ABOUT MORTALITY DATA FOR COSTA RICA

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GENERAL

Costa Rica established its first statistical agency, the *Dirección General de Estadística*, in 1883 and immediately began conducting population censuses (Pérez-Brignoli, 2010). In 1888, responsibility for the collection of vital registration data was transferred from the traditional parish registers to the *Dirección General de Estadística*. In 1998, the *Dirección General de Estadística* was renamed *Instituto Nacional de Estadística y Censos* (INEC). Civil registration data are regarded as exhaustive as of 1961 by the United Nations (United Nations, 1961). Due to concerns about data quality, we believe that mortality estimates derived from unadjusted death counts are not reliable prior to around the year 1984, although we have collected raw data dating back to 1950. Data quality appears to be much lower prior to the 1980s (for details, see related Data Quality Summary).

Sources of Data

Official vital statistics, population estimates, and census counts are made available on-line by the *Instituto Nacional de Estadística y Censos* through its collaboration with the *Centro Centroamericano de Población* (CCP), *Universidad de Costa Rica*. Aggregate data tables for the period since 1970 can be easily produced from individual vital statistics data available on the following website: http://censos.ccp.ucr.ac.cr. From this website, we obtained: a) annual birth counts by year of occurrence, year of registration, and sex for 1972-2013; b) annual death counts by year of occurrence, year of registration, single year of age, and sex for 1970-2013; c) census counts by sex and single year of age for 1973, 1984, 2000, & 2011; d) official annual population estimates as of June 30th by sex and single year of age for 1950-2014.

Birth counts for 1950-1971 came from the annual vital statistics volumes (*Principales Hechos Vitales Occuridos en Costa Rica* prior to 1964; *Estadística Vital* since 1964). Death counts for 1950-69 were downloaded from the Latin American Mortality Database (LAMBdA, http://www.ssc.wisc.edu/cdha/latinmortality/). Census counts from 1950 and 1963 came from publications by the *Instituto Nacional de Estadística y Censos,* which can be downloaded from CCP's Virtual Library (http://biblioteca.ccp.ucr.ac.cr/) at:

http://ccp.ucr.ac.cr/bvp/censos/1950/pdf/cuadro04-50.pdf (1950 Census)
http://ccp.ucr.ac.cr/bvp/censos/1963/pdf/cuadro50-63.pdf (1963 Census).

Specific Episodes in Costa Rica Demographic History

The population of Costa Rica has enjoyed a stable democratic government for the past sixty years and has one of the wealthiest economies in Latin America and the Caribbean. Characterized by the longest life expectancy at birth in the region—over 79 years in 2014, compared with 58 years in 1950 (CCP, 2009; INEC, 2016)—Costa Rica also has a low and continuously declining level of fertility, with a TFR of 1.8 in 2015, compared with 7.0 in 1955 (INEC, 2017a). Considering its favorable political, social, and

economic circumstances, Costa Rica has received increasingly large flows of migrants from less privileged neighboring countries over the past three or four decades. These migrants come from Nicaragua in particular as well as from El Salvador, Guatemala, Honduras, and Panama (Otterstrom, 2008; Wiley, 1995). In the 1980s, most migrants arrived in Costa Rica for political reasons, many as refugees. With the democratization of these countries' regimes starting in 1990, economic factors have become the most prominent cause. The stock of immigrants in the 2011 census was 386,000 or 9% of the total population; Nicaraguans comprise 75% of the foreign-born population (INEC, 2017b). After adjusting the census counts for under-enumeration, the foreign-born population is estimated at around 500,000, representing nearly 11% of the total population (CCP, 2013, Cuadro 11).

TERRITORIAL COVERAGE

There was no change in territorial coverage for the period starting in 1950.

DEATH COUNT DATA

Coverage and Completeness

The data cover all deaths to residents (including deaths of Costa Ricans that occurred in a foreign country). Death registration is required by law for burial purpose. A comparison of vital registration data with census data and voting registries suggests that the accuracy of the data, including the information on age at death, is very high (Rosero-Bixby, 2008). One report suggests that death records were already 92% complete in 1970 and that continuing progress has increased this figure to 99% as early as in 1990 (Solano, 2009). One lingering issue is that of delayed registration. For example, only 94% of deaths that occurred in 1971 were registered that same year; 4% were recorded the following year, and the remaining 2% were registered two to nine years after the year of death (authors' tabulations). By 2000, delayed registration of deaths comprised less than 4% of all deaths, with 3% of deaths that occurred in 2000 recorded one year later and 0.4% two to three years later (Solano, 2009).

Specific Details

Prior to 1970, death counts are available only by year of registration, not by year of occurrence.

