NBER WORKING PAPER SERIES
ON
HISTORICAL FACTORS IN LONG RUN GROWTH

# INTRA-ETHNIC DIVERSITY IN HISPANIC CHILD MORTALITY, 1890 - 1910

Myron P. Gutmann
Michael R. Haines
W. Parker Frisbie
K. Stephen Blanchard

Historical Paper 111

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
December 1998

Paper Prepared for the Annual Meeting of the Social Science History Association, New Orleans, Louisiana, October 10-13, 1996. The results reported here are still preliminary. This research has been supported by Grant No. 5 RO1-HD32325 from the National Institutes of Child Health and Human Development. We are grateful to members of the Social History Research Laboratory of the University of Minnesota, under the direction of Steven Ruggles, for their work in assembling the data we use in this paper. We are also grateful to the other participants in an NIH-sponsored workshop on Hispanic Maternal and Child Health, held in Bethesda, MD in August, 1996 for their comments and suggestions. Any opinions expressed are those of the authors and not those of the National Bureau of Economic Research.

© 1998 by Myron P. Gutmann, Michael R. Haines, W. Parker Frisbie, and K. Stephen Blanchard. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

Intra-Ethnic Diversity in Hispanic Child Mortality, 1890-1910
Myron P. Gutmann, Michael R. Haines,
W. Parker Frisbie, and K. Stephen Blanchard
NBER Historical Paper No. 111
December 1998
Development of the American Economy


## ABSTRACT

The recent demography of the Hispanic population of the United States has received considerable attention, but historical perspective is more elusive partly due to data limitations. A nationally representative sample of the Hispanic population of the United States, based on the manuscripts of the 1910 census, now exists that includes 71,500 Hispanic-origin persons plus another 24,000 of their non-Hispanic neighbors.

We estimate childhood mortality for 1890 to 1910, using indirect demographic methods of estimation and find infant and child mortality in the Hispanic population that was higher than for the non-Hispanic whites but slightly lower than for nonwhite, non-Hispanics (mostly African Americans). Hispanic rural, farm populations in California, Texas, and Arizona did the best, though still experiencing high mortality. The usual advantage of rural residence at the turn of the century holds outside of New Mexico and Florida.



Myron P. Gutmann
Population Research Center
University of Texas at Austin
Austin, TX 78713

Michael R. Haines
Department of Economics
Colgate University
13 Oak Drive
Hamilton, NY 13346
and NBER
mhaines@mail.colgate.edu

W. Parker Frisbie
Sociology Department
University of Texas at Austin
Austin, TX 78713

K. Stephen Blanchard
Department of Sociology
University of Texas at San Antonio
San Antonio, TX

INTRODUCTION

At the time of the Thirteenth United States Census in 1910, the Hispanic origin population had just begun the dramatic growth that would make it a significant part of the total U.S. population at the end of the twentieth century. In that year, the Hispanic population numbered nearly 850,000 individuals (Gutmann, Frisbie and Blanchard, 1999). Despite its size and its importance later in the twentieth century, we know relatively little about the growing population of Hispanics in the U.S. in 1910.

This population was also internally diverse. For example, Hispanics in Florida were from Cuba or Spain, and they were more likely to live in an urban environment, to be literate, and employed in artisanal jobs. In California, Arizona, and Texas, Hispanics were almost exclusively of Mexican origin, were mostly immigrants or the children of immigrants, lived in both cities and the countryside, and were spread through many occupations. In New Mexico, the population was rural, overwhelmingly the U.S.-born children of U.S.-born parents, and much more likely than elsewhere to describe their occupation as that of "farmer."

