

MORTALITY CRISES IN THE JESUIT MISSIONS OF PARAGUAY, 1730-1740

by
Robert Jackson

Scholars of the European-Native interface in the Americas after 1492 generally stress demographic change among the indigenous populations of the Americas as one of the more important consequences of sustained contact between the Old and New Worlds. However, many discussions of the process of demographic change during the first centuries after 1492 do not benefit from detailed sources that enable a detailed analysis of mortality crises that decimated native populations. A mortality crisis is generally defined as x3 normal mortality, and the general assumption is that recurring mortality crises decimated the native populations, causing drastic population declines.

This essay examines a series of mortality crises in the Jesuit missions of Paraguay between 1730 and 1740 that is well documented in contemporary documents. Three epidemics spread through the missions in 1733, 1735-1736, and 1738-1740. Epidemics usually spread along established trade routes, or when large numbers of people were on the move and carried infection in their bodies. The Jesuit missions of Paraguay participated in regional trade, and the coming and goings of people and goods facilitated the spread of contagion. The larger Rio de la Plata region was also a contested borderland, and thousands of Guarani militia from the missions participated in periodic campaigns against the Portuguese or were mobilized for possible military action. Royal officials mobilized the Guarani militia in the mid-1730s for possible action against the Portuguese in the disputed borderlands during a period of undeclared warfare that lasted until 1737. Moreover, the 1720s and 1730s also witnessed civil disorder in Paraguay known as the Comunero Revolt, and civil war, and royal officials also mobilized Guarani militiamen to defeat the rebels. The movement of goods within the region, the mobilization of thousands of Guarani militiamen, and the movement of troops created conditions ideal for the spread of highly contagious crowd diseases such as smallpox and measles.

Many scholars assume that the native peoples of the Americas had no natural immunities to the Old World diseases introduced into North and South America after 1492, and that the survivors of outbreaks acquired a degree of immunity. However, there is no evidence to support this assumption, and reference to demographic patterns in early modern Europe helps place the affects of epidemics on the native peoples into context.¹ Epidemics of smallpox, measles, bubonic plague, and other maladies swept through Europe's populations, and killed both adults and children. These epidemics usually occurred once a generation when there were enough potential hosts for the pathogens to spread and sustain the contagion, and then faded away. Moreover, disease killed thousands of young children every year, and respiratory ailments killed the young and old during the colder months of the year. However, the periodic epidemics and chronic ailments only slowed population growth, and the European populations recovered following the periodic mortality crises and during most of the early modern period experience slow to moderate growth.

How did the populations of the Jesuit missions of Paraguay compare to contemporary European populations? Did the mission populations recover following severe mortality crises? This essay outlines mortality patterns during the three epidemics that occurred during the 1730s, but also mortality and fertility in the years following the epidemics to determine if the mission populations recovered and grew. This in turn will document the short and long term consequences of the epidemics for the mission populations. This essay first examines the chronology and then the affects on the native populations of the epidemics. The first is the 1733 outbreak.

The timing and trajectory of the 1733 outbreak suggest that it may have traveled northward from Buenos Aires along the Parana River and Uruguay River following established trade routes, and/or with the return of thousands of Guarani militiamen from service in the *Banda Oriental*. In 1733, the heaviest mortality was in the missions in what today is southeastern Paraguay, including San Ignacio Guazu, Nuestra Senora de la Fe that experienced the largest number of deaths among the thirty missions with a total of 2,618 on the year, Santa Rosa, and Itapua. Several of the missions located east of the Parana River also experienced high mortality, including Loreto and Santa

Ana. Mortality was not as high among the missions along and east of the Uruguay River, with the exceptions of La Cruz and San Luis Gonzaga.

A second epidemic spread through the region in 1735 and 1736, although total mortality was not as high as in 1733. The epidemic appears to have been localized. The highest mortality was in two clusters of missions. One was centered on Loreto, which experienced the largest number of deaths of all of the missions on the year with a total of 1,321. Other missions affected included San Cosme, Santa Ana, San Ignacio Mini, Corpus Christi, and San Jose. There were smaller numbers of deaths at neighboring missions. The second cluster of missions was located on both sides of the Uruguay River, in close proximity to each other. This group included Santa Maria la Mayor, San Francisco Xavier, San Nicolas with a total of 726 deaths, and San Luis, and again with lesser number of deaths at several neighboring missions including Martires and San Lorenzo Martir.

The third epidemic during the decade identified as smallpox broke out between 1738 and 1740. The heaviest mortality was in 1738, but the continuation of large numbers of deaths into 1739 and 1740 suggests that the contagion first spread through the western part of the mission region and then to the eastern part of the mission region at the end of 1739 and into the first months of 1740, summer in the Rio de la Plata region which is when epidemics would be most likely to occur. The contagion struck all three mission communities located on the west bank of the Uruguay River in what today is Corrientes, but did not cross over the river to San Francisco de Borja located on the east bank of the river opposite Santo Thome which suggests the implementation of quarantine measures. Among these three missions the largest number of deaths was at La Cruz, where 1,605 died in 1739 and another 186 in 1740.² The number of deaths at the neighboring missions Yapeyu and Santo Thome was lower, showing variation in mortality from mission to mission. The epidemic killed 1,279 at Santa Maria la Mayor and lesser numbers of people at Martires and Concepcion. all located on or near the Uruguay River. These mission communities may have suffered higher losses in the previous year as well.

The contagion killed the largest number of people in the mission communities located east of the Uruguay River, and even here the spread of the epidemic was limited to four of the seven mission communities located east of the river. A total of 1,708 people died at San Nicolas, the westernmost of the missions, 2,445 at San Luis, and 2,681 at San Lorenzo located east of San Luis. The contagion apparently arrived at San Juan Bautista at the end of 1739, and 376 died on the year at that mission. However, most of the victims of the epidemic at San Juan Bautista died in the early months of 1740, and 2,400 died on the year at the mission. Interestingly, the epidemic did not kill many people at the last two and easternmost of the missions east of the Uruguay River, which again suggests the effective implementation of quarantine measures. At Santo Angel Custodio mission 258 died in 1739, and mortality at San Miguel was within normal ranges in both years.

