0728	0.0213	0.0034	2175	MAHONING	0.0628	0.1185	0.1111	0.0762	0.0296	0.0046	2014
BELMONT	0.0517	0.1328	0.1050	0.0576	0.0190	0.0027	1844	MARION	0.0786	0.1623	0.1128	0.0546	0.0160	0.0024	2133
BROWN	0.0666	0.1737	0.1083	0.0549	0.0173	0.0028	2118	MEDINA	0.0259	0.0956	0.1349	0.0931	0.0300	0.0045	1920
BUTLER	0.0591	0.0952	0.1128	0.0763	0.0249	0.0034	1858	MEIGS	0.0642	0.1608	0.0908	0.0452	0.0131	0.0025	1883
CARROLL	0.0508	0.1451	0.0992	0.0519	0.0209	0.0036	1858	MERCER	0.0373	0.1475	0.1728	0.0969	0.0254	0.0075	2438
CHAMPAIGN	0.0524	0.1500	0.1163	0.0540	0.0141	0.0030	1949	MIAMI	0.0496	0.1447	0.1134	0.0681	0.0200	0.0030	1994
CLARK	0.0758	0.1421	0.1123	0.0562	0.0198	0.0025	2043	MONROE	0.0398	0.1379	0.0984	0.0509	0.0183	0.0028	1741
CLERMONT	0.0573	0.1305	0.1223	0.0746	0.0263	0.0041	2076	MONTGOMERY	0.0672	0.1164	0.1108	0.0747	0.0263	0.0036	1995
CLINTON	0.0587	0.1461	0.1161	0.0546	0.0189	0.0021	1983	MORGAN	0.0636	0.1733	0.1078	0.0480	0.0154	0.0032	2056
COLUMBIANA	0.0555	0.1488	0.1093	0.0609	0.0191	0.0028	1982	MORROW	0.0566	0.1577	0.1273	0.0572	0.0197	0.0032	2109
COSHOCTON	0.0557	0.1613	0.1081	0.0550	0.0223	0.0037	2031	MUSKINGUM	0.0697	0.1543	0.1043	0.0583	0.0197	0.0027	2045
CRAWFORD	0.0586	0.1498	0.1098	0.0528	0.0176	0.0018	1952	NOBLE	0.0540	0.1699	0.0979	0.0522	0.0170	0.0041	1976
CUYAHOGA	0.0690	0.1141	0.1087	0.0896	0.0363	0.0058	2117	OTTAWA	0.0426	0.1258	0.1066	0.0676	0.0247	0.0021	1847
DARKE	0.0442	0.1493	0.1272	0.0592	0.0198	0.0038	2017	PAULDING	0.0527	0.1448	0.0982	0.0410	0.0149	0.0014	1765
DEFIANCE	0.0529	0.1353	0.1113	0.0570	0.0215	0.0031	1906	PERRY	0.0760	0.1668	0.1126	0.0520	0.0187	0.0028	2144
DELAWARE	0.0340	0.1006	0.1048	0.0840	0.0303	0.0043	1789	PICKAWAY	0.0627	0.1506	0.1194	0.0623	0.0217	0.0030	2099
ERIE	0.0559	0.1342	0.1177	0.0733	0.0230	0.0028	2034	PIKE	0.0853	0.1689	0.0972	0.0428	0.0163	0.0028	2066
FAIRFIELD	0.0487	0.1202	0.1231	0.0754	0.0221	0.0031	1963	PORTAGE	0.0421	0.0718	0.1103	0.0738	0.0276	0.0040	1648
FAYETTE	0.0677	0.1700	0.0937	0.0558	0.0163	0.0028	2032	PREBLE	0.0508	0.1376	0.1025	0.0539	0.0154	0.0015	1809
FRANKLIN	0.0693	0.0951	0.0986	0.0813	0.0320	0.0050	1906	PUTNAM	0.0390	0.1275	0.1736	0.1016	0.0309	0.0046	2387
FULTON	0.0391	0.1393	0.1424	0.0719	0.0216	0.0028	2085	RICHLAND	0.0686	0.1456	0.1142	0.0671	0.0221	0.0038	2107
GALLIA	0.0742	0.1540	0.0946	0.0541	0.0164	0.0028	1980	ROSS	0.0690	0.1559	0.1015	0.0478	0.0156	0.0028	1963
GEAUGA	0.0273	0.0695	0.0447	0.0209	0.0055	0.0008	843	SANDUSKY	0.0587	0.1441	0.1209	0.0670	0.0203	0.0025	2068
GREENE	0.0369	0.0905	0.1125	0.0774	0.0269	0.0042	1742	SCIOTO	0.0830	0.1586	0.0930	0.0424	0.0126	0.0025	1960
GUERNSEY	0.0675	0.1749	0.1069	0.0550	0.0160	0.0026	2114	SENECA	0.0589	0.1424	0.1254	0.0645	0.0222	0.0039	2086
HAMILTON	0.0716	0.1031	0.1054	0.0855	0.0348	0.0056	2030	SHELBY	0.0611	0.1517	0.1399	0.0731	0.0230	0.0042	2265
HANCOCK	0.0523	0.1312	0.1283	0.0770	0.0226	0.0033	2074	STARK	0.0562	0.1255	0.1177	0.0755	0.0269	0.0037	2027
HARDIN	0.0591	0.1206	0.1018	0.0592	0.0206	0.0053	1833	SUMMIT	0.0570	0.1050	0.1134	0.0834	0.0305	0.0044	1968
HARRISON	0.0506	0.1827	0.1002	0.0483	0.0116	0.0020	1977	TRUMBULL	0.0509	0.1251	0.1132	0.0703	0.0254	0.0040	1945
HENRY	0.0462	0.1413	0.1391	0.0701	0.0203	0.0043	2107	TUSCARAWAS	0.0519	0.1433	0.1192	0.0662	0.0206	0.0035	2023
HIGHLAND	0.0732	0.1661	0.1097	0.0504	0.0180	0.0035	2104	UNION	0.0535	0.1561	0.1223	0.0675	0.0246	0.0034	2136
HOCKING	0.0747	0.1551	0.1041	0.0476	0.0187	0.0024	2013	VAN WERT	0.0427	0.1416	0.1228	0.0645	0.0159	0.0034	1955
HOLMES	0.0280	0.1859	0.1922	0.1518	0.0676	0.0217	3235	VINTON	0.0754	0.2018	0.1068	0.0468	0.0144	0.0025	2239
HURON	0.0645	0.1526	0.1307	0.0625	0.0232	0.0033	2185	WARREN	0.0402	0.1173	0.1234	0.0852	0.0270	0.0029	1980
JACKSON	0.0746	0.1663	0.0940	0.0433	0.0140	0.0022	1972	WASHINGTON	0.0523	0.1462	0.1118	0.0640	0.0196	0.0034	1987
JEFFERSON	0.0551	0.1295	0.1011	0.0541	0.0187	0.0035	1810	WAYNE	0.0368	0.1468	0.1370	0.0843	0.0341	0.0062	2226
KNOX	0.0512	0.1456	0.1232	0.0660	0.0228	0.0032	2060	WILLIAMS	0.0562	0.1572	0.1092	0.0612	0.0189	0.0022	2024
LAKE	0.0259	0.0861	0.1165	0.0885	0.0316	0.0046	1766	WOOD	0.0402	0.0612	0.1099	0.0768	0.0247	0.0034	1581
								WYANDOT	0.0480	0.1530	0.1247	0.0565	0.0202	0.0026	2025

- Note:
1. ASFR\*: For single year of each age group.
  2. TFR\*\*: For five year (90-95 here). The total fertility rate (TFR) is the sum of the age-specific fertility rate times 5000.
  3. Birth of mother aged 15-19 includes the birth of mother aged under 15 years old.
  4. Birth of mother aged 40-44 includes the birth of mother aged over 44 years old.
  5. ASFRs were calculated by using the average births of 1990 to 1995, as well as the average population of census 1990 and estimate 1995.
  6. The estimate population of 1995 is calculate by: (census 1990 + Census 2000)/2.

Sources: Ohio Dept. of Health, Division of Vital Statistics, birth files for 1990-2000 [machine-readable data files]  
 Prepared by: Ohio Department of Development, Office of Strategic Research, P.O. Box 1001, Columbus, Ohio 43266-0101, March, 2003.

