POPULATION ESTIMATES FOR NEW YORK CITY AND BOROUGHS AS OF JULY 1, 2021

Summary of Findings

The U.S. Census Bureau has estimated New York City's population at 8,467,513, as of July 1, 2021, well over a year into the pandemic. This represents a decrease of 336,677 residents, or 3.8 percent, from the April 1, 2020 decennial census count of 8,804,190. Of this decline, 305,465 occurred between July 1, 2020 and June 30, 2021. Population declines were a result of larger than typical domestic outflows, slowed international migration, an increase in deaths due to Covid-19, and fewer births. These once-in-a-century pandemic patterns were temporary, and are likely to have reversed in the second half of 2021, after the estimation period in the current vintage.

New York State experienced a decline of 365,336 people from April 1, 2020 to July 1, 2021 due to a net decrease of 28,659 persons in counties outside the city, in addition to New York City's population decline of approximately 337,000. Of the State's 62 counties, 46 lost population since 2020. Within New York City, all five boroughs experienced population decline, with the largest decline by both number and percent in Manhattan (-6.9 percent), and smaller declines in Brooklyn (-3. 5 percent), the Bronx (-3.2 percent), Queens (-3.1 percent) and Staten Island (-0.5 percent) over the 15-month period.

The decline in the city's population is related to short-term changes in migration patterns and natural increase (births minus deaths) during the Covid-19 pandemic. Domestic migration patterns reflected a large uptick in movement to the suburbs and exurbs of New York City. Net international inflows were near historical lows as national immigration was severely curtailed, in large part due to limited land border crossings with Mexico and Canada and closed consulates abroad. In addition to changes in migration patterns, the birth rate declined nationally during the pandemic, a pattern reflected in New York City's birth rates. Of course, mortality due to Covid-19 affected the total number of deaths, particularly early in the pandemic.

Each of these patterns was temporary, and likely to have lessened or not to have continued into the second half of 2021. Borders have reopened, facilitating international migration; domestic migration for New York City has likely returned to pre-pandemic patterns; birth rates may have rebounded in the second half of 2021 and into 2022 as people who postponed having children choose to have them; and deaths due to Covid-19 are substantially lower than at the start of the pandemic.

In summary, the estimated large decline in the population after the April 1, 2020 Census enumeration date is a result of temporary, pandemic-related phenomena that are limited to the estimation period covered by the Vintage 2021 population estimates. Many of the trends contributing to the decline have attenuated or reversed. It is important to keep in mind that the Vintage 2021 estimate provides us with a window onto the population as of July 1, 2021, not the current population in 2022.

COMPLETE ANALYSIS OF U.S. CENSUS BUREAU ESTIMATES FOR JULY 1, 2021

Introduction

The Census Bureau's Population Estimates Program releases annual estimates of the national, state, and county populations, as well as components of population change – i.e. births, deaths, and net migration. The Vintage 2021 estimates, which include population estimates for July 1, 2020 and July 1, 2021, build in part on results from the 2020 Census, using a demographic procedure known as the "administrative records method." This method assumes that post-2020 Census population change can be closely approximated using vital statistics data on births and deaths, along with other administrative and survey data that provide a picture of migration patterns. Since some critical results from the 2020 Census are not yet available, Vintage 2021 population estimates are also based on the 2020 Demographic Analysis Estimates and the Vintage 2020 population estimates using a process called the "blended base." More details on methodology are available below.

Population estimates are most useful for identifying patterns of change in the city's population. It is important to keep in mind that the Census Bureau's methodology is not robust enough to precisely quantify the magnitude of year-to-year changes, even without the added uncertainty due to the pandemic. It is also important to keep in mind that the estimates are not for the current period, but for the population nine months earlier, as of July 1, 2021. Given the timing of the Covid-19 pandemic, many of the impacts of the pandemic on patterns of population change in 2020 and the first half of 2021 are unlikely to have continued into 2022. The Vintage 2021 population estimates do not account for population changes after July 1, 2021.