How did epidemics change the populations and social organization of the missions, beyond the simple reduction in numbers? A detailed 1735 census for Trinidad mission, prepared two years following another severe epidemic, provides clues.³ In 1731, the population of Trinidad totaled 3,569 and 3,598 in 1733 before the epidemic hit the community. The 1733 epidemic killed nearly half the population of the mission, and in 1735 only 1,837 remained. However, the population of the mission rebounded following the series of epidemics in the 1730s, and stood at 2,680 in 1756 and 2,558 in 1767. The contagion claimed the lives of Guarani across the full spectrum of the mission society including the families of the *caciques*, and there was a degree of generational change in leadership in the mission. Five *caciques* listed in 1735 were young boys under the age of ten who replaced parents killed during the epidemic... The epidemic also destroyed families as evidenced by a large number of orphans (154) and widows (101). Moreover, the census recorded many fugitives (109), primarily males, as well as women (43) abandoned or left in the mission by their fugitive husbands. The fugitives left the mission most likely to avoid military service, but also to escape the epidemic.

The epidemic reduced the number of large families at Trinidad with three or more children. In 1735, 888 (58 percent) people were grouped in families with a size of two or three, meaning either a mar-

ried couple or a couple with one child. These small families constituted seventy-three percent of all families at the mission. In contrast, there were only fifty families (six percent) with three or more children, or eighteen percent of the population grouped into families. A 1759 census for Santa Ana places the data for Trinidad into context.⁴ In 1731, Santa Ana had a population of 4,527, but this dropped to 3,716 in 1733. The numbers rebounded, and stood at 5,040 in 1756 and 5,141 in 1759. A total of thirty-one percent of the families at Santa Ana had three children or more, and as many as seven children. This was forty-seven percent of the people grouped in families. The population of Santa Ana had recovered from the epidemics of the 1730s, and was growing robustly as evidence by the large number of families with three or more children. The profile of the Santa Ana population in 1759 was similar to the structure of the mission populations prior to the epidemics.

A detailed census of Corpus Christi mission prepared in 1759 provides additional insights to the age and gender structure of the mission populations, the affects of the epidemics between 1730 and 1740, and the rebound or recovery of the populations following the epidemics. There are many detailed mission censuses that divide the populations down into family groups, but the 1759 Corpus Christi census is unique in that the Jesuits also noted the date of baptism of the bulk of the population, that enables a reconstruction of the age structure of the population. The population totaled 4,530, plus another 112 identified as Guananas, most likely a group from the Chaco region, congregated on the mission in 1724, 1730, and 1754. The Guananas population at Corpus Christi has not been included in the analysis here, because the date of baptism of the adults, when given, does not translate into the date of birth as it does for the bulk of the population. The mission population evidenced a gender imbalance, with more females than males, 2,321 to 2,209. Moreover, women who reached an age of fifty or over outlived men. There were 206 men over the age of fifty, and only six over seventy. In contrast, there were 220 women over the age of fifty, and twenty over seventy.⁵

Data from the census shows that Corpus Christi was a relatively closed community as regards the selection of marriage partners. With the exception of a handful of women originally from the Chaco re-

gion and from neighboring missions, the vast majority of Guarani men at Corpus Christi married women from the mission. Corpus Christi men married eight Guanana women from among the groups congregated in 1724, 1730, and 1754, and one Abipone woman, also a Chaco group. Corpus Christi men also married eight women from neighboring missions: San Francisco de Borja 1; Loreto 2; Santa Rosa 1; San Carlos 1; Itapua 2; and San Ignacio 1. Guarani women generally married shortly after reaching puberty, in a range between the ages of twelve to sixteen- nineteen. Women bore numerous children, but gaps between living children who were generally born two years apart also indicates high infant mortality. Nevertheless, enough children, particularly girls, survived to puberty to form new families and contribute to the growth of the population.

The age structure of Corpus Christi shows the effects of the epidemics, including those in the 1730s, as manifested in age cohorts that were smaller than they should have been given the age structure of the mission. The age 20 to 24 and 25 to 29 cohorts were smaller than the cohorts before and after, showing losses during the epidemics of the 1730s. The 20 to 24 cohort among females was smaller than that of males, and both show losses from the smallpox epidemic that struck the region between 1738 and 1740. Similarly, the 1733 epidemic culled the population of young children, as reflected in a small age 25 to 29 cohort. The epidemic that broke out in 1738 was the strongest of the three during the decade, and the mission population recovered losses during the decade through natural reproduction. Another strong epidemic killed off large numbers of children of both sexes between 1714 and 1719.

The epidemics during the 1730s claimed the lives of thousands of Guarani, and the populations of most of the missions dropped (see Table 1). The total population of the thirty missions dropped from 141,242 in 1732 to 73,910 in 1740, following the final epidemic. However, the populations of the missions in the Rio de la Plata recovered following the epidemics. The recovery or rebound of the Guarani populations demonstrates a major difference from the indigenous populations living on missions elsewhere, such as on the northern frontier of Mexico. The Guarani populations were high fertility and high mortality populations, similar to contemporary European popu-

lations. Birth and death rates were high and population growth low to moderate. Epidemics slowed or stopped population growth, but the population did recover.