**APPENDIX 10 (CONTINUED)**

**ESTIMATED ASFR\*s AND TFR\*\*s: OHIO & COUNTIES, 1995-2000**

County Name	ASFR 15-19	ASFR 20-24	ASFR 25-29	ASFR 30-34	ASFR 35-39	ASFR 40-44 (5 year)	TFR	County Name	ASFR 15-19	ASFR 20-24	ASFR 25-29	ASFR 30-34	ASFR 35-39	ASFR 40-44 (5 year)	TFR
<b>OHIO</b>	<b>0.0541</b>	<b>0.1107</b>	<b>0.1118</b>	<b>0.0817</b>	<b>0.0323</b>	<b>0.0056</b>	<b>1981</b>	LAWRENCE	0.0607	0.1350	0.0981	0.0468	0.0146	0.0031	1791
ADAMS	0.0757	0.1638	0.1123	0.0465	0.0160	0.0027	2085	LICKING	0.0523	0.1430	0.1243	0.0775	0.0286	0.0047	2151
ALLEN	0.0720	0.1492	0.1226	0.0710	0.0259	0.0048	2227	LOGAN	0.0601	0.1653	0.1275	0.0623	0.0247	0.0041	2220
ASHLAND	0.0422	0.1486	0.1250	0.0723	0.0310	0.0060	2126	LORAIN	0.0576	0.1246	0.1168	0.0811	0.0308	0.0053	2081
ASHTABULA	0.0515	0.1530	0.1179	0.0622	0.0238	0.0052	2069	LUCAS	0.0603	0.1112	0.1063	0.0772	0.0309	0.0057	1958
ATHENS	0.0558	0.0406	0.0865	0.0579	0.0228	0.0053	1344	MADISON	0.0528	0.1488	0.1237	0.0753	0.0258	0.0053	2159
AUGLAIZE	0.0380	0.1386	0.1417	0.0802	0.0237	0.0030	2126	MAHONING	0.0544	0.1042	0.1097	0.0796	0.0318	0.0055	1926
BELMONT	0.0399	0.1270	0.1033	0.0545	0.0227	0.0034	1754	MARION	0.0719	0.1526	0.1096	0.0534	0.0203	0.0028	2053
BROWN	0.0647	0.1649	0.1120	0.0565	0.0176	0.0030	2094	MEDINA	0.0231	0.0908	0.1384	0.1055	0.0378	0.0061	2009
BUTLER	0.0534	0.0912	0.1191	0.0882	0.0323	0.0051	1945	MEIGS	0.0591	0.1378	0.1066	0.0475	0.0173	0.0018	1851
CARROLL	0.0419	0.1339	0.1028	0.0622	0.0215	0.0067	1844	MERCER	0.0384	0.1404	0.1685	0.1004	0.0317	0.0046	2420
CHAMPAIGN	0.0598	0.1488	0.1288	0.0606	0.0193	0.0033	2103	MIAMI	0.0473	0.1361	0.1254	0.0731	0.0252	0.0033	2052
CLARK	0.0725	0.1371	0.1134	0.0601	0.0208	0.0044	2041	MONROE	0.0363	0.1320	0.1026	0.0526	0.0240	0.0034	1755
CLERMONT	0.0502	0.1150	0.1261	0.0912	0.0341	0.0055	2110	MONTGOMERY	0.0597	0.1100	0.1116	0.0782	0.0300	0.0051	1973
CLINTON	0.0705	0.1576	0.1301	0.0635	0.0227	0.0058	2251	MORGAN	0.0668	0.1547	0.1032	0.0511	0.0184	0.0036	1989
COLUMBIANA	0.0464	0.1346	0.1173	0.0643	0.0222	0.0036	1943	MORROW	0.0502	0.1524	0.1208	0.0556	0.0248	0.0051	2045
COSHOCTON	0.0503	0.1486	0.1166	0.0621	0.0225	0.0053	2027	MUSKINGUM	0.0667	0.1508	0.1136	0.0610	0.0225	0.0034	2090
CRAWFORD	0.0632	0.1551	0.1139	0.0580	0.0178	0.0023	2051	NOBLE	0.0440	0.1491	0.1086	0.0515	0.0207	0.0018	1878
CUYAHOGA	0.0595	0.1029	0.1013	0.0905	0.0411	0.0071	2012	OTTAWA	0.0380	0.1203	0.1216	0.0700	0.0220	0.0030	1874
DARKE	0.0453	0.1437	0.1395	0.0720	0.0224	0.0039	2134	PAULDING	0.0476	0.1242	0.0995	0.0503	0.0137	0.0028	1691
DEFIANCE	0.0544	0.1461	0.1221	0.0637	0.0202	0.0047	2056	PERRY	0.0715	0.1709	0.1253	0.0595	0.0248	0.0029	2275
DELAWARE	0.0272	0.0814	0.1157	0.1055	0.0407	0.0065	1885	PICKAWAY	0.0609	0.1478	0.1160	0.0675	0.0230	0.0030	2091
ERIE	0.0517	0.1249	0.1211	0.0760	0.0259	0.0047	2022	PIKE	0.0715	0.1598	0.0970	0.0473	0.0146	0.0036	1969
FAIRFIELD	0.0437	0.1276	0.1383	0.0876	0.0328	0.0053	2177	PORTAGE	0.0377	0.0702	0.1089	0.0813	0.0297	0.0054	1666
FAYETTE	0.0730	0.1638	0.1086	0.0513	0.0221	0.0034	2110	PREBLE	0.0492	0.1430	0.1198	0.0618	0.0198	0.0027	1981
FRANKLIN	0.0619	0.0883	0.0972	0.0860	0.0376	0.0066	1889	PUTNAM	0.0325	0.1163	0.1694	0.1062	0.0304	0.0051	2299
FULTON	0.0379	0.1350	0.1471	0.0807	0.0278	0.0055	2170	RICHLAND	0.0665	0.1500	0.1199	0.0670	0.0249	0.0047	2165
GALLIA	0.0688	0.1538	0.0973	0.0492	0.0197	0.0052	1970	ROSS	0.0740	0.1525	0.1105	0.0554	0.0197	0.0028	2075
GEAUGA	0.0165	0.1092	0.1546	0.1346	0.0547	0.0099	2397	SANDUSKY	0.0572	0.1485	0.1213	0.0720	0.0215	0.0042	2123
GREENE	0.0349	0.0813	0.1107	0.0843	0.0327	0.0067	1753	SCIOTO	0.0821	0.1620	0.0971	0.0450	0.0148	0.0026	2018
GUERNSEY	0.0623	0.1605	0.1170	0.0618	0.0238	0.0049	2151	SENECA	0.0548	0.1297	0.1182	0.0680	0.0266	0.0035	2004
HAMILTON	0.0610	0.0957	0.0999	0.0912	0.0394	0.0071	1971	SHELBY	0.0588	0.1532	0.1375	0.0796	0.0254	0.0057	2300
HANCOCK	0.0457	0.1112	0.1248	0.0812	0.0286	0.0043	1979	STARK	0.0523	0.1171	0.1190	0.0807	0.0299	0.0051	2021
HARDIN	0.0556	0.1126	0.1135	0.0591	0.0244	0.0058	1856	SUMMIT	0.0501	0.0987	0.1116	0.0914	0.0364	0.0059	1971
HARRISON	0.0494	0.1360	0.1080	0.0591	0.0165	0.0041	1866	TRUMBULL	0.0494	0.1233	0.1133	0.0726	0.0274	0.0047	1954
HENRY	0.0365	0.1400	0.1478	0.0764	0.0249	0.0038	2147	TUSCARAWAS	0.0490	0.1431	0.1299	0.0708	0.0257	0.0033	2110
HIGHLAND	0.0711	0.1704	0.1180	0.0570	0.0193	0.0026	2192	UNION	0.0483	0.1450	0.1389	0.0814	0.0338	0.0035	2254
HOCKING	0.0610	0.1482	0.1137	0.0588	0.0195	0.0038	2025	VAN WERT	0.0516	0.1289	0.1193	0.0692	0.0184	0.0025	1949
HOLMES	0.0275	0.1971	0.2105	0.1485	0.0695	0.0210	3371	VINTON	0.0826	0.1733	0.0988	0.0403	0.0164	0.0017	2066
HURON	0.0589	0.1586	0.1305	0.0766	0.0233	0.0032	2255	WARREN	0.0355	0.1037	0.1348	0.1088	0.0368	0.0059	2128
JACKSON	0.0745	0.1691	0.1098	0.0389	0.0160	0.0027	2055	WASHINGTON	0.0479	0.1376	0.1165	0.0593	0.0246	0.0043	1951
JEFFERSON	0.0469	0.1221	0.1033	0.0597	0.0232	0.0043	1798	WAYNE	0.0341	0.1351	0.1455	0.0980	0.0359	0.0075	2281
KNOX	0.0418	0.1384	0.1252	0.0784	0.0302	0.0064	2102	WILLIAMS	0.0603	0.1468	0.1049	0.0591	0.0178	0.0037	1963
LAKE	0.0287	0.0808	0.1154	0.0920	0.0379	0.0062	1805	WOOD	0.0341	0.0563	0.1120	0.0860	0.0294	0.0044	1611
								WYANDOT	0.0453	0.1449	0.1217	0.0673	0.0170	0.0034	1998

- Note:
1. ASFR\*: For single year of each age group.
  2. TFR\*\*: For five year (90-95 here). The total fertility rate (TFR) is the sum of the age-specific fertility rate times 5000.
  3. Birth of mother aged 15-19 includes the birth of mother aged under 15 years old.
  4. Birth of mother aged 40-44 includes the birth of mother aged over 44 years old.
  5. ASFRs were calculated by using the average births of 1990 to 1995, as well as the average population of census 1990 and estimate 1995.
  6. The estimate population of 1995 is calculate by: (census 1990 + Census 2000)/2.

Sources: Ohio Dept. of Health, Division of Vital Statistics, birth files for 1990-2000 [machine-readable data files]  
 Prepared by: Ohio Department of Development, Office of Strategic Research, P.O. Box 1001, Columbus, Ohio 43266-0101, March, 2003.

## APPENDIX 11

### LIFE TABLE AND SURVIVAL RATES, MALE, OHIO 1980

Age	nMx	nQx	lx	ndx	nLx	Tx	eox	Sx
0-4	0.00354	0.01754	100000	1754	495616	7002301	70.0	0.99030
5-9	0.00034	0.00172	98246	169	490810	6506685	66.2	0.99825
10-14	0.00036	0.00178	98078	174	489953	6015875	61.3	0.99593
15-19	0.00128	0.00637	97904	623	487960	5525921	56.4	0.99214
20-24	0.00188	0.00936	97280	910	484125	5037961	51.8	0.99083
25-29	0.00180	0.00899	96370	866	479685	4553836	47.3	0.99106
30-34	0.00178	0.00888	95504	849	475398	4074151	42.7	0.98994
35-39	0.00226	0.01124	94655	1064	470617	3598753	38.0	0.98603
40-44	0.00337	0.01673	93591	1566	464042	3128136	33.4	0.97801
45-49	0.00554	0.02734	92026	2516	453838	2664094	28.9	0.96360
50-54	0.00934	0.04571	89510	4091	437319	2210256	24.7	0.94187
55-59	0.01472	0.07115	85418	6077	411898	1772937	20.8	0.90933
60-64	0.02358	0.11169	79341	8862	374550	1361039	17.2	0.86014
65-69	0.03737	0.17157	70479	12092	322165	986489	14.0	0.79197
70-74	0.05742	0.25204	58387	14716	255144	664325	11.4	0.70357
75-79	0.08642	0.35578	43671	15537	179511	409181	9.4	0.59638
80-84	0.12663	0.47788	28133	13444	107056	229670	8.2	0.56129
85 +	0.11980	1.00000	14689	14689	122614	122614	8.3	0.53387

### LIFE TABLE AND SURVIVAL RATES, FEMALE, OHIO 1980

Age	nMx	nQx	lx	ndx	nLx	Tx	eox	Sx
0-4	0.00274	0.01363	100000	1363	496592	7758253	77.6	0.99253
5-9	0.00025	0.00123	98637	121	492881	7261661	73.6	0.99886
10-14	0.00021	0.00105	98516	104	492319	6768780	68.7	0.99816
15-19	0.00052	0.00262	98412	258	491415	6276461	63.8	0.99716
20-24	0.00061	0.00306	98154	300	490021	5785046	58.9	0.99697
25-29	0.00060	0.00301	97854	295	488534	5295025	54.1	0.99641
30-34	0.00084	0.00417	97559	407	486780	4806491	49.3	0.99484
35-39	0.00123	0.00615	97153	598	484269	4319711	44.5	0.99193
40-44	0.00201	0.01001	96555	966	480360	3835441	39.7	0.98687
45-49	0.00328	0.01629	95589	1557	474051	3355082	35.1	0.97928
50-54	0.00510	0.02522	94031	2371	464229	2881030	30.6	0.96747
55-59	0.00816	0.04003	91660	3669	449127	2416801	26.4	0.94945
60-64	0.01267	0.06151	87991	5412	426423	1967674	22.4	0.92371
65-69	0.01924	0.09203	82578	7600	393892	1541252	18.7	0.88413
70-74	0.03048	0.14213	74978	10657	348250	1147360	15.3	0.82387
75-79	0.04815	0.21577	64322	13879	286912	799110	12.4	0.72204
80-84	0.08686	0.35725	50443	18021	207163	512198	10.2	0.64096
85 +	0.10629	1.00000	32422	32422	305035	305035	9.4	0.59554

Data Source:

- 1) Report of Vital Statistics for Ohio, 1980 & 1981, Ohio Department of Health.
- 2) Census of population, 1980, Ohio, U.S. Bureau of the Census.