Total Population

According to U.S. Census Bureau population estimates, New York City's population decreased from 8,804,190 on April 1, 2020 to 8,467,513 on July 1, 2021. This is a decline of 336,677 residents from the 2020 population, or 3.8 percent. Among the boroughs, Manhattan saw the largest percentage decrease, -6.9 percent or 117,375 persons, followed by Brooklyn (-3.5 percent or 95,022 persons), the Bronx (-3.2 percent or 47,706 persons), Queens (-3.1 percent or 74,321 persons), and Staten Island (-0.5 percent or 2,253 persons) over the 15-month period.

Table 1. Change in Population, Census Bureau Estimates
New York State, New York City and Boroughs, April 1, 2020 and July 1, 2020 to July 1, 2021

	Census	Estimate		Change			
	April 2020	July 2020	July 2021	April 2020 – July 2021		July 2020 – July 2021	
				Number	Percent	Number	Percent
New York State	20,201,249	20,154,933	19,835,913	-365,336	-1.8	-319,020	-1.6
New York City	8,804,190	8,772,978	8,467,513	-336,677	-3.8	-305,465	-3.5
Bronx	1,472,654	1,466,438	1,424,948	-47,706	-3.2	-41,490	-2.8
Brooklyn	2,736,074	2,727,393	2,641,052	-95,022	-3.5	-86,341	-3.2
Manhattan	1,694,251	1,687,834	1,576,876	-117,375	-6.9	-110,958	-6.6
Queens	2,405,464	2,395,791	2,331,143	-74,321	-3.1	-64,648	-2.7
Staten Island	495,747	495,522	493,494	-2,253	-0.5	-2,028	-0.4

Source: U.S. Census Bureau, Population Estimates Program (Vintage 2021)

Manhattan disproportionately accounts for the city's population change, with under a fifth of the overall population, but more than a third of the population losses. Brooklyn and Manhattan taken together form about half of the city's population, but account for nearly two-thirds of the population decline. While the city's population has shown an overall decrease since 2020, declines in the population are largely due to temporary phenomena caused by Covid-19. It is important to note that the Vintage 2021 estimates do not reflect the current time point, but rather July 1, 2021.

Figure 1. New York City Population, 2000, 2010, 2020, and 2021
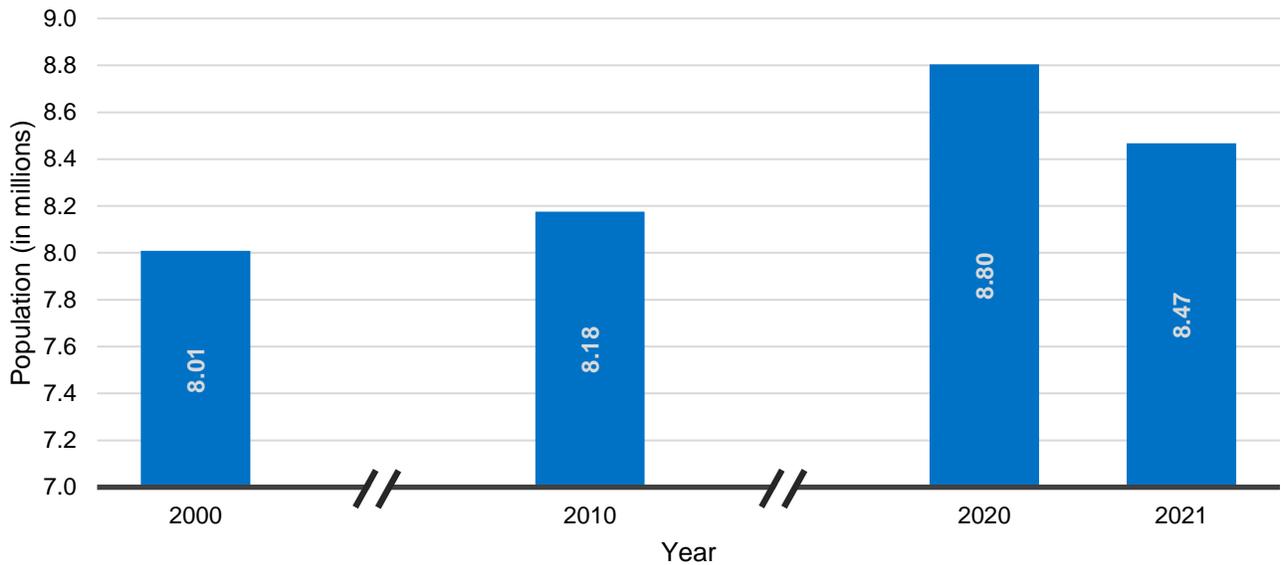
Source: U.S. Census Bureau, 2000 Census, 2010 Census, 2020 Census, and Population Estimates Program (Vintage 2021)