The Jesuits divided the missions administratively into two groups: those clustered around the Parana River; and those located west and east of the Uruguay River. In 1724, the populations of both groups of missions evidenced a pattern of imbalance, with more girls and women than men. This imbalance was related, in part, to the absence of men from the missions, the absence of thousands of men serving with the militia, and deaths while on campaign. In the Parana missions there were 28,863 girls and women compared to 25,408 boys and men. Similarly, it was 33,107 females and 29,588 males in the Uruguay River establishments. In random populations there generally is a gender imbalance, with slightly more females than males. The disparity reflected, in part, migration by males from the missions. Interestingly, there were considerably more widows than widowers, with 2,980 and 3,880 of the first category and 109 and 236 of the latter in the two groups of missions. This last category of information highlights the importance of the *cotiguazu*, the separate residence for widows, as a social institution in the missions. It also shows that widowers remarried. The mission populations evidenced similar patterns in 1740 and 1741 following the epidemics, with more females than males and considerably more widows than widowers.⁶

Patterns of Fertility and Mortality

Figures on baptisms and burials can be used to tentatively reconstruct the vital rates of the Guarani mission populations. The number of baptisms does not necessarily translate exactly to births, and without access to the original baptismal registers it would be difficult to establish if the Jesuits congregated and baptized significant numbers of Guarani or other natives from outside of the missions. Nevertheless, the total numbers of baptisms reported do give a notion of birth rates, but keeping in mind the caveat outlined above. The Guarani populations of the missions were high fertility and high mortality populations, meaning that women bore children and birth rates were moderate to high. At the same time mortality rates tended to be high, particularly for the most vulnerable segments of the population the very young and the old. In 1740, crude birth rates per thousand popu-

lation was 79.4/thousand and 40.8/thousand respectively for the Parana and Uruguay River establishments, as against crude death rates of 51.3/thousand and 34.1/thousand. The bulk of deaths occurred among young children, which more closely matches contemporary European demographic patterns. Disease culled the population of children in Europe, and during the course of the eighteenth-century smallpox was the single largest killer in Europe.

Crude birth rates recorded per thousand population were generally higher than death rates (see Tables 2-4) except in epidemic years, and without economic or social constraints the Guarani population grew robustly. The periodic mortality crises culled the population and slowed growth, but the numbers generally rebounded. In examining the global figures for the thirty missions, there were four major mortality crises (x3 regular mortality) in the years for which data are available. These were in 1733, 1738, 1739, and 1764. Major epidemic outbreaks not only raised death rates, but also tended to lower birth rates or the rates of life births. On average, Guarani living in the missions lived between twenty and thirty years from birth, but mean life expectancy at birth dropped as a result of major epidemics.⁷

An examination of crude birth and death rates at the individual missions demonstrates the strength and also variation in mortality levels during the epidemics in the 1730s as well as the geographic spread of contagion and patterns of fertility and mortality in non-epidemic years. I examine here data for 1733, 1736, 1739, 1740, 1741, and 1745 (see Tables 2-4). In 1733, there was elevated mortality and death rates in excess of 100 per thousand population at nine of the thirty missions, with the highest at 174.5/thousand at La Cruz on the Uruguay River which was three times normal mortality. Death rates were elevated and higher than birth rates at another eleven missions. Crude death rates at these communities ranged between 50 and 99 per thousand population. Mortality was high throughout most of the mission region, the epidemic centered on the establishments on both sides of the Uruguay River. The 1735-1736 epidemic appears to not have been as severe as the 1733 outbreak, and in 1736 the contagion only affected a handful of missions. Highest death rate of 239.2/thousand population was at Loreto, and it was 169.8/thousand at neighboring San Ignacio. Mortality was also elevated at San Cosme, across the Parana

River from Loreto and San Ignacio, and Corpus Christi close to San Ignacio. Death rates were high at San Carlos and San Jose, at Santa Maria La Mayor, San Francisco Xavier, and San Nicolas on the Uruguay River.

The smallpox epidemic of 1738-1740 was a severe mortality crisis. The record of births and burials is not available for 1738, but there are data for the next two years. The heaviest mortality in 1739 centered on the missions located between the Parana and Uruguay Rivers, and several of the missions east of the Uruguay River. This spatial distribution of burials suggests that mortality in 1738 would have been heaviest in the missions located west and northwest of the Parana River, the southeastern districts of modern Paraguay. The contagion most likely spread to the missions from Paraguay. Crude death rates ranged between 100 and 200 per thousand population at three missions, including Trinidad located near the western bank of the Parana. It was 230.8/thousand at San Thome on the west bank of the Uruguay River, which was between x4-x5 normal death rates. Deaths were extremely high at five missions, and as high as x9-x10 or higher normal mortality. The CDR reached 336.8/thousand or nearly 34 percent of the population at San Nicolas, 416.6/thousand at la Cruz, and 565.4/thousand, 565.1/thousand, and 556.9/thousand respectively at Santa Maria la Mayor, San Luis Gonzaga, and San Lorenzo Martir. In other words, more than 50 percent of the population of the three communities died during the course of the year. The bulk of deaths occurred in the mission communities along both sides of the Uruguay River, and east of the river.

Mortality returned to normal levels and levels at which birth rates were higher than death rates and the mission populations began to grow again. The exceptions were La Cruz, where death rates were nowhere close to being as high as in 1739. Smallpox probably reached San Juan Bautista mission at the end of 1739, and devastated the mission population in the early months of 1740. Death rates reached 485/thousand, or 48 percent of the population, and the numbers dropped from 4,949 in 1739 to 2,171. In the other missions the smallpox receded as the number of potential hosts dropped as the Guarani neophytes either died or recovered. In the following years the mission populations slowly recovered from the losses during the epidemics of

the 1730s. Birth rates again outstripped death rates, and the mission populations slowly grew again.

Conclusions

A conjuncture of events contributed to a series of lethal epidemics during the decade 1730-1740. This included civil war and an undeclared war with the Portuguese. Local royal officials mobilized thousands of Guarani militiamen from the missions, and the militiamen had to be supplied. Moreover, the missions provided supplies to the other colonial forces involved in the campaign. The Jesuits and the Guarani themselves participated in local and regional trade, which meant that there was a movement of people and goods between the missions and the Spanish communities. Spain and Portugal agreed to a conclusion of hostilities in 1737, and the Guarani militiamen returned to the missions as smallpox spread through the region. During the decade three epidemics spread through the Jesuit missions, but the 1738-1740 smallpox outbreak proved to be the most lethal.