This paper reports on a study of the extent to which the sub-groups within the Hispanic population experienced different levels of child mortality. Earlier work shows that there was considerable variation in child mortality in the late nineteenth and twentieth century (Preston and Haines 1991; Preston, Ewbank, and Hereward 1994; Gutmann and Fliess 1996). This earlier work is important for establishing broad comparisons for mortality in the U.S., but it offers little help in understanding conditions in the Hispanic population in the early twentieth century. This work follows the methodological lines established by Preston and Haines (1991), and makes use of individual-level data from the 1910 U.S. Census of Population. (Haines and Preston 1997; Gutmann and Fliess 1996). The data on which

the analysis is based is the newly constructed Gutmann-Ruggles Hispanic oversample of the 1910 U.S. census of population (Gutmann, Frisbie and Blanchard 1999; Gutmann, et al 1998). This sample, designed both to stand independently and to be merged with the existing 1910 Public Use Sample, includes data on about 69,214 persons who lived Hispanic-headed households, plus another 26,303 of their neighbors, who lived in 57 counties in six states: California, Arizona, New Mexico, Kansas, Texas, and Florida.[1] There are 6,651 currently married Hispanic women and 2,359 currently married non-Hispanic women (2,148 white and 211 non-white) of the appropriate marriage durations in 1910 whose child mortality experience can be studied.[2]

## THE HISTORICAL STUDY OF CHILD MORTALITY AND ITS CONTEXT IN 1910.

The data available in the 1910 census allow the estimation of levels of child mortality in the population. Perhaps more importantly, these data permit the measurement of differentials between groups within the population. The method makes use of an index of child mortality based on the data recorded in the census. According to Preston et al. (1994: 41),

> The index is the ratio of cumulative child deaths that a woman has experienced (i.e., the difference between her numbers of children born and surviving) to her expected number of child deaths. The expected number of deaths is calculated by multiplying her number of children-ever-born by an expected proportion dead. The expected proportion dead is based in turn on an estimate of the length of her children's exposure to the risk of mortality, combined with a "West" model life table.

We have followed this approach, scaling the expected proportion dead to a "West" model life table of 13.5 years, males and females combined (expectation of life at birth of 49.74 years). It represents mortality that is slightly higher than in the

life table used by Preston et al. (1994) for their analysis. The choice of one level or another is largely a matter of taste and convenience. The analytic results are the same, because the index values are proportional.[3] Given the fertility and mortality prevalent in the U.S. in the early twentieth century, the child mortality index refers to children born during a sixteen-year period prior to the census, with the average child born about eight years prior to the census. Thus the indexes reported here refer to children born between 1894 and 1910, with the average child born in 1902.

This article reports the child mortality index for every currently married woman in the Hispanic oversample population who was married only once, who was married fewer than 25 years and had a known number of children ever born and children surviving, and a known number of years of marriage. No woman whose oldest child living with her was more than two years older than her number of years married was included, on the grounds that those children were likely to be children of a previous marriage. We have excluded women married 25 or more years because the gains in number of cases are outweighed by the loss of precision (Preston and Haines 1991; Gutmann and Fliess 1996).[4] The analysis also excludes women with missing data for important variables pertaining to marriage duration, children ever born, and children surviving, even when reliable imputed data are available.[5] The index is irrelevant for childless women.

The recent work done on child mortality adds to a small body of earlier work about mortality in the United States, based on the limited death certificate data available for the late nineteenth and early twentieth centuries. In 1921, J.W. Glover published life tables for black and white Americans to the period 1900 to 1911 based on deaths recorded for the then-existing Death Registration Area, which in 1900 consisted of ten states in the Northeast and Midwest.[6] Glover's estimate of the expectation of life at birth, e(0), for the period 1901-1910 was 52.5 years for

whites, 35.7 years for blacks, and 50.9 years for all persons combined.[7] Moreover, his comparison of the 1901-1910 period with 1909-1911 showed that mortality was declining at the beginning of the twentieth century. Preston and Haines (1991), and Preston, et al. (1994) generally confirm Glover's estimates. The Hispanic populations in the older census samples are very small, and there are no states with significant Hispanic populations in the death registration data Glover used.[8]