Despite the decline in the population between 2020 and 2021, the July 1, 2021 population estimate represents a large increase in the population from roughly 8.18 million in 2010. The July 1, 2021 population estimate is higher than the 2010 Census enumeration for four of the five boroughs, with the exception of Manhattan, which experienced the largest pandemic-related net domestic migration loss. The short-term decline in New York City's population is likely an anomaly in a longer trajectory of population growth.

Components of Population Change, 2020-2021

Demographers divide population change into components. **Natural increase** represents the difference between births and deaths. **Net migration** represents the balance between persons entering and leaving an area. Together, these components describe how populations change over time. The U.S. Census

Bureau constructs population estimates for all counties in the United States by separately estimating the components of change. Births and deaths are compiled using data from the national vital statistics system. Net migration is a summation of two flows: migration of persons coming in from and leaving for other counties in the 50 states (**net domestic migration**) and the balance of people coming in from and leaving for areas beyond the 50 states (**net international migration**). The net domestic migration rate is derived using income tax returns from the Internal Revenue Service and Medicare enrollment data, as well as data from the Social Security Administration. The methods used by the Population Estimates Program are discussed in more detail below.

New York City has a dynamic population, with several hundred thousand people coming and going each year. This "churn" has long characterized the city. It represents a fluidity that is difficult to capture with a net migration figure, which masks the magnitude of inflows and outflows. The robust migration flows are a testament to the city being a magnet for those seeking opportunities, then moving on, only to be continuously replaced by other individuals. This vibrancy is one aspect of what makes New York City's population extraordinary and different from most other places in the nation and the world.

The most recent estimates from the U.S. Census Bureau indicate the following for the July 2020 to July 2021 period:

- Positive natural increase — The surplus of births over deaths added 29,572 persons to New York City's population between July 2020 and July 2021. While births were lower than typical, and deaths higher, natural increase remained positive during this period, according to Census Bureau estimates.
- Net out-migration — In its customary pattern of migration, New York City experienced losses through migration during the 2020-2021 period, though net domestic outflows were around three-and-a-half times and net international inflows about a quarter of the 2010-2019 average. The population decrease due to net migration totaled 329,754, the result of net domestic losses (-342,449) offset by relatively small international gains (12,695).

- Variation in migration flows by borough — All five boroughs experienced small positive net international migration. Manhattan and Brooklyn experienced the largest net domestic outflows, with more moderate outflows in Queens and the Bronx, and small outflows in Staten Island.

Table 2. Estimates of the Components of Population Change
New York City and Boroughs, July 1, 2020 to July 1, 2021

	Total Population Change	Natural Increase			Net Migration		
		Total	Births	Deaths	Total	Net Domestic Migration	Net International Migration
New York City	**-305,465**	**29,572**	**99,645**	**70,073**	**-329,754**	**-342,449**	**12,695**
Bronx	-41,490	5,551	18,196	12,645	-46,308	-49,840	3,532
Brooklyn	-86,341	14,713	35,247	20,534	-99,455	-102,352	2,897
Manhattan	-110,958	2,231	15,643	13,412	-111,204	-113,642	2,438
Queens	-64,648	6,823	25,490	18,667	-70,420	-74,129	3,709
Staten Island	-2,028	254	5,069	4,815	-2,367	-2,486	119

Note: Population change was calculated using the July 1, 2020 and 2021 population estimates. The estimated components of population change will not equal the numerical population change because of a small residual after controlling to the national totals.

Source: U.S. Census Bureau, 2020 Census and Population Estimates Program (Vintage 2021)

Declines in the city's population from 2020 to 2021 are closely related to pandemic-influenced patterns. All four components of change were influenced in some form by the pandemic.