**APPENDIX 12**

**LIFE TABLE AND SURVIVAL RATES, MALE, OHIO 1990**

Age	nMx	nQx	lx	ndx	nLx	Tx	eox	Sx
0-4	0.00280	0.01390	100000	1390	496525	7232954	72.3	0.99226
5-9	0.00030	0.00150	98610	148	492679	6736429	68.3	0.99847
10-14	0.00031	0.00155	98462	153	491928	6243750	63.4	0.99580
15-19	0.00138	0.00686	98309	674	489861	5751822	58.5	0.99272
20-24	0.00155	0.00770	97635	752	486297	5261960	53.9	0.99207
25-29	0.00164	0.00816	96884	790	482443	4775663	49.3	0.99154
30-34	0.00176	0.00877	96093	842	478361	4293220	44.7	0.99025
35-39	0.00216	0.01074	95251	1023	473697	3814859	40.1	0.98772
40-44	0.00278	0.01383	94228	1303	467881	3341162	35.5	0.98240
45-49	0.00433	0.02142	92925	1990	459648	2873281	30.9	0.97146
50-54	0.00728	0.03581	90934	3256	446531	2413633	26.5	0.95260
55-59	0.01222	0.05941	87678	5209	425368	1967102	22.4	0.92311
60-64	0.01999	0.09548	82469	7874	392661	1541734	18.7	0.88185
65-69	0.03073	0.14322	74595	10684	346267	1149073	15.4	0.82542
70-74	0.04700	0.21117	63911	13497	285816	802807	12.6	0.74484
75-79	0.07339	0.31093	50415	15676	212886	516990	10.3	0.63216
80-84	0.11689	0.45042	34739	15647	134579	304104	8.8	0.58822
85 +	0.11262	1.00000	19092	19092	169526	169526	8.9	0.55746

**LIFE TABLE AND SURVIVAL RATES, FEMALE, OHIO 1990**

Age	nMx	nQx	lx	ndx	nLx	Tx	eox	Sx
0-4	0.00276	0.01369	100000	1369	496577	7893054	78.9	0.99239
5-9	0.00029	0.00144	98631	142	492798	7396477	75.0	0.99880
10-14	0.00019	0.00096	98488	94	492207	6903679	70.1	0.99834
15-19	0.00047	0.00236	98394	233	491390	6411472	65.2	0.99745
20-24	0.00055	0.00274	98162	269	490136	5920082	60.3	0.99704
25-29	0.00064	0.00318	97893	311	488685	5429947	55.5	0.99661
30-34	0.00072	0.00360	97581	351	487030	4941262	50.6	0.99588
35-39	0.00093	0.00464	97230	452	485023	4454232	45.8	0.99381
40-44	0.00155	0.00774	96779	749	482021	3969209	41.0	0.98940
45-49	0.00271	0.01348	96029	1295	476911	3487188	36.3	0.98244
50-54	0.00438	0.02169	94735	2054	468538	3010278	31.8	0.97153
55-59	0.00720	0.03540	92680	3281	455198	2541740	27.4	0.95418
60-64	0.01163	0.05663	89399	5062	434339	2086542	23.3	0.92978
65-69	0.01762	0.08463	84337	7137	403840	1652203	19.6	0.89445
70-74	0.02734	0.12840	77199	9912	361216	1248363	16.2	0.84073
75-79	0.04294	0.19470	67287	13101	303684	887147	13.2	0.74626
80-84	0.07798	0.32705	54186	17721	226628	583463	10.8	0.65769
85 +	0.10219	1.00000	36465	36465	356835	356835	9.8	0.61158

Data Source:

- 1) Report of Vital Statistics for Ohio, 1989 & 1990, Ohio Department of Health.
- 2) Census of population, 1990, Ohio, U.S. Bureau of the Census.

Prepared by: The Office of Strategic Research, Ohio Department of Development.

## APPENDIX 13

### LIFE TABLE AND SURVIVAL RATES, MALE, OHIO 2000

Age	Population	Deaths	Mx	qx	lx	dx	Lx	Tx	ex	Sx
0-4	385,231	817	0.00212	0.01055	100000	1055	497363	7363980	73.6	0.99419
5-9	417,023	85	0.00020	0.00102	98945	101	494475	6866617	69.4	0.99893
10-14	424,906	96	0.00022	0.00112	98845	111	493946	6372142	64.5	0.99726
15-19	416,085	364	0.00087	0.00436	98734	431	492592	5878196	59.5	0.99471
20-24	363,689	453	0.00125	0.00622	98303	611	489988	5385604	54.8	0.99376
25-29	366,452	460	0.00126	0.00626	97692	612	486930	4895617	50.1	0.99279
30-34	390,689	640	0.00164	0.00816	97080	792	483420	4408686	45.4	0.99062
35-39	435,881	929	0.00213	0.01061	96288	1021	478887	3925266	40.8	0.98762
40-44	454,202	1,295	0.00285	0.01416	95267	1349	472960	3446379	36.2	0.98285
45-49	411,052	1,674	0.00407	0.02017	93917	1895	464849	2973419	31.7	0.97572
50-54	357,926	2,065	0.00577	0.02847	92022	2620	453563	2508570	27.3	0.96223
55-59	265,926	2,575	0.00968	0.04735	89403	4233	436431	2055007	23.0	0.93641
60-64	214,641	3,598	0.01676	0.08065	85170	6869	408676	1618576	19.0	0.89359
65-69	183,727	5,275	0.02871	0.13443	78301	10526	365190	1209899	15.5	0.83811
70-74	169,083	7,216	0.04268	0.19362	67775	13123	306068	844709	12.5	0.77267
75-79	130,350	8,073	0.06193	0.26913	54652	14709	236490	538641	9.9	0.68217
80-84	77,227	7,352	0.09519	0.38446	39944	15357	161326	302151	7.6	0.56095
85 +	48,172	8,410	0.17459	1.00000	24587	24587	140825	140825	5.7	0.46608

### LIFE TABLE AND SURVIVAL RATES, FEMALE, OHIO 2000

Age	Population	Deaths	Mx	qx	lx	dx	Lx	Tx	ex	Sx
0-4	369,699	630	0.00170	0.00849	100000	849	497878	7906264	79.1	0.99535
5-9	399,323	62	0.00015	0.00077	99151	76	495564	7408386	74.7	0.99918
10-14	402,905	70	0.00017	0.00086	99075	86	495159	6912822	69.8	0.99866
15-19	400,783	146	0.00036	0.00182	98989	180	494495	6417663	64.8	0.99813
20-24	365,239	141	0.00038	0.00192	98809	190	493571	5923168	59.9	0.99768
25-29	369,130	201	0.00054	0.00272	98619	268	492426	5429597	55.1	0.99684
30-34	393,623	285	0.00072	0.00361	98351	355	490867	4937172	50.2	0.99539
35-39	447,890	505	0.00113	0.00562	97996	551	488602	4446304	45.4	0.99328
40-44	467,343	735	0.00157	0.00784	97445	764	485317	3957702	40.6	0.99007
45-49	423,779	1,027	0.00242	0.01205	96681	1165	480495	3472385	35.9	0.98519
50-54	373,627	1,327	0.00355	0.01761	95517	1682	473378	2991890	31.3	0.97578
55-59	287,248	1,804	0.00628	0.03095	93835	2905	461911	2518512	26.8	0.95886
60-64	241,091	2,552	0.01059	0.05166	90930	4697	442906	2056601	22.6	0.93129
65-69	218,941	3,956	0.01807	0.08668	86233	7475	412475	1613695	18.7	0.89346
70-74	218,501	5,967	0.02731	0.12828	78758	10103	368529	1201219	15.3	0.84790
75-79	195,118	7,657	0.03924	0.17942	68654	12318	312476	832690	12.1	0.77471
80-84	138,014	8,995	0.06517	0.28119	56336	15841	242078	520214	9.2	0.62474
85 +	128,624	18,727	0.14559	1.00000	40495	40495	278136	278136	6.9	0.53466

Prepared in July 2002 by:

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Input Data: Census 2000 Total Population,  
Vital Birth and Death(1995-2000) from Ohio Department of Health.

## APPENDIX 14

### NATIONAL CENSUS SURVIVAL RATES BY SEX AND COUNTY: OHIO, 1990-1995

AGE IN 1990	AGE IN 1995	POPULATION 1990 MALE	DEATH 90-95 MALE	EXPECTED 1995 POP MALE	SURVIVAL RATE 1990-1995 MALE	POPULATION 1990 FEMALE	DEATH 90-95 FEMALE	EXPECTED 1995 POP FEMALE	SURVIVAL RATE 1990-1995 FEMALE
Birth(90-95)	0-4	<b>411,800</b>	4,957	406,843	<b>0.9880</b>	<b>393,099</b>	3,751	389,348	<b>0.99046</b>
	0-4	401,862	441	401,421	<b>0.9989</b>	382,794	307	382,487	<b>0.99920</b>
	5-9	406,238	589	405,649	<b>0.9986</b>	388,270	324	387,946	<b>0.99917</b>
	10-14	391,635	2,055	389,580	<b>0.9948</b>	372,916	774	372,142	<b>0.99792</b>
	15-19	376,537	2,695	373,842	<b>0.9928</b>	362,354	899	361,455	<b>0.99752</b>
	20-24	362,765	2,969	359,796	<b>0.9918</b>	379,677	1,167	378,510	<b>0.99693</b>
	25-29	414,326	4,065	410,261	<b>0.9902</b>	439,873	1,695	438,178	<b>0.99615</b>
	30-34	442,854	4,917	437,937	<b>0.9889</b>	470,428	2,276	468,152	<b>0.99516</b>
	35-39	411,442	5,920	405,522	<b>0.9856</b>	432,420	3,222	429,198	<b>0.99255</b>
	40-44	367,206	7,097	360,109	<b>0.9807</b>	388,593	4,302	384,291	<b>0.98893</b>
	45-49	287,989	9,002	278,987	<b>0.9687</b>	307,010	6,016	300,994	<b>0.98040</b>
	50-54	244,683	13,184	231,499	<b>0.9461</b>	265,796	8,739	257,057	<b>0.96712</b>
	55-59	227,449	21,031	206,418	<b>0.9075</b>	251,283	14,093	237,190	<b>0.94392</b>
	60-64	229,619	30,517	199,102	<b>0.8671</b>	262,373	21,993	240,380	<b>0.91618</b>
	65-69	204,462	36,074	168,388	<b>0.8236</b>	254,813	29,165	225,648	<b>0.88554</b>
	70-74	148,726	37,484	111,242	<b>0.7480</b>	203,885	35,239	168,646	<b>0.82716</b>
	75-79	98,074	32,166	65,908	<b>0.6720</b>	156,448	39,838	116,610	<b>0.74536</b>
	80 +	81,708	36,235	45,473	<b>0.5565</b>	169,156	78,786	90,370	<b>0.53424</b>
	80-84	52,436				99,482			
	85 +	29,272				69,674			