One clear point of comparison for understanding Hispanic mortality in the 20th century can be drawn from the work of Gutmann and Fliess (1996), who provide estimates of child mortality for six Texas counties in 1900 and 1910. These results, some of which appear in Table 1, give the q(5) life table parameter, that is, the probability of dying between birth and age five, along with the child mortality index and an implied expectation of life at birth. The estimates from the 1900 census indicate that ethnic differentials varied by a factor of nearly three, while they differed by a factor of more than two in 1910. In each case, the German-origin populations of south and central Texas had by far the lowest child mortality, and the Mexican-origin population (in this case mostly from Webb County near the Mexican border) had the highest child death rates. Given the poor socioeconomic conditions of the Mexican-origin population in Texas and elsewhere in the United States, the Gutmann and Fliess results are not surprising. Mexican-origin child mortality was high, higher even than that of the African American population in early 20th century Texas. There was some improvement for Mexican-origin children between 1900 and 1910, but even so their mortality was 50 percent higher in 1910 than that of the population as a whole.

The analysis presented here emphasizes differences in child mortality between sub-groups of the Hispanic population, based on generation, place of residence, nativity, and social status. These are all characteristics revealed by census data. What this census-based research cannot reveal are the proximate causes of child

mortality. It is silent about the availability to individual families of sanitary facilities, the extent of breast feeding, knowledge of hygiene and food preparation, or access to medical care.

These differences in living conditions can produce differences in child mortality experience. Preston and Haines (1991), and Preston et al. (1994) show that in the early twentieth century, rural children survived better than those in cities. Generation of mother and her national origin also mattered. Moreover, the children of families where there was likely to be more income should have survived better than those of itinerant farm laborers and other low income groups. Theories of child mortality also suggest that the children of families in which someone was literate, or where knowledge about improving health could be acquired (English speakers, for example) should be healthier and live longer. Finally, these differences could be large. Nothing in the work of Gutmann and Fliess is more striking than the very low mortality experienced by the children of German immigrant families in Texas. The question here is whether any part of the Hispanic population -- for example, those who held white collar jobs, or those with substantial farms or ranches -- might have very low child mortality. At the same time, it is possible that some group might have experienced very high child mortality.

Generation and residence are central to these questions, because in most historical populations the children of native-born women had lower mortality than did those of immigrant women (Preston and Haines, 1991). More recent vital statistics data, on the other hand, tell a different story. For example, risk of mortality (as well as of adverse birth outcomes) is lower for many infants born to immigrant mothers (including immigrants from Mexico, Asia and Southeast Asia, and Africa) than for their native-born counterparts (Cabral et al. 1990; Frisbie et al. 1997; Frisbie, Forbes, and Hummer 1998; Rumbaut and Weeks 1991; Singh and Yu 1996).

The present analysis incorporates four categories of risk factors. The first is

at the level of the woman herself. Some of the woman's characteristics should influence the mortality of her children. The second set of characteristics that influence child mortality are those at the level of the woman's husband. His occupation, for example, or his literacy or ability to speak English are in this category. The third set of characteristics that influence mortality are the family's living arrangements. Single family homes, home ownership, and nuclear family households should all lead to lower child mortality, as evidence of better living conditions and greater prosperity. The fourth set of characteristics that influence child mortality describe the community in which the family lives. In this simplified analysis, only the state and the size of the community are taken as relevant. In some way each of these four levels of analysis influenced child mortality among Hispanics and their neighbors.

## NEW ESTIMATES OF HISPANIC CHILD MORTALITY IN THE EARLY TWENTIETH CENTURY.

Table 2 reports the child mortality index for women in the Hispanic oversample, divided by the most important characteristics of the women themselves: their ethnic group, generation, literacy, labor force status, and language spoken. This series of bivariate results sets the broad parameters for understanding the child mortality experiences of this population. The table also includes an equivalent table based on the national PUMS for 1910.[9] The panel reporting the child mortality index tabulated by ethnic group and marriage duration suggests the gradual improvement in child mortality over time that is implied by lower child mortality indexes for women married more recently.