- New York City typically has negative net domestic migration, reflecting the churn of people moving to and from the City. Outflows from New York City were exaggerated during the pandemic,[1] as many more chose to move to suburbs or exurbs, a pandemic-era phenomenon occurring in urban areas across the country. Net domestic migration was estimated at an average

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[1] New York City Office of the Comptroller. November 15, 2021. "The Pandemic's Impact on NYC Migration Patterns." Report, Available at https://comptroller.nyc.gov/reports/the-pandemics-impact-on-nyc-migration-patterns/

of approximately -98,000 per year from 2010 to 2019,[2] but outflows in the 2020-2021 period were around three-and-a-half times that level.

- Immigration to New York City, a destination for many international migrants, slowed as a result of pandemic shutdowns and federal policies restricting international movement. During the pandemic, international migration was at a multi-decade low, while land border crossings were severely restricted and many consulates were closed.[3] In the year leading up to July 2021, net international migration to New York City was estimated at about 12,700,[4] compared to an estimated annual average of over 53,000 per year from 2010 to 2019. Net international migration for the country as a whole was under 250,000 from July 2020 to July 2021, compared to a little over 1 million annually in the middle of the previous decade.

- The number of births in New York City has been declining in recent years, estimated at about 121,000 from July 2010 to July 2011 and about 107,000 from July 2018 to July 2019. Births dropped to under 100,000 for year leading up to July 2021. The decline in births in New York City mirrors national trends. Total births in the United States were estimated at 3.77 million in the period from July 2018 to July 2019, and 3.75 million from July 2019 to July 2020, but dropped to 3.58 million in the year leading up to July 2021.[5]

- Deaths, which averaged approximately 54,000 per year from 2010 to 2019, increased sharply due to Covid during the current estimation period, with just over 70,000 estimated for the year

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[2] U.S. Census Bureau, Population Estimates Program Vintage 2020 and Vintage 2021 Population Estimates, Available at https://www.census.gov/programs-surveys/popest/technical-documentation/research/evaluation-estimates/2020-evaluation-estimates/2010s-counties-total.html

[3] Schachter, Jason, Pete Borsella, and Anthony Knapp. December 21, 2021. "Net International Migration at Lowest Levels in Decades: New Population Estimates Show COVID-19 Pandemic Significantly Disrupted Migration Across Borders." U.S. Census Bureau, America Counts: Stories Behind the Numbers. Available at https://www.census.gov/library/stories/2021/12/net-international-migration-at-lowest-levels-in-decades.html

[4] For 15-month change between the April 1, 2020 Census enumeration and the July 1, 2021 population estimate, see the appendix.

[5] U.S. Census Bureau, Population Estimates Program Vintage 2020 and Vintage 2021 Population Estimates, Available at https://www.census.gov/programs-surveys/popest/technical-documentation/research/evaluation-estimates/2020-evaluation-estimates/2010s-counties-total.html and https://www.census.gov/data/tables/time-series/demo/popest/2020s-national-total.html

leading up to July 2021. The New York City Department of Health and Mental Hygiene indicates about 10,000 deaths due to Covid-19 alone during the year from July 2020 to July 2021.[6]

Figure 2 below shows estimated annual births, deaths, and net international migration for the United States from 2000 to 2021 from the Population Estimates Program. The estimates for the components of change for July 2020 to July 2021 is highlighted on the right side of the graph. While births and international migration were trending downward before the pandemic, these trends were accelerated in the 2020-2021 period due to Covid-19. Similarly, while deaths were trending upward before the pandemic, this trend was also accelerated.