POPULATION COUNT DATA

The first national population census was conducted in November 1864. Additional censuses occurred in 1883, 1892, 1927, 1950, 1963, 1973, 1984, 2000, and most recently, 2011. In addition, CCP, in collaboration with the INEC, has produced population estimates by single year of age and by sex for every year starting in 1950. These estimates were updated in 2016 and are available online at http://censos.ccp.ucr.ac.cr/. The document describing how these estimates were produced is available at: http://ccp.ucr.ac.cr/observa/CRnacional/index.html. We use these official annual population estimates published by CCP/INEC as the basis for computing mortality rates and life tables. The official census counts are used only for comparison.

Coverage and Completeness

All censuses cover the entire national (*de jure*) population. Evaluation of the census data indicates a significant under-count. Estimates indicate that census coverage improved progressively up to the 1973 census (when under-count is estimated to have reached 0.9% compared with 6.5% in the 1950 census and 3.2% in the 1963 census) (Rosero-Bixby, 2004, Cuadro 1; Gómez Barrantes, 1972; INEC-CCP, 2002). However, the following census, in 1984, was again characterized by significant under-count (6.5%). In the 2000 Census, the under-count was estimated at 2.9% of the total population (INEC-CCP, 2002). The estimated under-count for the most recent Census (2011) was 6.2% (CCP, 2013, p. 18).

The under-count appears to have particularly affected children below 5. In this age group, the under-enumeration reached 9.2% in the 1963 census (Jimenez, 1967; cited in Pérez-Brignoli, 2010, p. 81), 4.2% in the 1973 census (CELADE-DGEC, 1976, p. 19), 9.3% in the 1984 census (MIDEPLAN, CELADE, & DGEC, 1988), 5.3% in the 2000 census (Solano, 2009), and 8.3% in the 2011 census (CCP, 2013, Cuadro 8).

Considering the relatively large number of immigrants to Costa Rica, a significant proportion of undocumented aliens (mostly from Nicaragua) might contribute to the census under-count, though probably not at younger ages. Evaluation of the 2011 census suggests that the under-count was much higher for foreign-born residents (22%) than for those born in Costa Rica (4%) (CCP, 2013, p. 18).

BIRTH COUNT DATA

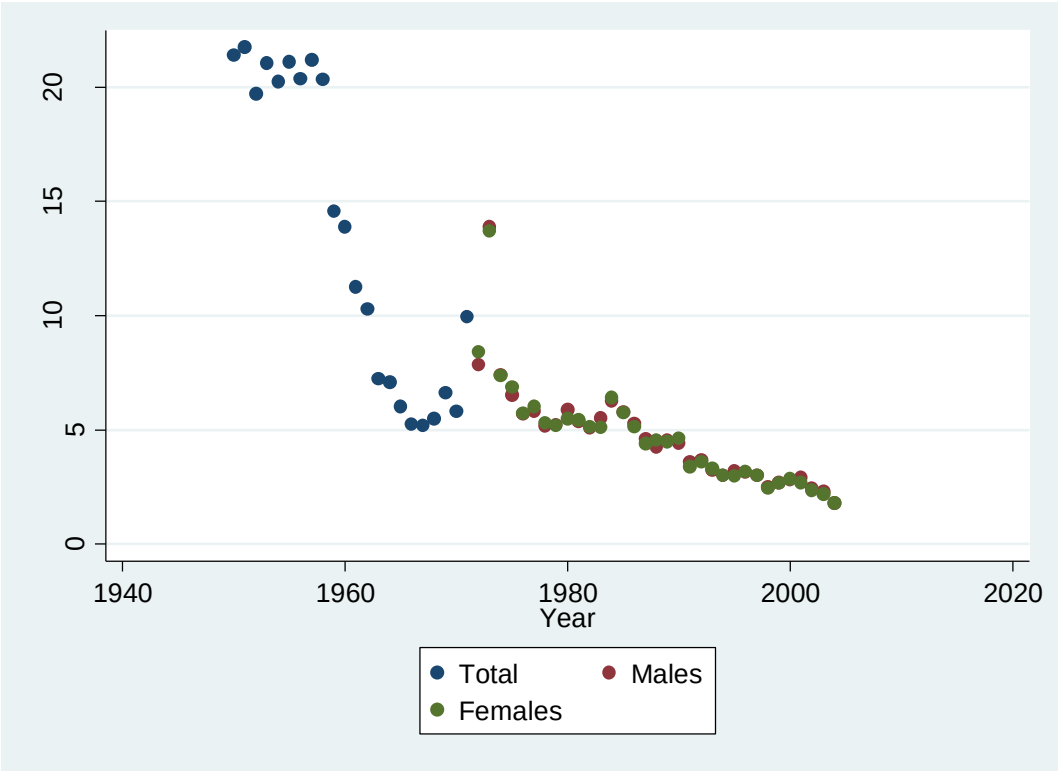
Coverage and Completeness

In recent years, birth registration is believed to be virtually complete in Costa Rica, reaching more than 99% a year since the early 1990s (Solano, 2009). Like for death records, the main remaining issue is that of delayed registration. The proportion of births that are registered late has declined over time, but in the 1950s such delayed registration was substantial. We compiled the birth counts by both year of birth and year of registration (including births registered up to nine years after the birth year). These data indicated that delayed registration of births declined from more than 20% in the 1950s to less than 2% in 2004 (Figure 1).[*] There is no indication that delayed registrations vary by sex (after 1972; prior to 1972, the sex distribution of delayed registrations is not available).