- Note
- 1): Survival Rates 90-95 = Expected 1995 pop. / Pop. in 1990.
  - 2): 1990 census Household Population.
  - 3): Birth and Death 90-95 are the totals 4/1/90-3/31/95.
  - 4): Expected population 95 = (Household 1990) + (birth 90-95) - (Death 90-95)

APPENDIX 15  
ESTIMATED IN-MIGRATION NUMBERS BY COUNTY, 1990-2000

COUNTY	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	1990-2000
<b>TOTAL</b>	<b>418,969</b>	<b>414,916</b>	<b>418,511</b>	<b>415,988</b>	<b>431,885</b>	<b>429,968</b>	<b>439,626</b>	<b>433,755</b>	<b>451,404</b>	<b>450,548</b>	<b>4,305,570</b>
ADAMS	1,057	1,037	1,051	954	1,098	1,153	1,408	1,427	1,386	1,329	11,900
ALLEN	3,370	3,518	3,303	3,415	3,422	3,304	3,258	3,231	3,401	3,749	33,971
ASHLAND	2,084	2,004	2,120	2,331	2,198	2,276	2,540	2,610	2,701	2,480	23,344
ASHTABULA	3,256	3,243	3,097	3,261	3,284	3,226	3,479	3,243	3,373	3,353	32,815
ATHENS	2,278	2,142	2,408	2,297	2,472	2,495	2,668	2,688	2,576	2,930	24,954
AUGLAIZE	2,161	2,160	2,009	2,068	2,276	2,182	1,934	1,949	1,917	1,941	20,597
BELMONT	2,123	1,877	2,001	1,753	2,007	2,023	2,056	2,245	2,094	2,042	20,221
BROWN	2,341	2,405	2,465	2,707	2,529	2,577	2,518	2,487	2,532	2,784	25,345
BUTLER	17,287	16,674	17,157	16,819	17,360	17,129	17,900	18,015	18,048	18,291	174,680
CARROLL	1,540	1,566	1,609	1,649	1,752	1,792	1,748	1,645	1,665	1,735	16,701
CHAMPAIGN	1,951	1,824	1,930	1,972	1,974	2,129	2,523	2,432	2,439	2,547	21,721
CLARK	5,414	5,356	5,299	5,158	5,395	5,252	4,781	4,818	5,070	4,909	51,452
CLERMONT	10,649	10,848	11,013	10,875	11,006	11,167	12,961	13,325	13,866	13,619	119,329
CLINTON	2,103	2,068	1,974	2,118	2,213	2,348	2,808	2,775	2,917	2,905	24,229
COLUMBIANA	3,621	3,591	3,341	3,459	3,375	3,407	3,538	3,561	3,473	3,338	34,704
COSHOCTON	1,184	1,166	1,299	1,249	1,454	1,239	1,544	1,456	1,535	1,618	13,744
CRAWFORD	1,728	1,785	1,693	1,801	1,846	1,885	1,960	1,961	1,999	1,894	18,552
CUYAHOGA	31,475	30,328	29,768	29,049	30,871	30,220	30,318	30,729	31,937	30,763	305,458
DARKE	1,874	1,797	1,832	1,834	1,842	1,910	1,907	1,696	1,864	1,908	18,464
DEFIANCE	1,567	1,501	1,631	1,623	2,101	1,921	1,674	1,735	1,802	1,551	17,106
DELAWARE	5,933	5,734	6,294	6,878	7,683	8,156	14,453	15,122	16,790	17,798	104,841
ERIE	3,041	3,173	3,144	3,058	3,571	3,302	3,179	3,053	3,180	3,174	31,875
FAIRFIELD	6,312	6,641	6,985	6,971	7,170	7,089	8,367	8,580	9,614	9,374	77,103
FAYETTE	1,446	1,339	1,400	1,320	1,345	1,502	1,329	1,339	1,349	1,411	13,780
FRANKLIN	41,471	40,773	41,438	40,238	41,251	42,907	43,783	43,055	45,665	47,050	427,631
FULTON	2,004	2,234	2,002	2,039	2,319	2,232	2,004	1,963	2,089	1,931	20,817
GALLIA	1,114	1,781	1,137	1,234	1,182	1,114	1,352	1,266	1,202	1,254	12,636
GEAUGA	3,958	4,105	3,958	3,987	4,089	4,094	4,726	4,309	4,497	4,504	42,227
GREENE	10,479	10,772	11,186	10,838	11,429	10,583	10,312	9,783	11,116	10,572	107,070
GUERNSEY	1,532	1,569	1,512	1,503	1,551	1,510	1,596	1,614	1,593	1,544	15,524
HAMILTON	29,813	29,623	29,211	28,417	27,985	27,410	27,453	26,657	26,817	26,466	279,852
HANCOCK	2,912	2,846	2,781	2,790	2,922	3,098	3,006	3,111	3,307	3,166	29,939
HARDIN	1,330	1,142	1,252	1,280	1,363	1,309	1,359	1,251	1,254	1,323	12,863
HARRISON	578	535	542	496	549	569	887	764	772	809	6,501
HENRY	1,051	1,185	1,004	1,087	1,319	1,297	1,160	1,107	1,150	1,279	11,639
HIGHLAND	1,939	2,049	2,025	2,052	2,190	2,151	1,855	1,955	2,147	2,084	20,447
HOCKING	1,181	1,328	1,385	1,298	1,430	1,433	1,384	1,412	1,431	1,430	13,712
HOLMES	873	929	811	827	941	859	1,008	1,083	1,051	1,048	9,430
HURON	2,809	2,535	2,655	2,800	3,037	3,017	2,963	2,716	2,822	2,881	28,235
JACKSON	1,165	1,172	1,142	1,178	1,124	1,209	1,290	1,245	1,346	1,261	12,132
JEFFERSON	2,025	1,947	1,887	1,950	1,890	1,684	1,625	1,751	1,811	1,785	18,355
KNOX	2,189	2,340	2,256	2,274	2,330	2,579	2,797	2,546	2,609	2,660	24,580
LAKE	8,610	8,446	8,202	8,053	8,371	8,112	8,151	7,937	8,240	7,844	81,966
LAWRENCE	2,065	2,144	2,201	2,050	2,158	2,189	2,286	2,151	2,122	2,092	21,458

APPENDIX 15 (CONTINUED)  
ESTIMATED IN-MIGRATION NUMBERS BY COUNTY, 1990-2000

COUNTY	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	1990-2000
LICKING	6,526	6,205	6,461	6,713	6,810	6,497	6,841	6,279	6,692	6,771	65,795
LOGAN	1,998	2,085	2,016	1,887	2,153	2,218	2,174	2,152	2,171	1,927	20,781
LORAIN	8,937	8,732	8,633	8,888	9,154	8,814	8,963	8,862	9,917	10,055	90,955
LUCAS	12,956	12,314	12,402	12,574	12,707	13,280	13,619	12,986	13,298	13,571	129,707
MADISON	2,311	2,331	2,447	2,492	2,497	2,461	2,290	2,270	2,276	2,061	23,436
MAHONING	7,152	7,119	7,158	6,731	6,753	7,043	6,652	6,671	6,546	6,650	68,475
MARION	2,212	2,212	2,116	2,177	2,346	2,182	2,197	2,210	2,191	2,068	21,911
MEDINA	7,634	7,512	7,558	7,817	8,203	8,242	8,603	8,328	9,268	8,801	81,966
MEIGS	864	850	945	966	1,116	948	699	623	706	717	8,434
MERCER	1,063	1,056	1,087	1,180	1,326	1,270	1,219	1,248	1,136	1,205	11,790
MIAMI	4,634	4,577	4,632	4,729	4,567	4,568	4,720	4,672	4,778	4,677	46,554
MONROE	434	423	472	458	555	488	534	613	620	576	5,173
MONTGOMERY	23,052	23,041	22,481	21,019	22,070	21,671	21,548	20,722	20,561	20,492	216,657
MORGAN	462	484	483	444	541	490	775	757	777	814	6,027
MORROW	1,541	1,611	1,654	1,530	1,733	1,606	1,727	1,657	1,863	1,738	16,660
MUSKINGUM	2,541	2,601	2,604	2,800	2,811	2,703	2,766	2,652	2,796	2,801	27,075
NOBLE	531	447	549	504	574	565	509	437	393	388	4,897
OTTAWA	1,870	1,747	1,812	1,899	1,990	1,922	1,807	1,935	1,919	1,892	18,793
PAULDING	658	714	810	732	780	798	813	686	711	689	7,391
PERRY	1,304	1,486	1,491	1,490	1,533	1,760	1,314	1,207	1,152	1,252	13,989
PICKAWAY	2,688	2,597	2,685	2,785	2,771	2,754	2,603	2,671	2,624	2,671	26,849
PIKE	1,161	1,311	1,359	1,503	1,804	1,685	1,683	1,714	1,877	1,874	15,971
PORTAGE	7,309	7,437	7,361	7,410	7,728	7,869	7,092	7,224	7,647	7,687	74,764
PREBLE	2,127	1,994	2,037	2,081	2,133	2,125	1,946	1,897	1,755	1,728	19,823
PUTNAM	1,041	971	938	997	1,062	1,016	905	1,013	870	954	9,767
RICHLAND	4,165	3,865	3,878	4,137	4,274	4,313	4,279	4,050	4,210	3,867	41,038
ROSS	2,679	2,454	2,720	2,690	2,907	2,905	2,683	2,458	2,509	2,543	26,548
SANDUSKY	2,284	2,198	2,004	2,045	2,331	2,251	2,027	1,980	1,986	2,145	21,251
SCIOTO	2,270	2,294	2,233	1,907	2,049	1,924	2,166	2,070	2,110	2,099	21,122
SENECA	1,823	1,904	1,991	1,982	1,929	2,022	1,830	1,800	1,710	1,802	18,793
SHELBY	1,756	1,613	1,740	1,809	1,929	1,882	1,844	1,800	1,911	1,776	18,060
STARK	11,208	10,808	11,033	10,838	11,393	10,799	10,374	9,970	10,760	10,085	107,268
SUMMIT	18,812	18,437	19,114	18,931	19,270	19,829	19,034	18,738	19,172	19,307	190,644
TRUMBULL	6,677	6,306	6,172	5,738	6,289	6,177	5,673	5,873	5,719	5,896	60,520
TUSCARAWAS	2,751	2,696	2,611	2,791	2,827	2,878	2,885	2,962	2,957	2,841	28,199
UNION	2,020	2,202	2,418	2,443	2,556	2,488	2,461	2,316	2,238	2,382	23,524
VAN WERT	1,103	1,000	991	1,032	984	1,049	1,013	889	1,052	951	10,064
VINTON	423	499	577	487	516	556	518	498	601	526	5,201
WARREN	8,396	8,425	9,969	10,448	10,610	10,671	11,062	11,744	13,555	14,291	109,171
WASHINGTON	2,290	2,374	2,465	2,380	2,253	2,244	2,271	2,278	2,116	2,279	22,950
WAYNE	4,228	4,448	4,588	4,468	4,858	4,858	4,418	4,274	4,259	4,142	44,541
WILLIAMS	1,274	1,396	1,307	1,450	1,701	1,545	1,470	1,436	1,428	1,575	14,582
WOOD	6,093	6,121	6,298	6,714	6,987	6,683	6,932	6,477	7,098	6,674	66,077
WYANDOT	818	787	801	882	831	879	839	858	900	882	8,477

Data Source: IRS County to County Migration Flows, 1990-2000, Internal Revenue Service, Department of The Treasury, Washington, D.C.  
Prepared by: Ohio Department of Development, Office of Strategic Research, P.O. Box 1001, Columbus, Ohio 43266-0101, March, 2003.