**Figure 2. Components of Population Change
United States, 2000-2021**
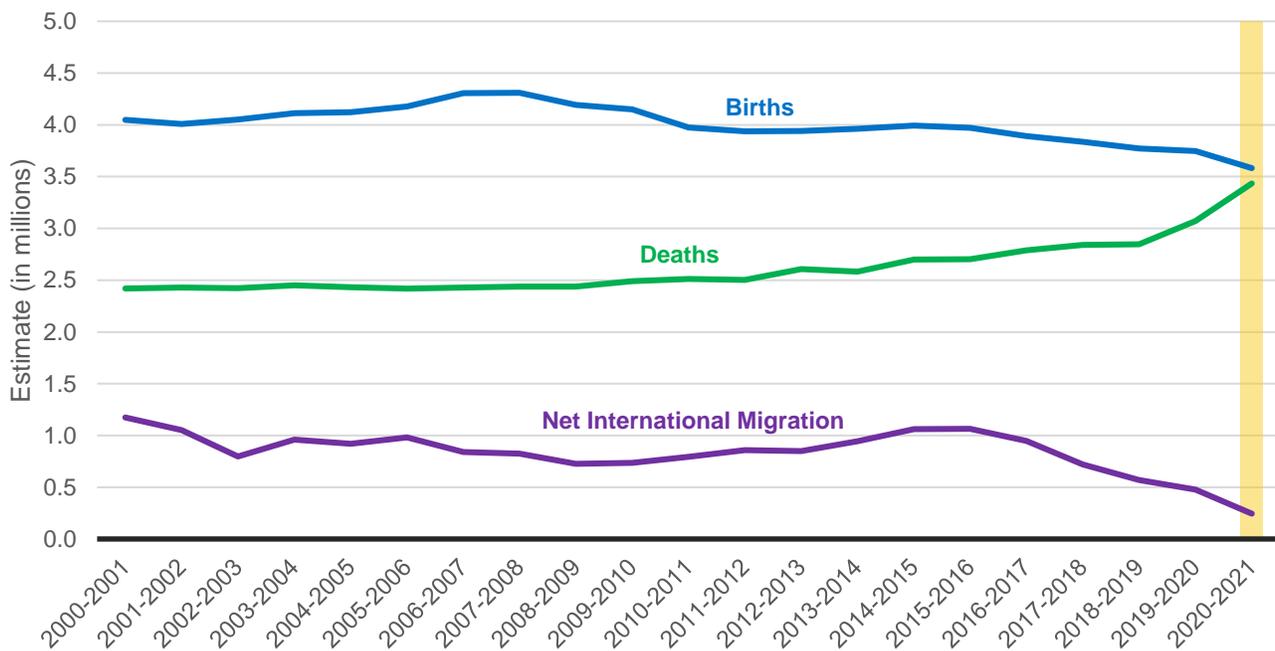
Source: U.S. Census Bureau, Vintage 2010 Population Estimates, Vintage 2020 Population Estimates, Vintage 2021 Population Estimates

[6] New York City Department of Health and Mental Hygiene, NYC Coronavirus Disease 2019 (COVID-19) Data, Available at https://github.com/nychealth/coronavirus-data/blob/master/trends/deaths-by-day.csv, Retrieved March 22, 2022

The atypical components of change for New York City reflect broader national patterns during the pandemic. In New York City, population growth is typically the result of positive natural increase as well as international migration, offset by domestic migration losses. During the pandemic period, captured neatly by the Vintage 2021 estimates, components of change contributing to population gains were curtailed while components contributing to population losses were exaggerated, leading to an atypical change in the population since the 2020 Census. As New York City and the country emerge from the pandemic, each of these patterns is likely to attenuate or reverse.

While natural increase and net international migration – which typically drive population growth in New York City – were both lower than in recent years, New York City's population losses were largely driven by net domestic outflows. These outflows were concentrated in Manhattan and Brooklyn, two boroughs that likely disproportionately experienced the brunt of pandemic-related migration away from New York City.[7]

Trends After July 1, 2021

Births, deaths, net international migration, and net domestic migration all experienced short-term shifts due to Covid-19. As can be seen in Figure 2 above, the components of change for the year leading up to July 2021 are atypical for the country over the past two decades, and New York City likewise experienced atypical components of change during this period. It is likely that each of the components of change has returned to more typical patterns in the second half of 2021, after the estimation period captured by the Vintage 2021 estimates.

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[7] New York City Office of the Comptroller. November 15, 2021. "The Pandemic's Impact on NYC Migration Patterns." Report, Available at https://comptroller.nyc.gov/reports/the-pandemics-impact-on-nyc-migration-patterns/

- While there were temporary large outflows from New York City to suburbs and exurbs, particularly early on in the pandemic, data suggest that New York City migration flows are returning to their pre-pandemic patterns of more moderate losses through migration.[8]

- As borders and consulates reopen, international migration is likely to increase nationwide again. With New York City a hub for international migrants, and as restrictions on international flows ease, immigrants will continue to make New York City their home.