The results presented in Table 2 show that child mortality was higher for Hispanics than for other groups, especially white non-Hispanics, in the oversample. The child mortality index was more than 65 percent higher for Hispanics (1.54) than for non-Hispanic whites (0.93). Child mortality in the small sample of African

Americans was slightly lower than that of Hispanics.

The divisions between groups of Hispanic women reveal both predictable and surprising results. Predictably, literate women and women who spoke English had better child mortality experiences than illiterate women and those who did not speak English. The consequences of labor force participation and generation ran counter to our expectations, however. Women in the labor force had lower child mortality than those outside the labor force. Perhaps most surprising of all, both foreign-born (immigrant) women and the native-born women of foreign-born parents (the second generation) had better child mortality experiences than did those of the native-born children of native-born parents (third and greater generation). This is a puzzling result, because most other studies of early twentieth century populations show a monotonic improvement in childhood mortality by generation. This led to a hypothesis that the longer a family had been in the United States, the more likely that family would find itself in improved socioeconomic and living conditions. On the other hand, the higher child mortality of many immigrants in 1900 was due to urban residence, rather than socioeconomic status (Preston and Haines, 1991, Table 4.4).

The characteristics of the husbands (Table 3) show that the children of literate and English-speaking men lived longer than did those of illiterate men and men who did not speak English. The families of men who were employed should have been healthier than those of men who were unemployed, and this was often the case. As was the case for women, the mortality of the children of third-generation or later men was greater than for those of second generation men, but not higher relative to those of immigrant men. Finally, the analysis of occupation is revealing. The children of farmers and high white collar workers had the lowest mortality, somewhat lower than all others. As hypothesized, the most privileged groups in this sense were somewhat better off, but the differences are not great.

The third direction of approach to Hispanic child mortality is through household living arrangements (upper panel of Table 4). Single family homes, home ownership, and family-only household composition should all be favorable to child health, and therefore reduce child mortality. That was not the case. None of these potentially beneficial characteristics led to reduced mortality; single and multiple-family residence had about an equal effect, while home ownership, and family only household composition were associated with higher child mortality. The only possible hypothesis confirmation comes from the two final characteristics of the household composition category, households with employees and with multiple family types (many of which had employees). The presence of employees should be a proxy for wealth, and therefore to predict lower child mortality. That proved to be the case.

The influence of the characteristics of places in which people lived are reported in the bottom panel of Table 4. Contrary to expectations, there is no clear relationship at the bivariate level between size of place and child mortality. Most importantly, no benefit accrued to Hispanic children by living in the countryside. This was in striking contrast to all other groups in the population, where there was a noticeable difference between the child mortality index for rural places (as well as those with fewer than 5,000 people) and all larger places.

Another important result appears in the child mortality indexes for each of the individual states in the Hispanic oversample. Hispanic children experienced similar levels of mortality in Arizona, California, and Texas; but the child mortality index was somewhat larger in Florida, and very much larger in New Mexico, than in the other states. Map 1 displays child mortality indexes for individual counties. The map demonstrates both the diversity of individual county characteristics, and the clustering of relatively high levels of child mortality in New Mexico, with some additional areas in each of the other states.[10]

To summarize, women who did not speak English, and were not literate, or whose

husbands did not speak English or were illiterate, had higher child mortality indexes. Moreover, the children of Hispanic farmers and men with high white collar occupations also had lower child mortality. More striking are the characteristics that ran counter to expectations. The child mortality index for home ownership, single family households, and women outside the labor force, were higher rather than lower. These are the characteristics of child mortality in the Hispanic population that require explanation. They are all the more important to explain because they do not coincide with the results for non-Hispanic whites and African Americans.