Between 40 and 56 percent of the population of several of the Paraguay missions died during the smallpox epidemic in 1739 and 1740, which was extremely heavy epidemic mortality. What accounted for the heavy mortality? Smallpox and other contagion spread inside the bodies of people on the move, and propagated in populations with a certain threshold of people not previously exposed. Contagion spread rapidly in populations living in close proximity to each other, as in the neophyte housing in the missions. Many of the missions, particularly the ones that experienced extremely heavy mortality from smallpox, had large populations concentrated in compact villages (see Figure 6).

In contrast to mission populations on the northern frontier of Mexico, the Guarani populations recovered following the devastating epidemics. Birth rates exceeded death rates, and the populations experienced slow to moderate growth in the decades following the epidemics. There were other epidemics in the 1740s and 1760s, and the Guarani resistance to the plan to relocate the seven Trans-Uruguay missions to sites west of the Uruguay pursuant to the 1750 Treaty of Madrid disrupted the missions, and epidemics continued to recur following the expulsion of the Jesuits in 1767/1768.⁸ However, epidemic or series of epidemics was/were as devastating as the outbreaks that occurred in the 1730s.

Table 1
Population of the Jesuit Missions of Paraguay, 1724-1744

Mission	1724	1731	1733	1735	1736	1738	1739	1740	1741	1744
Guasu	3343	3195	1266	1631	1576	1846	1964	2018	2152	2231
La Fe	5463	6515	4251	2465	2595	2701	2903	3086	3298	3593
S Rosa	4742	6093	2775	1780	1671	1828	1916	1973	2031	2170
Santiago	2720	3524	3479	3237	3740	3955	4081	4128	4276	4389
Itapua	5357	6548	6396	4361	4650	2690	2591	2179	2106	2847
Candelaria	2863	3317	3134	2990	3048	1511	1503	1441	1639	1764
S Cosme	2120	2306	2145	2143	1531	1225	1236	1209	1094	1272
S Ana	3600	4527	3716	4083	4055	4343	4397	4533	4505	4331
Loreto	6113	7048	6077	5523	1937	2234	1756	2246	2422	2789
S I Mini	3138	4356	3959	3010	1808	1934	1849	1933	2076	2218
Corpus	3584	4400	4008	2790	2190	1975	2667	2808	2922	3241
Trinidad	3140	3569	3598	1829	1733	1975	2149	2268	2047	2245
Jesus	1947	2436	2241	2256	2204	1902	1962	1836	1850	1679
S Carlos	3065	3388	3369	2400	3212	2377	1239	1140	1273	1404
S Jose	3274	3720	3605	3473	3382	1392	1338	1390	1411	1594
Aposteles	4140	5185	5267	3884	3716	1315	1341	1494	1582	1577
Concepcion	4894	5848	5881	5920	6460	4234	1669	1944	2369	2296
Martires	3343	3874	3665	3416	3396	3230	2777	2829	2839	2834
La Mayor	3490	3902	3585	2903	2232	2262	711	819	894	993
S Javier	3409	3813	3663	3494	2873	1876	1710	1789	1894	1895
S Nicolas	6667	7690	7415	6986	6104	5071	1772	2194	2279	3107
S Luis	5045	6149	5619	5305	4445	4327	1978	2308	2432	2868
S Lorenzo	5224	6420	6100	5177	4405	4814	974	1173	1311	1573
S Miguel	3972	4904	4465	4019	4156	4522	4741	4740	4974	6611
S Juan	4629	4503	4968	4621	5110	5012	4949	2171	2525	2843
Stos Ang.	4052	4601	4925	4501	4336	4921	5163	5228	5199	4824
San Tome	2949	3545	3494	2282	3211	2041	1699	1892	2063	2397
S Borja	2906	3629	3658	3584	3358	2998	3244	3291	3430	3814
La Cruz	3615	4573	4345	4372	4304	3853	2167	2163	2314	2540
Yapeyu	4360	5666	5374	5106	5283	5410	5713	5687	5748	6187

Source: Ernesto Maeder, "La poblacion de las misiones de Guaranies (1641-1682). Reubicacion de los pueblos y consecuencias demograficas," *Estudios Ibero-Americanos* 15:1 (June 1989), 49-80; Ernesto

Maeder, "Fuentes Jesuíticas de información demográfica misional para los siglos XVII y XVIII," in Dora Celton, coordinator, *Fuentes útiles para los estudios de la población Americana: Simposio del 49o Congreso Internacional de Americanistas, Quito 1997* (Quito, 1997), 45-57; Guillermo Furlong Cardiff, S.J., *Misiones y sus pueblos de Guaraníes* (Buenos Aires, 1962), 175-179; Thomas Whigham, "Paraguay's Pueblos de Indios: Echoes of a Missionary Past," in Erick Langer and Robert H. Jackson, eds., *The New Latin American Mission History* (Lincoln, 1995), 168; Pablo Hernandez, S.J., *Organización social de las Doctrinas Guaraníes de la Compañía de Jesús*, 2 vols. (Barcelona, 1913), vol 2, 616-617.