APPENDIX 15 (CONTINUED)  
ESTIMATED OUT-MIGRATION NUMBERS BY COUNTY, 1990-2000

COUNTY	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	1990-2000
<b>TOTAL</b>	<b>421,795</b>	<b>416,137</b>	<b>424,278</b>	<b>431,710</b>	<b>439,325</b>	<b>437,624</b>	<b>459,369</b>	<b>459,039</b>	<b>471,348</b>	<b>470,655</b>	<b>4,431,280</b>
ADAMS	784	813	904	781	975	792	1,273	1,287	1,302	1,390	10,301
ALLEN	4,312	4,041	3,888	4,204	4,293	4,107	4,146	4,200	4,034	3,854	41,079
ASHLAND	1,840	1,741	1,880	1,942	1,893	2,187	2,329	2,390	2,515	2,510	21,227
ASHTABULA	3,287	3,154	2,936	2,964	3,110	3,029	3,115	3,230	3,449	3,526	31,800
ATHENS	2,082	2,218	2,196	2,426	2,466	2,430	2,712	2,689	2,739	2,719	24,677
AUGLAIZE	1,914	1,899	2,101	2,040	2,167	2,078	2,145	1,963	1,941	1,994	20,242
BELMONT	2,185	1,813	1,820	1,822	2,032	1,947	2,072	2,147	2,321	2,200	20,359
BROWN	2,051	1,959	1,929	2,018	2,146	2,183	2,081	2,080	2,053	2,061	20,561
BUTLER	14,173	14,144	14,769	15,875	15,459	15,123	16,816	17,000	17,645	17,338	158,342
CARROLL	1,265	1,423	1,279	1,378	1,352	1,405	1,337	1,420	1,485	1,560	13,904
CHAMPAIGN	1,849	1,695	1,691	1,831	1,834	1,674	2,480	2,464	2,457	2,390	20,365
CLARK	5,924	5,878	5,863	5,478	5,634	5,602	5,950	5,727	5,615	5,557	57,228
CLERMONT	9,095	9,284	9,508	9,873	10,076	9,620	11,084	11,786	12,233	12,643	105,202
CLINTON	1,822	1,728	1,786	1,756	2,082	1,914	2,338	2,479	2,571	2,469	20,945
COLUMBIANA	3,251	3,187	3,194	3,305	3,213	3,241	3,492	3,532	3,503	3,550	33,468
COSHOCTON	1,156	1,204	1,075	1,140	1,221	1,264	1,494	1,532	1,491	1,446	13,023
CRAWFORD	2,022	2,005	1,826	1,926	1,755	1,913	2,278	2,165	2,365	2,240	20,495
CUYAHOGA	39,704	39,093	39,924	39,444	40,228	39,080	41,769	41,824	42,764	43,622	407,452
DARKE	2,110	1,948	1,914	1,869	1,883	1,920	2,104	2,031	2,041	2,067	19,887
DEFIANCE	1,655	1,769	1,681	1,766	1,899	1,902	2,053	2,096	2,137	2,028	18,986
DELAWARE	4,482	4,692	4,859	5,101	5,273	5,820	9,513	9,379	10,045	10,559	69,723
ERIE	3,211	3,199	3,121	3,188	3,198	3,316	3,623	3,632	3,695	3,396	33,579
FAIRFIELD	4,900	4,898	5,139	5,303	5,420	5,753	6,932	6,950	7,535	7,726	60,556
FAYETTE	1,293	1,309	1,208	1,276	1,303	1,331	1,287	1,438	1,486	1,439	13,370
FRANKLIN	39,693	39,572	41,053	42,894	44,075	43,556	47,053	47,440	48,296	49,468	443,100
FULTON	1,920	1,843	1,960	2,085	1,875	2,041	1,942	1,841	1,931	1,994	19,432
GALLIA	1,046	1,054	1,696	1,043	1,028	1,072	1,222	1,152	1,230	1,230	11,773
GEAUGA	3,793	3,889	3,984	3,878	3,840	3,849	4,015	3,950	4,178	3,897	39,273
GREENE	10,117	10,678	10,883	11,105	11,108	11,313	11,155	10,794	10,583	10,223	107,959
GUERNSEY	1,394	1,456	1,561	1,323	1,333	1,426	1,499	1,496	1,645	1,579	14,712
HAMILTON	33,007	33,527	34,273	36,016	35,505	34,547	34,409	33,552	35,791	35,951	346,578
HANCOCK	2,880	2,730	2,852	2,776	2,844	3,141	3,210	3,135	3,319	3,342	30,229
HARDIN	1,321	1,271	1,232	1,167	1,267	1,318	1,381	1,366	1,381	1,448	13,152
HARRISON	633	555	556	618	588	553	749	758	795	805	6,610
HENRY	1,170	1,122	1,111	1,089	1,214	1,226	1,285	1,281	1,334	1,433	12,265
HIGHLAND	1,559	1,618	1,552	1,561	1,653	1,775	1,770	1,543	1,735	1,791	16,557
HOCKING	1,006	967	1,033	1,053	1,067	1,193	1,262	1,302	1,278	1,407	11,568
HOLMES	1,000	977	972	897	930	1,030	1,077	1,145	1,208	1,190	10,426
HURON	2,567	2,618	2,669	2,588	2,664	2,649	2,872	2,907	2,946	2,805	27,285
JACKSON	828	867	939	988	1,041	987	1,200	1,200	1,312	1,331	10,693
JEFFERSON	2,125	2,263	2,038	2,127	2,126	2,269	2,309	2,625	2,305	2,301	22,488
KNOX	2,039	1,823	1,856	1,769	1,755	1,945	2,176	1,986	2,309	2,176	19,834
LAKE	8,212	7,941	8,278	8,418	8,064	7,825	8,683	8,450	8,728	8,387	82,986
LAWRENCE	1,944	1,797	1,924	1,905	2,003	1,894	2,101	2,163	2,219	2,215	20,165

APPENDIX 15 (CONTINUED)  
ESTIMATED OUT-MIGRATION NUMBERS BY COUNTY, 1990-2000

COUNTY	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	1990-2000
LICKING	5,515	5,681	5,509	5,904	5,931	6,062	6,070	5,772	6,017	6,041	58,502
LOGAN	1,582	1,815	1,712	1,869	1,897	1,990	1,955	1,952	1,981	2,089	18,842
LORAIN	9,299	9,001	9,012	9,297	9,312	9,160	9,353	10,241	10,638	9,624	94,937
LUCAS	16,934	15,984	16,357	16,205	17,005	16,200	16,056	16,206	16,634	16,416	163,997
MADISON	2,175	1,991	2,045	2,130	2,185	2,503	2,220	2,235	2,216	2,234	21,934
MAHONING	7,855	7,260	7,559	7,613	8,262	7,950	8,026	8,028	8,250	8,360	79,163
MARION	2,534	2,290	2,340	2,174	2,351	2,407	2,572	2,727	2,587	2,550	24,532
MEDINA	6,203	5,859	6,043	6,295	6,351	6,428	6,843	6,953	6,784	7,176	64,935
MEIGS	774	719	688	716	802	871	679	638	652	813	7,352
MERCER	1,259	1,162	1,147	1,103	1,159	1,361	1,322	1,288	1,382	1,413	12,596
MIAMI	4,378	4,377	4,392	4,473	4,561	4,511	4,468	4,600	4,693	4,641	45,094
MONROE	538	478	600	510	531	481	535	542	558	576	5,349
MONTGOMERY	25,707	25,719	26,855	27,295	26,579	25,932	27,179	25,323	26,186	25,190	261,965
MORGAN	485	393	421	363	446	509	804	751	805	770	5,747
MORROW	1,447	1,450	1,430	1,332	1,398	1,504	1,449	1,481	1,509	1,375	14,375
MUSKINGUM	2,667	2,630	2,591	2,546	2,560	2,793	2,916	2,738	2,880	2,745	27,066
NOBLE	343	424	448	481	433	443	354	414	355	315	4,010
OTTAWA	1,918	1,788	1,774	1,839	1,722	1,915	1,723	1,758	1,768	1,915	18,120
PAULDING	895	980	825	862	821	765	834	867	808	895	8,552
PERRY	1,292	1,242	1,209	1,294	1,399	1,319	1,211	1,306	1,251	1,217	12,740
PICKAWAY	2,603	2,306	2,472	2,511	2,519	2,878	2,422	2,428	2,659	2,527	25,325
PIKE	1,007	945	1,006	986	1,145	1,268	1,295	1,572	1,721	1,655	12,600
PORTAGE	6,876	6,876	6,898	7,022	7,226	7,161	6,984	7,196	7,562	7,419	71,220
PREBLE	1,996	1,818	1,884	1,936	1,786	1,876	1,815	1,900	1,607	1,799	18,417
PUTNAM	1,018	1,072	1,178	1,048	1,087	1,088	1,176	1,038	1,144	999	10,848
RICHLAND	4,635	4,504	4,369	4,270	4,477	4,465	4,736	4,788	4,704	4,400	45,348
ROSS	2,229	2,277	2,196	2,270	2,372	2,245	2,280	2,362	2,466	2,536	23,233
SANDUSKY	2,195	2,353	2,336	2,255	2,401	2,369	2,507	2,422	2,361	2,249	23,448
SCIOTO	1,998	2,040	2,033	2,011	2,149	2,382	2,335	2,428	2,424	2,521	22,321
SENECA	2,247	2,087	1,993	2,091	2,200	2,136	2,130	2,143	2,092	2,211	21,330
SHELBY	1,626	1,830	1,716	1,886	1,894	2,133	1,877	1,926	1,931	1,898	18,717
STARK	11,274	10,726	10,708	11,258	11,710	11,388	11,692	11,411	11,284	11,342	112,793
SUMMIT	18,312	18,392	19,037	18,777	19,680	19,243	19,082	19,616	19,952	19,631	191,722
TRUMBULL	6,815	6,610	6,808	6,939	7,307	6,697	6,685	6,803	6,768	7,070	68,502
TUSCARAWAS	2,416	2,422	2,426	2,369	2,598	2,737	2,882	2,701	2,969	2,670	26,190
UNION	1,666	1,700	1,808	1,870	1,861	1,988	1,836	1,804	1,788	1,781	18,102
VAN WERT	1,219	1,130	1,174	1,037	1,060	1,124	1,023	1,115	1,086	1,125	11,093
VINTON	375	402	417	432	398	590	597	421	493	540	4,665
WARREN	7,389	7,138	7,502	7,992	7,929	7,995	7,964	7,944	8,455	8,355	78,663
WASHINGTON	2,454	2,143	2,141	2,229	2,292	2,262	2,526	2,602	2,453	2,530	23,632
WAYNE	4,218	4,172	4,084	3,972	4,084	4,160	4,287	4,332	4,122	4,344	41,775
WILLIAMS	1,470	1,382	1,343	1,323	1,408	1,593	1,623	1,558	1,629	1,662	14,991
WOOD	6,476	6,070	6,089	6,058	6,268	6,618	6,294	6,389	6,898	6,860	64,020
WYANDOT	860	837	790	861	877	884	959	793	881	919	8,661