- Early evidence points to a possible rebound in U.S. birth rates in March 2021, after a drop in births due to Covid-19 in late 2020 and early 2021.[9] This could indicate that the downward pressure on birth rates due to Covid-19 was isolated to a short period that ended before summer 2021. Outside of the United States, birth rates of some countries have risen in March 2021 compared to March 2020, indicating a broader potential pattern of "catch-up" births as people have children they initially postponed at the start of the pandemic. New York City and the United States may also experience this "catch-up" period.

- The average number of deaths per day due to Covid-19 in New York City has declined substantially from 28 over the period from July 2020 to July 2021, to 11 in the first two weeks of March.[10] While deaths due to Covid-19 continue, they are currently far lower than earlier in the pandemic.

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[8] New York City Office of the Comptroller. November 15, 2021. "The Pandemic's Impact on NYC Migration Patterns." Report, Available at https://comptroller.nyc.gov/reports/the-pandemics-impact-on-nyc-migration-patterns/

[9] Morse, Anne. September 21, 2021. "U.S. Births Declined During the Pandemic: Fewer Babies Born in December and January but Number Started to Rise in March." U.S. Census Bureau, America Counts: Stories Behind the Numbers. Available at https://www.census.gov/library/stories/2021/09/united-states-births-declined-during-the-pandemic.html

[10] New York City Department of Health and Mental Hygiene, NYC Coronavirus Disease 2019 (COVID-19) Data, Available at https://github.com/nychealth/coronavirus-data/blob/master/trends/deaths-by-day.csv, Retrieved March 22, 2022. Note: Average calculated by DCP using both confirmed and probable deaths.

U.S. CENSUS BUREAU POPULATION ESTIMATES METHODOLOGY

Each year, the U.S. Census Bureau's Population Estimates Program (PEP) produces estimates of the population for states, counties, cities and other places, as well as for the nation as a whole. Starting with a base population, the population is estimated using components of change, i.e. births, deaths, and migration.

Typically, the latest decennial census is used to produce the estimates base, however the Census Bureau needed to make use of additional data sources to produce the Vintage 2021 estimates base. While basic demographics are available from the 2020 Census, some key detailed data are not yet available; these data are required for the estimation process, for example to create linkages with administrative data sets used for births and domestic migration. In addition, the Population Estimates Program has not yet been able to evaluate the suitability of the 2020 Census data for use as a base, given delays in releasing key results. To address these issues, the PEP has adopted a **blended base** for its Vintage 2021 estimates. The blended base draws information from three sources: the 2020 Census (PL 94-171 Redistricting File), the 2020 Demographic Analysis (DA) Estimates, and the Vintage 2020 Population Estimates. The 2020 Census provides national, state, and county population totals. The age and sex distributions from the DA and the race and Hispanic origin distributions from the Vintage 2020 estimates are applied to the national population total to produce national estimates. Finally, age, sex, race, and Hispanic origin distributions from the Vintage 2020 estimates are used to estimate state- and county-level populations by characteristics.

For each county in the U.S., the Census Bureau subtracts the annual number of resident deaths from the annual number of resident births to derive annual growth due to **natural increase**.[11] Births are tabulated by residence of the mother, regardless of where the birth occurred. Similarly, deaths are tabulated by the

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[11] Data on births and deaths are generally considered to be the most reliable part of the components of change analysis.

most recent residence of the decedent, regardless where the death occurred. Data are from the National Center for Health Statistics, derived from birth and death certificates, as well as from the Federal-State Cooperative for Population Estimates. Data on births and deaths are made available to the Census Bureau with a delay. Data for the most recent years are extrapolated.[12]

Net Domestic Migration represents the net exchange between one county and all other counties in the 50 states and the District of Columbia. This component is estimated for three age groups (0-17, 18-64, and 65 years of age and older). For ages 0 to 64, the U.S. Census Bureau uses data on filers, spouses, and dependents from federal income tax returns supplied by the Internal Revenue Service (IRS).