Table 2
Crude Birth Rates (CBR) and Crude Death Rates (CDR) per Thousand Population in 1733 & 1736

Mission	1733 CBR*	1733 CDR*	1736 CBR	1736 CDR
Guasu	49.5	56.5	35.3	33.5
La Fe	86.1	40.7	49.5	28.8
S Rosa	76.2	49.1	55.6	44.9
Santiago	33.1	22.5	48.2	36.8
Itapua	53.3	18.9	50.0	43.8
Candelaria	43.2	53.2	45.5	50.2
S Cosme	46.9	15.4	28.9	100.8
S Ana	55.3	26.2	33.8	79.6
Loreto	92.8	31.3	25.2	239.2
S I Mini	84.9	39.3	24.6	169.8
Corpus	69.4	25.1	28.0	88.2
Trinidad	43.7	50.3	45.9	72.2
Jesus	56.8	121.1	47.0	57.6
S Carlos	44.5	70.8	62.1	74.6
S Jose	43.4	93.7	38.3	84.1
Aposteles	27.2	60.0	58.7	41.5
Concepcion	41.1	55.5	48.1	47.3
Martires	51.2	124.2	55.0	58.3
La Mayor	48.6	133.3	33.1	91.3
S Javier	33.1	115.5	42.1	94.2
S Nicolas	64.1	103.5	32.9	103.9
S Luis	42.5	148.9	35.6	56.7
S Lorenzo	36.3	99.9	34.2	50.0
S Miguel	30.1	110.4	53.0	32.4
S Juan	42.1	94.7	39.4	43.5
Stos Ang.	38.3	66.3	44.7	48.7
S Tome	63.3	57.6	56.1	54.8
S Borja	38.0	92.8	56.1	49.1
La Cruz	52.8	174.5	73.2	47.1
Yapeyu	56.4	126.8	96.0	40.5

*Estimated.

Source: Individual annual censuses of the Jesuit missions for 1724, 1733, 1736, 1739, 1740, 1741, 1744,

and 1745, titled "Catologo de la numeracion anual de las Doctrinas del Rio Parana Ano; Catologo de la numeracion anual de las Doctrinas del Rio Uruguay; Archivo General de la Nacion, Buenos Aires; Ernesto Maeder, "Fuentes Jesuiticas de informacion demografica misional para los siglos XVII y XVIII," in Dora Celton, coordinator, *Fuentes utiles para los estudios de la poblacion Americana: Simposio del 49o Congreso Internacional de Americanistas, Quito 1997* (Quito, 1997), 45-57.

Table 3
Crude Birth Rates (CBR) and Crude Death Rates (CDR) per Thousand Population in 1739 & 1740

Mission	1739 CBR	1739 CDR	1740 CBR	17340 CDR
Guasu	84.5	47.7	68.2	56.5
La Fe	106.5	53.3	86.1	40.7
S Rosa	68.9	44.9	76.2	49.1
Santiago	51.2	24.3	33.1	22.5
Itapua	52.0	97.4	53.3	18.9
Candelaria	96.6	52.3	43.2	53.2
S Cosme	32.7	37.6	46.9	15.4
S Ana	60.8	28.3	55.3	26.2
Loreto	63.6	30.0	92.8	31.3
S I Mini	58.4	118.0	84.9	39.3
Corpus	73.6	28.9	69.4	25.1
Trinidad	53.7	115.4	43.7	50.3
Jesus	81.5	50.0	49.4	31.6
S Carlos	11.4	12.2	88.0	32.3
S Jose	29.5	47.4	86.7	20.9
Aposteles	26.6	25.1	79.1	22.4
Concepcion	7.1	35.0	64.1	27.0
Martires	40.9	184.2	61.2	34.2
La Mayor	39.6	565.4	85.8	23.9
S Javier	34.7	37.3	74.3	22.2
S Nicolas	10.7	336.8	120.8	50.2
S Luis	20.3	565.1	87.0	36.0
S Lorenzo	33.2	556.9	46.2	50.3
S Miguel	47.8	32.3	52.9	20.3
S Juan	64.5	75.0	14.4	485.0
Stos Ang.	52.4	52.4	46.3	27.1
S Tome	30.4	230.8	113.6	19.4
S Borja	46.4	43.0	58.3	21.0
La Cruz	16.9	416.6	88.1	85.8
Yapeyu	73.8	38.5	68.8	37.5

Source: Individual annual censuses of the Jesuit missions for 1724, 1733, 1736, 1739, 1740, 1741, 1744, and 1745, titled "Catologo de la numeracion anual de las Doctrinas del Rio Parana Ano; Catologo de la numeracion anual de las Doctrinas del Rio Uruguay; Archivo General de la Nacion, Buenos Aires; Ernesto Maeder, "Fuentes Jesuiticas de informacion demografica misional para los siglos XVII y XVIII," in Dora

Celton, coordinator, *Fuentes utiles para los estudios de la poblacion Americana: Simposio del 49o Congreso Internacional de Americanistas, Quito 1997* (Quito, 1997), 45-57.

Table 4
Crude Birth Rates (CBR) and Crude Death Rates (CDR) per Thousand Population in 1741 & 1745

Mission	1741 CBR	1741 CDR	1745 CBR	1745 CDR
Guasu	112.5	54	73.1	72.6
La Fe	109.9	40.8	98.3	39.5
S Rosa	93.3	59.3	84.3	41.5
Santiago	54.0	24.5	59.0	24.4
Itapua	67.5	45.4	75.2	48.5
Candelaria	49.3	68.0	86.7	53.9
S Cosme	51.3	31.4	65.3	36.2
S Ana	74.1	57.1	55.7	24.5
Loreto	93.1	50.8	69.9	36.9
S I Mini	93.1	82.8	85.7	71.2
Corpus	97.2	55.6	78.1	11.7
Trinidad	54.7	46.3	66.4	47.2
Jesus	75.1	77.3	66.7	45.9
S Carlos	62.3	24.6	78.4	47.7
S Jose	48.2	38.9	75.9	32.6
Aposteles	52.2	34.8	67.9	43.8
Concepcion	52.5	26.8	44.0	24.4
Martires	67.9	56.6	60.0	49.8
La Mayor	95.2	40.3	144.0	64.5
S Javier	63.7	31.9	64.4	39.6
S Nicolas	83.9	36.9	95.9	83.7
S Luis	70.2	27.7	71.8	49.5
S Lorenzo	60.5	27.3	89.0	45.8
S Miguel	63.3	25.7	50.8	40.4
S Juan	108.7	31.3	60.1	25.0
Stos Ang.	56.4	37.9	60.9	60.0
S Tome	103.6	27.0	78.9	30.0
S Borja	58.3	24.6	53.8	65.8
La Cruz	30.8	20.7	68.9	43.7
Yapeyu	76.0	35.6	70.6	50.6