Data Source: IRS County to County Migration Flows, 1990-2000, Internal Revenue Service, Department of The Treasury, Washington, D.C.  
Prepared by: Ohio Department of Development, Office of Strategic Research, P.O. Box 1001, Columbus, Ohio 43266-0101, March, 2003

APPENDIX 15 (CONTINUED)  
ESTIMATED NET MIGRATION NUMBERS BY COUNTY, 1990-2000

COUNTY	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	90-00	1990-2000
<b>TOTAL</b>	<b>-2,826</b>	<b>-1,221</b>	<b>-5,767</b>	<b>-15,722</b>	<b>-7,440</b>	<b>-7,656</b>	<b>-19,743</b>	<b>-25,284</b>	<b>-19,944</b>	<b>-20,107</b>	<b>-125,710</b>	<b>-53,410</b>
ADAMS	273	224	147	173	123	361	135	140	84	-61	1,599	1087
ALLEN	-942	-523	-585	-789	-871	-803	-888	-969	-633	-105	-7,108	-7718
ASHLAND	244	263	240	389	305	89	211	220	186	-30	2,117	2702
ASHTABULA	-31	89	161	297	174	197	364	13	-76	-173	1,015	166
ATHENS	196	-76	212	-129	6	65	-44	-1	-163	211	277	1307
AUGLAIZE	247	261	-92	28	109	104	-211	-14	-24	-53	355	-576
BELMONT	-62	64	181	-69	-25	76	-16	98	-227	-158	-138	-1447
BROWN	290	446	536	689	383	394	437	407	479	723	4,784	5451
BUTLER	3,114	2,530	2,388	944	1,901	2,006	1,084	1,015	403	953	16,338	20376
CARROLL	275	143	330	271	400	387	411	225	180	175	2,797	1738
CHAMPAIGN	102	129	239	141	140	455	43	-32	-18	157	1,356	1362
CLARK	-510	-522	-564	-320	-239	-350	-1,169	-909	-545	-648	-5,776	-6995
CLERMONT	1,554	1,564	1,505	1,002	930	1,547	1,877	1,539	1,633	976	14,127	13474
CLINTON	281	340	188	362	131	434	470	296	346	436	3,284	2896
COLUMBIANA	370	404	147	154	162	166	46	29	-30	-212	1,236	-1050
COSHOCTON	28	-38	224	109	233	-25	50	-76	44	172	721	10731
CRAWFORD	-294	-220	-133	-125	91	-28	-318	-204	-366	-346	-1,943	-2008
CUYAHOGA	-8,229	-8,765	-10,156	-10,395	-9,357	-8,860	-11,451	-11,095	-10,827	-12,859	-101,994	-77937
DARKE	-236	-151	-82	-35	-41	-10	-197	-335	-177	-159	-1,423	-2036
DEFIANCE	-88	-268	-50	-143	202	19	-379	-361	-335	-477	-1,880	-1693
DELAWARE	1,451	1,042	1,435	1,777	2,410	2,336	4,940	5,743	6,745	7,239	35,118	36826
ERIE	-170	-26	23	-130	373	-14	-444	-579	-515	-222	-1,704	-243
FAIRFIELD	1,412	1,743	1,846	1,668	1,750	1,336	1,435	1,630	2,079	1,648	16,547	12687
FAYETTE	153	30	192	44	42	171	42	-99	-137	-28	410	399
FRANKLIN	1,778	1,201	385	-2,656	-2,824	-649	-3,270	-4,385	-2,631	-2,418	-15,469	23994
FULTON	84	391	42	-46	444	191	62	122	158	-63	1,385	1234
GALLIA	68	727	-559	191	154	42	130	114	-28	24	863	-746
GEAUGA	165	216	-26	109	249	245	711	359	319	607	2,954	3456
GREENE	362	94	303	-267	321	-730	-843	-1,011	533	349	-889	3303
GUERNSEY	138	113	-49	180	218	84	97	118	-52	-35	812	1031
HAMILTON	-3,194	-3,904	-5,062	-7,599	-7,520	-7,137	-6,956	-6,895	-8,974	-9,485	-66,726	-64608
HANCOCK	32	116	-71	14	78	-43	-204	-24	-12	-176	-290	1369
HARDIN	9	-129	20	113	96	-9	-22	-115	-127	-125	-289	-238
HARRISON	-55	-20	-14	-122	-39	16	138	6	-23	4	-109	-1
HENRY	-119	63	-107	-2	105	71	-125	-174	-184	-154	-626	-1257
HIGHLAND	380	431	473	491	537	376	85	412	412	293	3,890	3687
HOCKING	175	361	352	245	363	240	122	110	153	23	2,144	1676
HOLMES	-127	-48	-161	-70	11	-171	-69	-62	-157	-142	-996	426
HURON	242	-83	-14	212	373	368	91	-191	-124	76	950	-878
JACKSON	337	305	203	190	83	222	90	45	34	-70	1,439	1471
JEFFERSON	-100	-316	-151	-177	-236	-585	-684	-874	-494	-516	-4,133	-5395
KNOX	150	517	400	505	575	634	621	560	300	484	4,746	5389
LAKE	398	505	-76	-365	307	287	-532	-513	-488	-543	-1,020	2043
LAWRENCE	121	347	277	145	155	295	185	-12	-97	-123	1,293	-659

**APPENDIX 15 (CONTINUED)**  
**ESTIMATED NET MIGRATION NUMBERS BY COUNTY, 1990-2000**

COUNTY	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	90-00	1990-2000
LICKING	1,011	524	952	809	879	435	771	507	675	730	7,293	10525
LOGAN	416	270	304	18	256	228	219	200	190	-162	1,939	1651
LORAIN	-362	-269	-379	-409	-158	-346	-390	-1,379	-721	431	-3,982	-5489
LUCAS	-3,978	-3,670	-3,955	-3,631	-4,298	-2,920	-2,437	-3,220	-3,336	-2,845	-34,290	-33628
MADISON	136	340	402	362	312	-42	70	35	60	-173	1,502	897
MAHONING	-703	-141	-401	-882	-1,509	-907	-1,374	-1,357	-1,704	-1,710	-10,688	-11873
MARION	-322	-78	-224	3	-5	-225	-375	-517	-396	-482	-2,621	-2477
MEDINA	1,431	1,653	1,515	1,522	1,852	1,814	1,760	1,375	2,484	1,625	17,031	19484
MEIGS	90	131	257	250	314	77	20	-15	54	-96	1,082	-25
MERCER	-196	-106	-60	77	167	-91	-103	-40	-246	-208	-806	-1169
MIAMI	256	200	240	256	6	57	252	72	85	36	1,460	982
MONROE	-104	-55	-128	-52	24	7	-1	71	62	0	-176	-158
MONTGOMERY	-2,655	-2,678	-4,374	-6,276	-4,509	-4,261	-5,631	-4,601	-5,625	-4,698	-45,308	-48396
MORGAN	-23	91	62	81	95	-19	-29	6	-28	44	280	589
MORROW	94	161	224	198	335	102	278	176	354	363	2,285	2067
MUSKINGUM	-126	-29	13	254	251	-90	-150	-86	-84	56	9	-1119
NOBLE	188	23	101	23	141	122	155	23	38	73	887	378
OTTAWA	-48	-41	38	60	268	7	84	177	151	-23	673	576
PAULDING	-237	-266	-15	-130	-41	33	-21	-181	-97	-206	-1,161	-819
PERRY	12	244	282	196	134	441	103	-99	-99	35	1,249	784
PICKAWAY	85	291	213	274	252	-124	181	243	-35	144	1,524	1669
PIKE	154	366	353	517	659	417	388	142	156	219	3,371	2541
PORTAGE	433	561	463	388	502	708	108	28	85	268	3,544	2476
PREBLE	131	176	153	145	347	249	131	-3	148	-71	1,406	571
PUTNAM	23	-101	-240	-51	-25	-72	-271	-25	-274	-45	-1,081	-1607
RICHLAND	-470	-639	-491	-133	-203	-152	-457	-738	-494	-533	-4,310	-5197
ROSS	450	177	524	420	535	660	403	96	43	7	3,315	1841
SANDUSKY	89	-155	-332	-210	-70	-118	-480	-442	-375	-104	-2,197	-2860
SCIOTO	272	254	200	-104	-100	-458	-169	-358	-314	-422	-1,199	-2219
SENECA	-424	-183	-2	-109	-271	-114	-300	-343	-382	-409	-2,537	-3156
SHELBY	130	-217	24	-77	35	-251	-33	-126	-20	-122	-657	-499
STARK	-66	82	325	-420	-317	-589	-1,318	-1,441	-524	-1,257	-5,525	-3620
SUMMIT	500	45	77	154	-410	586	-48	-878	-780	-324	-1,078	3119
TRUMBULL	-138	-304	-636	-1,201	-1,018	-520	-1,012	-930	-1,049	-1,174	-7,982	-10309
TUSCARAWAS	335	274	185	422	229	141	3	261	-12	171	2,009	3927
UNION	354	502	610	573	695	500	625	512	450	601	5,422	6107
VAN WERT	-116	-130	-183	-5	-76	-75	-10	-226	-34	-174	-1,029	-1628
VINTON	48	97	160	55	118	-34	-79	77	108	-14	536	1173
WARREN	1,007	1,287	2,467	2,456	2,681	2,676	3,098	3,800	5,100	5,936	30,508	31743
WASHINGTON	-164	231	324	151	-39	-18	-255	-324	-337	-251	-682	-764
WAYNE	10	276	504	496	774	698	131	-58	137	-202	2,766	2656
WILLIAMS	-196	14	-36	127	293	-48	-153	-122	-201	-87	-409	28
WOOD	-383	51	209	656	719	65	638	88	200	-186	2,057	2919
WYANDOT	-42	-50	11	21	-46	-5	-120	65	19	-37	-184	103