[*] In 2004, more than 98% of births were registered that same year, while most of the remainder were registered in the following year; only 0.4% were registered more than two years late (author's calculations). Thus, birth counts for recent years are likely to be incomplete, particularly those for the last three years of the data series. For example, birth counts for the last year of the data series (2013) include only those births registered in that same year; given historical patterns, we would estimate that up to 2% of the births that actually occurred in 2013 will be registered within the next nine years (and can then be included in the updated data series). Birth counts for the penultimate year of the data series (2012) are likely to be more than 99% complete. We judge birth counts prior to 2005 to be virtually complete because they include all births registered up to nine years after the birth year.

Even though we include births registered up to nine years later, those counts may still be an under-estimate because they omit those who died before they could be registered. That may not be such a problem in recent years, when infant mortality rates and the proportion with delayed registration are both low. In earlier years (e.g., 1950s), it could be a notable problem. Gómez (2009, Cuadro 6, p. 17) reports that 48,500 births occurred in 1955 and were registered within 10 years; he estimates that adjusting for mortality would increase the birth count for 1955 by 2.7% to 49,800 births.

Figure 1. Proportion of Births 1950-2004 that were registered later than the year of occurrence



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APPENDIX A:
DESCRIPTION OF DATA USED FOR LEXIS DATABASE

DEATHS

Period	Type of Data	Age Grouping	Comments	RefCode(s)†
1950-1969	Annual number of deaths, by year of registration, sex, and 5-year age groups (5x1) except for first and last age intervals	0, 1-4, 5-9,…80-84, 85+, unk	Death counts are available only by year of registration, not by year of occurrence. There are no deaths of unknown age for 1950, 1967, or 1968. Deaths of unknown age for those years were redistributed proportionately.	21
1970-2013	Annual number of deaths, by year of occurrence, sex, and single year of age with open interval for ages 100+	0, 1,…99, 100+	Deaths of unknown ages have already been redistributed using the "hot-pack" procedure.* These counts includes only deaths registered through 2013. Deaths counts for 2013 in particular are likely to be incomplete because of delayed registration.	20

* Published data show the unknown category. For the period since 2001, these data can be obtained online at: http://www.inec.go.cr/Web/Home/GeneradorPagina.aspx. For example, in the year 2012, only 9 deaths (<0.1% of all deaths) were of unknown age. In 2001, deaths of unknown age comprised 0.6% of all deaths.

POPULATION ESTIMATES

Period	Type of Data	Age Grouping	Comments	RefCode(s)
1950-1981	Population estimates as of June 30, by sex and single year of age to 98+	0,1,…97,98+		40
1982-2014	Population estimates as of June 30, by sex and single year of age to 100+	0,1,…,99,100+		40

BIRTHS

Period	Type of Data	Comments	RefCode(s)
1950-1971	Annual number of live births by year of occurrence and year of registration	These birth counts were not available by sex; we estimated the sex distribution (see NoteCode 1). We included births registered up to nine years after the birth year.	1-10
1972-2013	Annual number of live births by year of occurrence, year of registration, and sex	We included births registered up to nine years after the birth year. Includes only birth registered through 2013. Birth counts since 2005 are likely to be incomplete because of delayed registration.	11

APPENDIX B:
ADDITIONAL DATA USED ONLY FOR COMPARISON

CENSUS COUNTS

Period	Type of Data	Age Grouping	Comments	RefCode(s)
1950	Census counts by sex and single year of age to 100+ with age unknown category as of May 22nd	0,1,…,99,100+, unk		35
1963	Census counts by sex and single year of age to 100+ with age unknown category as of March 31st	0,1,…,99,100+, unk		30
1973	Census counts by sex and single year of age to 99+ as of May 14th	0,1,…,99+		31
1984	Census counts by sex and single year of age to 99+ as of June 11th	0,1,…,99+		32
2000	Census counts by sex and single year of age to 99+ as of June 28th	0,1,…,99+		33
2011	Census counts by sex and single year of age as of June 1st*	0,1,…max		34

max = Maximum age attained; unk = unknown age
* Census was conducted between May 30, 2011 and June 3, 2011.