The surprisingly high child mortality index for New Mexico provides some insight into a solution to the whole range of unexpected bivariate results. New Mexico is different from other states in the social composition of its population, and in the responsiveness of child mortality to that social composition. Tables 5 and 6 present the child mortality index for groups identified by generation and state. Table 6 contains tabulations by female literacy, language, and labor force participation. Table 7 presents similar results by state, generation, and husband's occupation. The results show that for virtually every category the child mortality index in New Mexico is higher than in the other states. A good example of the distortion possible appears in the child mortality of women whose husbands were farmers. In California, Arizona, and Texas, the statewide child mortality index is less than 1.2. In New Mexico it is more than 1.8. Moreover, it is especially high in New Mexico for native born women who were the children of native born parents.

These results confirm that New Mexico has had a disproportionate impact on all of the results presented thus far. More than anything else, Hispanics in New Mexico were likely to be the U.S.-born children of U.S.-born parents (third generation or more). In addition, they constitute a significant proportion of our sample. The high child mortality index of New Mexican Hispanic women thus inflates the overall third generation child mortality index overall. Going further, New Mexican Hispanic

males were more likely than males in other states to be farmers, raising the child mortality index for farmer families in the overall sample. Finally, New Mexico families are very likely to be homeowners and to live in nuclear families and in single family homes.

## A MULTIVARIATE ANALYSIS OF HISPANIC CHILD MORTALITY IN 1910.

The multivariate analysis of child mortality based on the Hispanic oversample for 1910 follows the same multi-level procedure as the bivariate analysis. The OLS regression, weighting each case by each woman's number of children ever born, is the procedure used by Preston and Haines (1991).[11] The dependent variable is each individual woman's child mortality index. All of the cases identified earlier are in the analysis, except for women who were not living with their husbands. They have no husbands' characteristics to add to the analysis.

Table 7 reports the regression results. The text that follows only discusses the full model, but the table presents a broader range of coefficients. These coefficients are displayed in the right hand column of both pages of Table 7. The regression results predictably overcome many of the limitations imposed by the bivariate analysis, and confirm most of the implicit hypotheses. Given the relatively large number of cases, most of the coefficients are significant. The overall r-squared value and adjusted r-squared values are low, but they are in the general range found by similar studies.

At the most basic level, the coefficient for Hispanic women was positive and significant, confirming the extent to which the child mortality of Hispanic families was higher than that of non-Hispanic white families. Interestingly, after adding all the other socioeconomic and environmental characteristics, child mortality was now worse for non-whites than for Hispanics. Also, the introduction of state of residence to the model has an impact on the role of generation. In the final model,

both of the native-born generational groups had lower child mortality than did immigrants. Even in this model, however, the coefficient for third and greater generation women was not significant. This is a residue of the interaction between generation and state of residence, which can be considered with a model that includes interactions.

As expected, those other characteristics of the woman that reflected low socioeconomic status, limited knowledge of sanitation, and limited exposure to forces in American society that were working toward improved child health were generally associated with higher child mortality. Illiterate women and those who could not speak English had higher child mortality indexes than did literate or English-speaking women. Women's labor force participation did not have a significant effect, although the coefficient for being in the labor force was negative, suggesting that labor force participation lowered child mortality slightly.

The two characteristics of the husband in the model show that his occupational status and ability to speak English had meaningful roles in determining child mortality in the family. First, the families of men who did not speak English had higher child mortality than did those who spoke English. In the case of occupation, the results are all significant and define a clear hierarchy of associations between husband's occupation and child mortality. Husbands who were farmers are the reference group. Their child mortality was lower than that of all other groups. Among the remaining groups, two categories, "High White Collar", and "Skilled Manual" had the lowest child mortality, confirming the benefits that accrued to families where the men held relatively high-status and higher-paying jobs, and the penalties that accrued to those who generally lived in urban environments, despite the control for size of place.