Data Source: IRS County to County Migration Flows, 1990-2000, Internal Revenue Service, Department of The Treasury, Washington, D.C.  
 Prepared by: Ohio Department of Development , Office of Strategic Research, P.O. Box 1001, Columbus, Ohio 43266-0101, March, 2003

APPENDIX 15 (CONTINUED)  
ESTIMATED GROSS MIGRATION NUMBERS BY COUNTY, 1990-2000

COUNTY	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	1990-2000
<b>TOTAL</b>	<b>840,764</b>	<b>831,053</b>	<b>842,789</b>	<b>847,698</b>	<b>871,210</b>	<b>867,592</b>	<b>898,995</b>	<b>892,794</b>	<b>922,752</b>	<b>921,203</b>	<b>8,736,850</b>
ADAMS	1,841	1,850	1,955	1,735	2,073	1,945	2,681	2,714	2,688	2,719	22,201
ALLEN	7,682	7,559	7,191	7,619	7,715	7,411	7,404	7,431	7,435	7,603	75,050
ASHLAND	3,924	3,745	4,000	4,273	4,091	4,463	4,869	5,000	5,216	4,990	44,571
ASHTABULA	6,543	6,397	6,033	6,225	6,394	6,255	6,594	6,473	6,822	6,879	64,615
ATHENS	4,360	4,360	4,604	4,723	4,938	4,925	5,380	5,377	5,315	5,649	49,631
AUGLAIZE	4,075	4,059	4,110	4,108	4,443	4,260	4,079	3,912	3,858	3,935	40,839
BELMONT	4,308	3,690	3,821	3,575	4,039	3,970	4,128	4,392	4,415	4,242	40,580
BROWN	4,392	4,364	4,394	4,725	4,675	4,760	4,599	4,567	4,585	4,845	45,906
BUTLER	31,460	30,818	31,926	32,694	32,819	32,252	34,716	35,015	35,693	35,629	333,022
CARROLL	2,805	2,989	2,888	3,027	3,104	3,197	3,085	3,065	3,150	3,295	30,605
CHAMPAIGN	3,800	3,519	3,621	3,803	3,808	3,803	5,003	4,896	4,896	4,937	42,086
CLARK	11,338	11,234	11,162	10,636	11,029	10,854	10,731	10,545	10,685	10,466	108,680
CLERMONT	19,744	20,132	20,521	20,748	21,082	20,787	24,045	25,111	26,099	26,262	224,531
CLINTON	3,925	3,796	3,760	3,874	4,295	4,262	5,146	5,254	5,488	5,374	45,174
COLUMBIANA	6,872	6,778	6,535	6,764	6,588	6,648	7,030	7,093	6,976	6,888	68,172
COSHOCTON	2,340	2,370	2,374	2,389	2,675	2,503	3,038	2,988	3,026	3,064	26,767
CRAWFORD	3,750	3,790	3,519	3,727	3,601	3,798	4,238	4,126	4,364	4,134	39,047
CUYAHOGA	71,179	69,421	69,692	68,493	71,099	69,300	72,087	72,553	74,701	74,385	712,910
DARKE	3,984	3,745	3,746	3,703	3,725	3,830	4,011	3,727	3,905	3,975	38,351
DEFIANCE	3,222	3,270	3,312	3,389	4,000	3,823	3,727	3,831	3,939	3,579	36,092
DELAWARE	10,415	10,426	11,153	11,979	12,956	13,976	23,966	24,501	26,835	28,357	174,564
ERIE	6,252	6,372	6,265	6,246	6,769	6,618	6,802	6,685	6,875	6,570	65,454
FAIRFIELD	11,212	11,539	12,124	12,274	12,590	12,842	15,299	15,530	17,149	17,100	137,659
FAYETTE	2,739	2,648	2,608	2,596	2,648	2,833	2,616	2,777	2,835	2,850	27,150
FRANKLIN	81,164	80,345	82,491	83,132	85,326	86,463	90,836	90,495	93,961	96,518	870,731
FULTON	3,924	4,077	3,962	4,124	4,194	4,273	3,946	3,804	4,020	3,925	40,249
GALLIA	2,160	2,835	2,833	2,277	2,210	2,186	2,574	2,418	2,432	2,484	24,409
GEAUGA	7,751	7,994	7,942	7,865	7,929	7,943	8,741	8,259	8,675	8,401	81,500
GREENE	20,596	21,450	22,069	21,943	22,537	21,896	21,467	20,577	21,699	20,795	215,029
GUERNSEY	2,926	3,025	3,073	2,826	2,884	2,936	3,095	3,110	3,238	3,123	30,236
HAMILTON	62,820	63,150	63,484	64,433	63,490	61,957	61,862	60,209	62,608	62,417	626,430
HANCOCK	5,792	5,576	5,633	5,566	5,766	6,239	6,216	6,246	6,626	6,508	60,168
HARDIN	2,651	2,413	2,484	2,447	2,630	2,627	2,740	2,617	2,635	2,771	26,015
HARRISON	1,211	1,090	1,098	1,114	1,137	1,122	1,636	1,522	1,567	1,614	13,111
HENRY	2,221	2,307	2,115	2,176	2,533	2,523	2,445	2,388	2,484	2,712	23,904
HIGHLAND	3,498	3,667	3,577	3,613	3,843	3,926	3,625	3,498	3,882	3,875	37,004
HOCKING	2,187	2,295	2,418	2,351	2,497	2,626	2,646	2,714	2,709	2,837	25,280
HOLMES	1,873	1,906	1,783	1,724	1,871	1,889	2,085	2,228	2,259	2,238	19,856
HURON	5,376	5,153	5,324	5,388	5,701	5,666	5,835	5,623	5,768	5,686	55,520
JACKSON	1,993	2,039	2,081	2,166	2,165	2,196	2,490	2,445	2,658	2,592	22,825
JEFFERSON	4,150	4,210	3,925	4,077	4,016	3,953	3,934	4,376	4,116	4,086	40,843
KNOX	4,228	4,163	4,112	4,043	4,085	4,524	4,973	4,532	4,918	4,836	44,414
LAKE	16,822	16,387	16,480	16,471	16,435	15,937	16,834	16,387	16,968	16,231	164,952
LAWRENCE	4,009	3,941	4,125	3,955	4,161	4,083	4,387	4,314	4,341	4,307	41,623

APPENDIX 15 (CONTINUED)  
ESTIMATED GROSS MIGRATION NUMBERS BY COUNTY, 1990-2000

COUNTY	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	1990-2000
LICKING	12,041	11,886	11,970	12,617	12,741	12,559	12,911	12,051	12,709	12,812	124,297
LOGAN	3,580	3,900	3,728	3,756	4,050	4,208	4,129	4,104	4,152	4,016	39,623
LORAIN	18,236	17,733	17,645	18,185	18,466	17,974	18,316	19,103	20,555	19,679	185,892
LUCAS	29,890	28,298	28,759	28,779	29,712	29,480	29,675	29,192	29,932	29,987	293,704
MADISON	4,486	4,322	4,492	4,622	4,682	4,964	4,510	4,505	4,492	4,295	45,370
MAHONING	15,007	14,379	14,717	14,344	15,015	14,993	14,678	14,699	14,796	15,010	147,638
MARION	4,746	4,502	4,456	4,351	4,697	4,589	4,769	4,937	4,778	4,618	46,443
MEDINA	13,837	13,371	13,601	14,112	14,554	14,670	15,446	15,281	16,052	15,977	146,901
MEIGS	1,638	1,569	1,633	1,682	1,918	1,819	1,378	1,261	1,358	1,530	15,786
MERCER	2,322	2,218	2,234	2,283	2,485	2,631	2,541	2,536	2,518	2,618	24,386
MIAMI	9,012	8,954	9,024	9,202	9,128	9,079	9,188	9,272	9,471	9,318	91,648
MONROE	972	901	1,072	968	1,086	969	1,069	1,155	1,178	1,152	10,522
MONTGOMERY	48,759	48,760	49,336	48,314	48,649	47,603	48,727	46,045	46,747	45,682	478,622
MORGAN	947	877	904	807	987	999	1,579	1,508	1,582	1,584	11,774
MORROW	2,988	3,061	3,084	2,862	3,131	3,110	3,176	3,138	3,372	3,113	31,035
MUSKINGUM	5,208	5,231	5,195	5,346	5,371	5,496	5,682	5,390	5,676	5,546	54,141
NOBLE	874	871	997	985	1,007	1,008	863	851	748	703	8,907
OTTAWA	3,788	3,535	3,586	3,738	3,712	3,837	3,530	3,693	3,687	3,807	36,913
PAULDING	1,553	1,694	1,635	1,594	1,601	1,563	1,647	1,553	1,519	1,584	15,943
PERRY	2,596	2,728	2,700	2,784	2,932	3,079	2,525	2,513	2,403	2,469	26,729
PICKAWAY	5,291	4,903	5,157	5,296	5,290	5,632	5,025	5,099	5,283	5,198	52,174
PIKE	2,168	2,256	2,365	2,489	2,949	2,953	2,978	3,286	3,598	3,529	28,571
PORTAGE	14,185	14,313	14,259	14,432	14,954	15,030	14,076	14,420	15,209	15,106	145,984
PREBLE	4,123	3,812	3,921	4,017	3,919	4,001	3,761	3,797	3,362	3,527	38,240
PUTNAM	2,059	2,043	2,116	2,045	2,149	2,104	2,081	2,051	2,014	1,953	20,615
RICHLAND	8,800	8,369	8,247	8,407	8,751	8,778	9,015	8,838	8,914	8,267	86,386
ROSS	4,908	4,731	4,916	4,960	5,279	5,150	4,963	4,820	4,975	5,079	49,781
SANDUSKY	4,479	4,551	4,340	4,300	4,732	4,620	4,534	4,402	4,347	4,394	44,699
SCIOTO	4,268	4,334	4,266	3,918	4,198	4,306	4,501	4,498	4,534	4,620	43,443
SENECA	4,070	3,991	3,984	4,073	4,129	4,158	3,960	3,943	3,802	4,013	40,123
SHELBY	3,382	3,443	3,456	3,695	3,823	4,015	3,721	3,726	3,842	3,674	36,777
STARK	22,482	21,534	21,741	22,096	23,103	22,187	22,066	21,381	22,044	21,427	220,061
SUMMIT	37,124	36,829	38,151	37,708	38,950	39,072	38,116	38,354	39,124	38,938	382,366
TRUMBULL	13,492	12,916	12,980	12,677	13,596	12,874	12,358	12,676	12,487	12,966	129,022
TUSCARAWAS	5,167	5,118	5,037	5,160	5,425	5,615	5,767	5,663	5,926	5,511	54,389
UNION	3,686	3,902	4,226	4,313	4,417	4,476	4,297	4,120	4,026	4,163	41,626
VAN WERT	2,322	2,130	2,165	2,069	2,044	2,173	2,036	2,004	2,138	2,076	21,157
VINTON	798	901	994	919	914	1,146	1,115	919	1,094	1,066	9,866
WARREN	15,785	15,563	17,471	18,440	18,539	18,666	19,026	19,688	22,010	22,646	187,834
WASHINGTON	4,744	4,517	4,606	4,609	4,545	4,506	4,797	4,880	4,569	4,809	46,582
WAYNE	8,446	8,620	8,672	8,440	8,942	9,018	8,705	8,606	8,381	8,486	86,316
WILLIAMS	2,744	2,778	2,650	2,773	3,109	3,138	3,093	2,994	3,057	3,237	29,573
WOOD	12,569	12,191	12,387	12,772	13,255	13,301	13,226	12,866	13,996	13,534	130,097
WYANDOT	1,678	1,624	1,591	1,743	1,708	1,763	1,798	1,651	1,781	1,801	17,138

Data Source: IRS County to County Migration Flows, 1990-2000, Internal Revenue Service, Department of The Treasury, Washington, D.C.  
Prepared by: Ohio Department of Development, Office of Strategic Research, P.O. Box 1001, Columbus, Ohio 43266-0101, March, 2003.