Source: Individual annual censuses of the Jesuit missions for 1724, 1733, 1736, 1739, 1740, 1741, 1744, and 1745, titled "Catologo de la numeracion annual de las Doctrinas del Rio Parana Ano; Catologo de la numeracion annual de las Doctrinas del Rio Uruguay; Archivo General de la Nacion, Buenos Aires; Ernesto Maeder, "Fuentes Jesuiticas de informacion demografica misional para los siglos XVII y XVIII," in Dora Celton, coordinator, *Fuentes utiles para los estudios de la poblacion Americana: Simposio del 49o Congreso Internacional de Americanistas, Quito 1997* (Quito, 1997), 45-57.

1. For Europe see Michael Flinn, *The European Demographic System, 1500-1820* (Baltimore, 1980).

2. Burials in the Guaraní Missions in 1733, 1736, 1739, & 1740

Mission	1733		1736		1739		1740	
	Adults	Parvulos	Adults	Parvulos	Adults	Parvulos	Adults	Parvulos
Guasu	560	632	50	40	22	66	27	84
La Fe	1365	1253	58	13	46	98	36	83
Sta Rosa	900	1363	43	37	26	56	30	64
Santiago	76	131	58	61	38	57	37	55
Itapua	243	568	89	102	98	164	18	31
Candelaria	52	194	49	101	13	66	10	70
S Cosme	80	182	117	99	32	14	5	14
S Ana	377	471	151	174	35	89	31	84
Loreto	515	471	779	542	17	50	11	44
S Ignacio	192	257	275	236	148	80	15	54
Corpus	324	261	161	95	20	52	20	47
Trinidad	138	204	68	64	143	85	48	60
Jesus	136	154	66	64	50	45	20	42
S Carlos	44	201	68	111	6	23	8	32
S Jose	117	249	167	125	19	47	9	19
Aposteles	149	178	92	69	15	18	5	25
Concep.	102	229	90	190	102	46	7	38
Martires	154	337	72	127	388	207	40	55
La Mayor	223	298	133	132	1047	232	6	11
S Javier	172	289	166	163	22	48	14	24
S Nicolas	204	595	362	364	1050	658	58	31
S Luis	218	718	163	138	1457	988	37	34
S Lorenzo	400	371	119	140	1655	1026	31	18
S Miguel	240	296	50	80	68	78	43	53
S Juan	226	272	49	152	241	135	1502	898
Stos Amg	129	207	117	102	137	121	66	74
San Tome	60	140	54	71	332	139	13	20
S Borja	124	235	97	79	76	35	25	63
La Cruz	246	617	77	129	1086	519	81	105
Yapeyu	174	559	38	169	45	163	52	162

Sources: ; Enumeratio Annua, 1733, Archivo General de la Nacion, Sala IX-6-9-6; Enumeratio Annua, 1736, Archivo General de la Nacion, Buenos Aires, Sala IX-6-9-7; Catologo de la numeracion annual de las Doctrinas del Rio Parana Ano 1736; Numeracion Annual de los Pueblos del Rio Uruguay Ano de 1736; Catologo de la numeracion annual de las Doctrinas del Rio Parana Ano 1740; Numeracion Annual de los Pueblos del Rio Uruguay Ano de 1740, Archivo Nacional, Asuncion, Paraguay, Pablo Hernandez, S.J., *Organizacion social de las Doctrinas Guaranies de la Compania de Jesus*, 2 vols. (Barcelona, 1913), vol 2, 616-617.

Jackson / MORTALITY CRISES

17

The net decline in population is was as follows:

Mission	1733	1736	1739	1740
Guasu	-1076	5	68	23
La Fe	-2472	51	143	131
Sta Rosa	-2153	19	44	52
Santiago	-86	37	107	43
Itapua	-604	27	-122	89
Candelaria	-50	-14	67	-15
S Cosme	-192	-154	-6	39
S Ana	-758	-187	140	128
Loreto	-723	-1182	75	108
S Ignacio	-247	-437	-115	88
Corpus	-306	-178	111	118
Trinidad	-227	-48	-122	-14
Jesus	-154	-24	60	35
S Carlos	-91	-30	-2	69
S Jose	-201	-159	-25	88
Aposteles	-179	67	2	76
Concep.	-86	5	-118	62
Martires	-289	-11	-463	75
La Mayor	-323	-169	-1235	44
S Javier	-329	-182	-5	89
S Nicolas	-304	-496	-1654	125
S Luis	-669	-112	-2357	101
S Lorenzo	-491	-82	-2521	-4
S Miguel	-150	83	70	155
S Juan	-289	-19	-53	-2329
Stos Amg	-142	-18	0	99
San Tome	20	3	-309	160
S Borja	-212	25	13	101
La Cruz	-602	114	-1540	5
Yapeyu	-407	283	191	179

A detailed examination of the vital rates of two missions, Loreto and San Lorenzo, provide additional insights to the affect of epidemics on the mission populations in the 1730s (see Table 7). Prior to the first epidemic, in 1724, Loreto mission counted a population of 6,113, and 6,077 in 1733 at the end of the first

outbreak. The numbers dropped to 1,756 in 1739, but then grew over the next two decades and reached 4,023 in 1756. Crude death rates in non-epidemic years averaged 36.0 per thousand population, which put in other terms meant that 3.6 percent of the population died on the year. Two years evidenced a mortality crisis, which is defined as x3 normal mortality. The crude death rate in 1733 was 146.3, or slightly more than x4 normal mortality. In 1736, the crude death rate was 239.2, or x6.6 normal mortality. Crude birth rates were moderate to high, except in the years of severe mortality crisis. In 1736, for example, the crude birth rate was 23.4, much lower than in non-epidemic years. The average family size, a crude measure of family size, declined during the decade, and stood at 3.6 in 1739.