In-migrants and out-migrants between counties, as well as non-migrants, are identified by comparing the addresses of income tax filers from one year to the next to determine residence at two points in time. For example, in-migrants to a given county in 2021 are defined as those with an address in the county in 2021, but outside the county in 2020; out-migrants as those with an address in the county in 2020, but outside the county in 2021; and non-migrants as individuals who filed tax returns in the same county at both points in time. Since not every U.S. resident files a tax return or is claimed as an exemption, these data cannot be used to directly estimate the number of county-to-county migrants. Instead, a net domestic migration rate is calculated by taking the difference between the number of in- and out-migrants (net migrants) and dividing it by the sum of the non-migrants and out-migrants, calculated separately for those age 0-17 and those 18-64, and applying the rate to the population within the applicable age range. Since many retired persons do not file tax returns, to determine domestic migration for the population 65 years of age and older, the U.S. Census Bureau compares addresses from one year to another in the individual Medicare enrollee records in much the same way as they use IRS data. The

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[12] County-level birth and death data for the most recent period were extrapolated from prior years and then adjusted to the national figures to take into account the effects of Covid-19.

NUMIDENT and Demographic Characteristics File are used to allocate age, sex, race, and Hispanic origin.

Net International Migration is the balance of migration flows to and from foreign countries and Puerto Rico. These flows are sub-divided into five parts: immigration of the foreign-born, emigration of the foreign-born, net migration between the U.S. and Puerto Rico, net migration of natives to and from the United States, and net movement of the Armed Forces population to and from the United States.

Net international migration sub-components are estimated at the national level, and then distributed down to states and counties using American Community Survey 1-year and 5-year data, except for estimating the movement of the Armed Forces population, which is estimated using a combination of data from the Defense Manpower Data Center and American Community Survey 5-year data.

The Census Bureau relies on the ACS Residence-One-Year-Ago (ROYA) question to estimate foreign-born immigration. Foreign-born immigration is estimated separately for Mexico and All Other Countries.[13] Net migration between the United States and Puerto Rico is also estimated using the ROYA question in the ACS and the Puerto Rico Community Survey, as well as Bureau of Transportation Statistics Airline Passenger Traffic data. Emigration of the foreign-born is estimated using the residual method. Change in the foreign-born population is estimated using mortality and immigration estimates, which are then compared to change in the foreign-born population estimated using American Community Survey 1-year files. The difference between estimated change in the foreign-born population and what is accounted for by mortality and immigration serves as the basis for estimating emigration rates. Emigration rates are estimated separately for several groups based on country or region of origin and number of years since entry into the United States.

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[13] Since the 2020 ACS 1-year estimates could not be used for the Vintage 2021 estimates because of data quality issues due to Covid-19, the historical correlation between estimated international flows and number of visas issued was used to estimate international migration in 2020 and 2021.

Net migration of the native-born is estimated using population register and census data from approximately 80 countries, comparing U.S.-born or U.S. citizen populations at two points in time.

APPENDIX

Table 3. Estimates of the Components of Population Change
New York City and Counties, April 1, 2020 to July 1, 2021

Geographic Area	Total Population Change	Natural Increase			Net Migration		
		Total	Births	Deaths	Total	Net Domestic Migration	Net International Migration
New York City	**-336,677**	**38,564**	**124,750**	**86,186**	**-370,153**	**-383,105**	**12,952**
Bronx	-47,706	7,108	22,690	15,582	-54,179	-57,953	3,774
Brooklyn	-95,022	18,675	43,990	25,315	-112,175	-115,005	2,830
Manhattan	-117,375	3,298	19,755	16,457	-118,684	-121,225	2,541
Queens	-74,321	9,024	31,973	22,949	-82,321	-86,008	3,687
Staten Island	-2,253	459	6,342	5,883	-2,794	-2,914	120

Note: Population change was calculated using the 2020 Census and the 2021 population estimate. The estimated components of population change will not equal the numerical population change because of a small residual after controlling to the national totals.

Source: U.S. Census Bureau, 2020 Census and Population Estimates Program (Vintage 2021)

March 24, 2022