## APPENDIX 16 NUMERICAL AND GRAPHICAL MIGRATION PROJECTIONS

County: Cuyahoga

Y	X	Year	Migration Rate*	Regression Output:	
0.00	0	70-75	-9.49	Constant	-7.80194444
0.00	5	75-80	-7.42	Std Err of Y Est	1.33030866
0.00	10	80-85	-4.86	R Squared	0.69440122
0.00	15	85-90	-4.99	No. of Observations	8
0.00	20	90-95	-3.10	Degrees of Freedom	6
0.00	25	95-00	-3.50	X Coefficient(s)	0.151587302
0.00	30	<b>00-05</b>	<b>-2.00</b>	Std Err of Coef.	0.041054216
0.00	35	<b>05-10</b>	<b>3.27</b>		
0.00	40	<b>10-15</b>	<b>-0.50</b>		
0.00	45	<b>15-20</b>	<b>1.26</b>		
0.00	50	<b>20-25</b>	<b>1.00</b>		
0.00	55	<b>25-30</b>	<b>1.00</b>		

### SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.8333074
R Square	0.6944012
Adjusted R	0.6434681
Standard Er	1.3303087
Observator	8

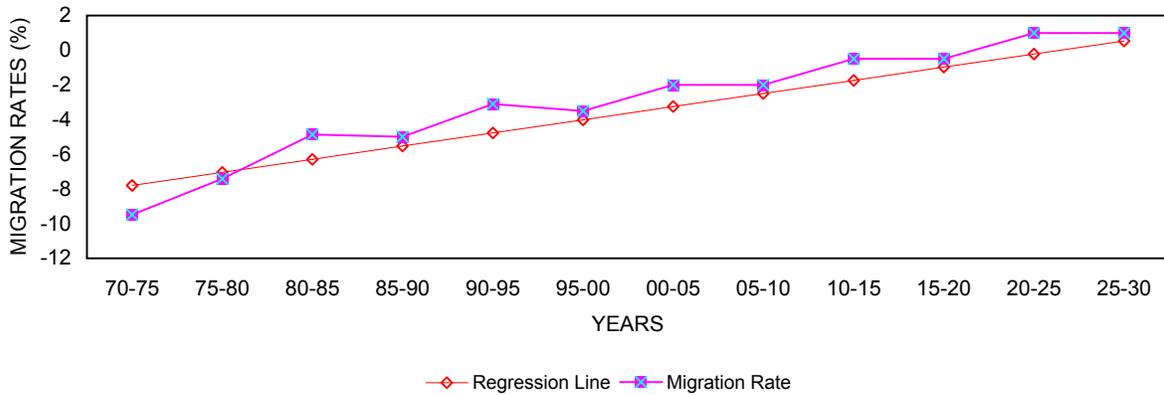
### ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	24.1276455	24.127646	13.63358624	0.010180081
Residual	6	10.61832672	1.7697211		
Total	7	34.74597222			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-7.8019444	0.858710545	-9.085651	9.97949E-05	-9.90313499	-5.7007539	-9.90313499	-5.7007539
X Variable 1	0.1515873	0.041054216	3.6923686	0.010180081	0.051131179	0.25204342	0.051131179	0.25204342

\*: The rates of 1970-2000 are Estimate rates;  
the rates of 2000-2030 are projected rates.

### ESTIMATED & PROJECTED MIGRATION RATES CUYAHOGA: 1970 - 2030



**APPENDIX 17  
AGE AND SEX CONSTRUCTION OF POPULATION PROJECTIONS**

**OHIO**

AGE COHORTS	1990			2000			2005			2010		
	TOTAL	MALE	FEMALE									
0-4	7.24%	7.69%	6.81%	6.65%	6.99%	6.33%	6.38%	6.72%	6.05%	6.12%	6.43%	5.82%
5-9	7.33%	7.78%	6.91%	7.19%	7.57%	6.84%	6.74%	7.06%	6.43%	6.49%	6.81%	6.17%
10-14	7.07%	7.52%	6.65%	7.29%	7.71%	6.90%	7.55%	7.95%	7.17%	7.15%	7.50%	6.81%
15-19	7.32%	7.72%	6.95%	7.20%	7.55%	6.86%	7.41%	7.78%	7.05%	7.73%	8.08%	7.39%
20-24	7.33%	7.53%	7.14%	6.42%	6.60%	6.25%	6.32%	6.46%	6.18%	6.65%	6.87%	6.45%
25-29	8.01%	8.16%	7.87%	6.48%	6.65%	6.32%	5.86%	5.77%	5.95%	5.78%	5.67%	5.88%
30-34	8.54%	8.69%	8.41%	6.91%	7.09%	6.74%	6.71%	6.93%	6.51%	6.15%	6.12%	6.18%
35-39	7.87%	8.02%	7.73%	7.78%	7.91%	7.67%	7.04%	7.28%	6.81%	6.87%	7.16%	6.61%
40-44	7.03%	7.12%	6.94%	8.12%	8.24%	8.00%	7.70%	7.89%	7.53%	6.98%	7.29%	6.69%
45-49	5.53%	5.57%	5.49%	7.35%	7.46%	7.26%	7.88%	8.01%	7.76%	7.48%	7.67%	7.30%
50-54	4.74%	4.73%	4.75%	6.44%	6.49%	6.40%	7.03%	7.13%	6.93%	7.54%	7.65%	7.44%
55-59	4.45%	4.39%	4.50%	4.87%	4.82%	4.92%	5.97%	5.96%	5.99%	6.55%	6.57%	6.52%
60-64	4.58%	4.44%	4.71%	4.01%	3.89%	4.13%	4.41%	4.30%	4.52%	5.45%	5.34%	5.55%
65-69	4.30%	3.97%	4.60%	3.55%	3.33%	3.75%	3.50%	3.29%	3.71%	3.88%	3.66%	4.09%
70-74	3.34%	2.91%	3.73%	3.41%	3.07%	3.74%	2.98%	2.64%	3.29%	2.96%	2.63%	3.27%
75-79	2.48%	1.96%	2.96%	2.87%	2.36%	3.34%	2.71%	2.24%	3.15%	2.38%	1.94%	2.80%
80-84	1.59%	1.09%	2.04%	1.90%	1.40%	2.36%	2.14%	1.57%	2.68%	2.04%	1.49%	2.55%
85+	1.27%	0.69%	1.81%	1.56%	0.87%	2.20%	1.66%	1.01%	2.29%	1.82%	1.13%	2.48%

AGE COHORTS	2015			2020			2025			2030		
	TOTAL	MALE	FEMALE									
0-4	6.07%	6.37%	5.78%	6.08%	6.37%	5.80%	6.10%	6.39%	5.82%	6.04%	6.31%	5.77%
5-9	6.24%	6.54%	5.94%	6.18%	6.47%	5.91%	6.20%	6.49%	5.93%	6.24%	6.52%	5.97%
10-14	6.90%	7.26%	6.56%	6.67%	7.01%	6.35%	6.63%	6.95%	6.31%	6.68%	7.01%	6.37%
15-19	7.38%	7.69%	7.08%	7.19%	7.51%	6.88%	7.01%	7.32%	6.71%	7.04%	7.34%	6.75%
20-24	6.99%	7.20%	6.79%	6.72%	6.93%	6.51%	6.54%	6.77%	6.31%	6.45%	6.71%	6.20%
25-29	6.09%	6.06%	6.13%	6.40%	6.38%	6.43%	6.13%	6.12%	6.14%	5.96%	5.98%	5.94%
30-34	6.06%	6.02%	6.11%	6.39%	6.42%	6.35%	6.69%	6.74%	6.65%	6.46%	6.52%	6.40%
35-39	6.33%	6.37%	6.29%	6.25%	6.28%	6.21%	6.57%	6.68%	6.46%	6.90%	7.03%	6.77%
40-44	6.83%	7.18%	6.49%	6.28%	6.41%	6.15%	6.22%	6.34%	6.09%	6.54%	6.75%	6.34%
45-49	6.78%	7.10%	6.49%	6.62%	6.97%	6.28%	6.11%	6.25%	5.97%	6.05%	6.19%	5.92%
50-54	7.16%	7.33%	7.00%	6.48%	6.77%	6.20%	6.33%	6.67%	6.01%	5.85%	5.98%	5.72%
55-59	7.04%	7.07%	7.02%	6.68%	6.76%	6.60%	6.04%	6.25%	5.84%	5.92%	6.18%	5.68%
60-64	5.99%	5.91%	6.06%	6.44%	6.35%	6.52%	6.12%	6.10%	6.14%	5.54%	5.64%	5.44%
65-69	4.81%	4.58%	5.04%	5.30%	5.07%	5.51%	5.72%	5.49%	5.95%	5.45%	5.28%	5.61%
70-74	3.29%	2.94%	3.62%	4.09%	3.71%	4.47%	4.52%	4.13%	4.89%	4.90%	4.49%	5.30%
75-79	2.37%	1.93%	2.79%	2.64%	2.17%	3.08%	3.28%	2.75%	3.80%	3.64%	3.08%	4.17%
80-84	1.81%	1.31%	2.29%	1.81%	1.31%	2.29%	2.00%	1.46%	2.52%	2.47%	1.84%	3.08%
85+	1.85%	1.15%	2.53%	1.80%	1.10%	2.46%	1.78%	1.09%	2.45%	1.88%	1.15%	2.57%

Prepared by: Ohio Department of Development, Office of Strategic Research, P.O. Box 1001, Columbus, Ohio 43266-0101, March, 2003.