The population of San Lorenzo experienced drastic decline during the decade, and had only begun to recover at the time of the so-called Guarani War in the mid-1750s. In 1731, the mission had a population of 6,420, but this dropped to 974 in 1739. It then slowly recovered over the next decades, and reached 1,563 in 1745 and 1,459 in 1756. Crude death rates average 44.2 in non-epidemic years, and the two epidemics documented in the sample were extreme mortality crises, particularly 1739. In 1733, the crude death rate was 117 per thousand population, or x2.7 normal mortality. Mortality in 1739 was extremely high at a crude rate of 557, or x12.6 times normal mortality. The year 1739 must have been hellish for the residents of San Lorenzo. The population of the mission had already shown signs of recovery following the earlier outbreaks, and totaled 4,814 at the end of 1738. Smallpox spread to the community, and 1,655 adults and 1,026 young children died. A mere 974 remained at the end of the year, reflecting mortality and a net loss in population of 2,521 as well as flight as Guarani fled hoping to avoid a horrible smallpox death. The crude death rate indicates that 55.7 percent of the population died. Several neighboring missions experienced equally high death rates. Burials at San Luis Gonzaga reached 2,445 in 1739 and a crude death rate of 565.1 per thousand population, 1,708 burials and a death rate of 336.8 at San Nicolas, 1,279 burials and a death rate of 565.4 at Santa Maria la Mayor, and 1,605 burials at La Cruz and a death rate of 416.6. In the following year 2,400 died at San Juan Bautista, and a crude death rate of 484.9. Birth rates at San Lorenzo were moderate to high in the years following the epidemic, but recovery was slow as noted above.

Jackson / MORTALITY CRISES

19

Vital Rates of Loreto Mission in Selected Years

Year	Families	Population	Baptisms	Burials		CBR	CDR	AFS
				Adults	Par.			
1724	1543	6113	380	46	119	64.4*	28.0*	4.0
1733	1484	6077	263	525	471	38.6*	146.3*	4.1
1736	549	1937	129	779	542	23.4	239.2	3.5
1739	486	1756	122	17	50	54.6	54.6	3.6
1740	560	2246	163	11	44	92.8	31.3	4.0
1741	635	2422	209	15	94	93.1	50.8	3.8
1744	703	2789	246	29	93	92.3*	45.8*	4.0
1745	738	2855	195	19	84	69.9	36.9	3.9
1756	853	4023	216	40	74	55.1*	29.1	4.7

Vital Rates of San Lorenzo Mission in Selected Years

Year	Families	Population	Baptisms	Burials		CBR	CDR	AFS
				Adults	Par.			
1724	1246	5224	423	63	173	84.0*	46.9*	4.2
1733	1359	6100	280	400	371	42.5*	117.0*	4.5
1736	899	4405	177	119	140	34.2	50.0	4.9
1739	165	974	160	1655	1026	33.2	557.0	5.9
1740	242	1173	45	31	18	46.2	50.3	4.9
1741	340	1311	71	12	20	60.5	27.3	3.9
1744	429	1573	121	8	50	80.1*	38.4	3.7
1745	464	1563	140	28	54	89.0	52.1	3.4
1756	358	1459	80	23	82	53.9*	70.8	4.1

Source: Individual annual censuses of the Jesuit missions for 1724, 1733, 1736, 1739, 1740, 1741, 1744, and 1745, titled "Catologo de la numeracion anual de las Doctrinas del Rio Parana Ano; Catologo de la numeracion anual de las Doctrinas del Rio Uruguay; Archivo General de la Nacion, Buenos Aires; Ernesto Maeder, "Fuentes Jesuiticas de informacion demografica misional para los siglos XVII y XVIII," in Dora Celton, coordinator, *Fuentes utiles para lose studios de la poblacion Americana: Simposio del 49o Congreso Internacional de Americanistas, Quito 1997* (Quito, 1997), 45-57.

3. Juan Valdeviejo, S.J., Trinidad, September 9, 1735, "Estado del Pueblo de la Santissima Trinidad," Archivo General de la Nacion, Buenos Aires, "Padrones de Indios," Sala 9-17-3-6.

Structure of the Population of Trinidad in 1735

Family Size	# of Families	# People/ Families	Orphans Boys	Orphans Girls	Widows	Widowers
2	258	516	94	50	101	6
3	124	372				
4	93	372				
5	34	170				
6	13	78				
7	3	21				

Not all missions experienced the same level of population loss and particularly of the destruction of families as a result of the epidemic. A 1735 census of San Cosme, located fairly close to Trinidad, manifests a somewhat different population structure, although there was still a large number of orphans and widows. Nevertheless, there was a larger percentage of families with more than one child that survived the epidemic, which is a sign of a population that was reproducing itself.

Structure of the Population of San Cosme y Damian in 1735

<i>Family Size</i>	<i># of Families</i>	<i># People/ Families</i>	<i>Orphans Boys</i>	<i>Orphans Girls</i>	<i>Widows</i>	<i>Widowers</i>
2	141	282	126	167	133	8
3	121	363				
4	95	380				
5	64	320				
6	45	270				
7	19	133				
8	3	24				

Source: Ventura Suarez, San Cosme y Damian, August 16, 1735 "Padron del Pueblo de S. Cosme y Damian que se hizo este presente ano 1735," Archivo General de la Nacion, Buenos Aires, "Padrones de Indios," Sala 9-17-3-6.

4. "Padron del Pueblo de Sta Anna 1759," Archivo General de la Nacion, Buenos Aires, "Padrones de Indios," Sala 9-17-3-6.

Structure of the Population of Santa Ana in 1759

<i>Family Size</i>	<i># of Families</i>	<i># People/ Families</i>	<i>Orphans Boys</i>	<i>Orphans Girls</i>	<i>Widows</i>	<i>Widowers</i>
2	350	700	128	121	131	8
3	264	792				
4	245	980				
5	180	900				
6	127	792				
7	53	371				
8	21	168				
9	3	27				

Source: "Padron del Pueblo de Sta Anna 1759," Archivo General de la Nacion, Buenos Aires, "Padrones de Indios," Sala 9-17-3-6.

5. "Matricula deste Pueblo de Corpus Christi," Archivo General de la Nacion, Buenos Aires, "Padrones de Indios," Sala 9-17-3-6.

Age and Gender Structure of Corpus Christi in 1759

	<i>Age Cohort</i>	<i>Males #</i>	<i>Percentage</i>	<i>Females #</i>	<i>Percentage</i>
	0-4	339	15.4	372	16.0
	5-9	346	15.7	324	13.9
	10-14	324	14.7	380	16.4
	15-19	261	11.8	269	11.6
	20-24	160	7.2	133	5.7
	25-29	82	3.7	89	3.8
	30-34	146	6.6	148	6.4
	35-39	159	7.2	177	7.6
	40-44	104	4.7	97	4.2
	45-49	70	3.2	64	2.8
	50-54	85	3.9	89	3.8
	55-59	53	2.4	47	2.0
	60-64	49	2.2	42	1.8
	65-69	13	0.5	22	1.0
	70+	6	0.3	20	0.9
Not Given	12	0.5	48	2.1	
Total	2,209		2,321		
Guananas	52		60		
Total	2,261		2,381		
Total Population	4,642				

6. Catologo de la numeracion annual de las Doctrinas del Rio Parana Ano 1724; Catologo de la numeracion annual de las Doctrinas del Rio Uruguay-1724; Catologo de la numeracion annual de las Doctrinas del Rio Parana Ano 1740; Numeracion Annual de los Pueblos del Rio Uruguay Ano de 1740; Catologo de la numeracion annual de las Doctrinas del Rio Parana Ano 1741; Numeracion Annual de los Pueblos del Rio Uruguay Ano de 1741. The originals are from the Archivo Nacional in Asuncion, Paraguay. I would like to thank Barbara Ganson for providing copies of these documents. Detailed censuses for individual missions confirm the patterns outlined in the general censuses. I cite here a 1759 census for Corpus Christi, that shows that large families were common, but that there were also a large number of widows and orphans. The summary below records the actual family size, or in other words the number of families with a size of two people, three people, etc., as well as the number of people in each category of families, the number of orphans, widowers, and widows.

Structure of the Population of Corpus Christi in 1759

<i>Family Size</i>	<i># of Families</i>	<i># People/ Families</i>	<i>Orphans Boys</i>	<i>Orphans Girls</i>	<i>Widows</i>	<i>Widowers</i>
2	314	628	137	137	122	6
3	211	633				
4	157	628				
5	153	765				
6	143	858				
7	58	406				
8	17	136				
9	8	72				

Source: "Matricula deste Pueblo de Corpus Christi," Archivo General de la Nacion, Buenos Aires, "Padrones de Indios," Sala 9-17-3-6.

A small fragment of baptisms survives for Santa Rosa in the 1750s and 1760s, and shows large numbers of births. A figure on the number of burials for 1756 from the census for that year places the number of baptisms into context. In 1756, the net growth in the population of Santa Rosa was 67, not factoring in out-migration.

Baptisms Recorded at Santa Rosa, 1754-1763

<i>Year</i>	<i>Baptisms</i>	<i>Burials</i>
1754	176	
1755	153	
1756	180	113
1757	185	
1758	161	
1759	168	
1760	203	
1761	190	
1762	202	
1763	183	

Source: Santa Rosa Baptismal Register, Santa Rosa Parish, Paraguay; Maeder, "Fuentes Jesuiticas de informacion demografica misional."

7. Calculated by Robert McCaa using Populate and included as a dataset with Populate, a microcomputer program that uses inverse projection to calculate sophisticated demographic statistics including mean life expectancy at birth. Populate analyzes five year samples of data, and reports statistics at the mid-point in the quinquennium. McCaa used data from the research of Ernesto Maeder, and used populate to fill in the gaps in missing data.

Quinquennium Mean Life Expectation at Birth* in the Guarani Missions, 1692-1767

<i>Year</i>	<i>MLE</i>	<i>Year</i>	<i>MLE</i>	<i>Year</i>	<i>MLE</i>
1692	29.7	1722	26.7	1752	30.0
1697	28.6	1727	34.8	1757	23.2
1702	26.6	1732	8.8	1762	6.1
1707	26.7	1737	0.2	1767	8.3
1712	32.3	1742	20.1		
1717	19.3	1747	23.0		

*Calculated using "Populate."

McCaa's figures give an average of the mean life expectancy of 26.8 years at birth in quinquenniums without major epidemics, and 5.9 years at birth in quinquenniums with major epidemics. We calculated the same statistics using a sample of only complete data for the years 1736-1755, and 1762 to 1766. The figures we calculated for Mean Life Expectancy may be a little different from McCaa's, but are in the general range: 1736-1740=4.5 years; 1741-1745=24.8 years; 1746-1750=24.4; 1751-1755=29.9; 1762-1766=9.4 years. The average in non-epidemic periods was 26.4 years at birth, and 7 years at birth in periods with a mortality crisis.

8. In 1777, for example, 277 died from smallpox at Corpus Christi. Of the total, 234 or 84.5 percent were identified as adults. See Juan Baptista Flores, Corpus Christi, September 30, 1777, "Empadronamiento del Pueblo de Corpus Christi que se expresan por cacicasgo todo los naturales," Archivo General de la Nacion, Sala IX, 6.9.7.