The next set of coefficients bring in the nature of the house and household

itself. They show that family structure and the type of housing are correlated with meaningful differences in child mortality. In the case of family structure, families with employees or some mix of employees and other complex types had significantly lower child mortality than did the nuclear family reference group. This is probably because of some combination of greater wealth and improved child care, although it is difficult to tell which. On the other hand, extended families and families with lodgers and other unrelated people had slightly higher (but not statistically significant) child mortality than did those in the nuclear family reference group. The type of housing in which people lived lead to similar conclusions. Families who lived in multiple family houses, and those who lived in group quarters, had significantly higher child mortality than did those who lived in single family houses, the reference group. On the other hand, home ownership does not appear to be beneficial. Families who rented their homes had somewhat lower child mortality than did those who owned their homes, a conclusion that is counter to expectations.

The last set of variables introduced in the model represent the state of residence and the size of place in which people lived. State of residence makes the kind of major difference that we had predicted based on the bivariate analysis. Texas is the reference category, and Arizona, Florida, and especially New Mexico had higher child mortality. The differences between Texas and California and Kansas were not significant.[12] Because relatively few Hispanics in 1910 lived in large cities, the models identify individual cities of residence for places with populations of 25,000 or greater. With only one exception, all the coefficients were positive relative to the reference group, which was made up of rural areas and small towns (under 5,000 inhabitants). This is predictable, given the relative benefits of rural life over urban life at the turn of the century. Among the larger places, there was no simple pattern, which probably reflected local variations in

the development of sanitation infrastructure at the time.

Local sanitation and mortality conditions differed in each of the four sizable cities. Leaving Tampa aside for a moment, the data confirm a trend that others have observed, in which larger cities improved their sanitation conditions more rapidly in the late nineteenth and early twentieth centuries than did smaller cities. While El Paso, San Antonio, and Los Angeles all had higher mortality than rural areas, their coefficients reflect mortality that declined with size of city. The three cities shared certain characteristics. After 1890 their Mexican-origin populations were growing rapidly, although not as rapidly as they were to grow after the beginning of the Mexican Revolution around 1910. This population was concentrated in specific areas within each city, and those areas had very poor living conditions. In all three cities public authorities were aware of the poor living conditions in which the Mexican population lived, but they were relatively slow to bring improvements, and the initial improvements had relatively little impact.

El Paso had by far the worst of the urban health conditions. While city officials had made efforts in the late nineteenth century to improve sanitation, little was accomplished for the Mexican population (El Paso 1903). The Mexican residential areas – especially the Chihuahuita barrio -- were widely perceived by contemporaries as having terrible living conditions (Garcia 1981). Despite that perception, conditions worsened up until 1910, and reform began only in the years from 1913 to 1916, through the demolition of substandard housing in the areas where Mexicans lived and through the extension of water and sewer service to those areas. Even in the areas of improvement, however, the standard imposed was one toilet and one faucet for every fifteen families. San Antonio was little better than El Paso at the turn of the century. While public and private parties modernized water service and public facilities in the late nineteenth and early twentieth centuries, conditions in the Mexican-American areas on the west side of the city were little

improved. These large areas were not cleaned up in any significant way until the 1930s (Blanchard 1996). Los Angeles had fewer Mexican origin people than either El Paso or San Antonio, in the context of a much larger city. The result was a city in which conditions for Mexicans were slightly better than in the other cities we have studied. Los Angeles also acted more quickly to improve conditions for the city's Mexican residents. The Los Angeles City Council created the Los Angeles Housing Commission in 1906. The Housing Commission began the process of slum condemnation and the slow creation of slightly improved housing (de Castillo 1979; Fogelson 1967; Miranda 1990; Rios-Bustamante and Castillo 1986; Romo 1983).

Tampa is the one noticeable surprise in this survey of urban mortality in the early twentieth century. Its story is a ray of light that shows that living conditions for Hispanic Americans prior to 1910 did not have to be absolutely deplorable. Tampa was a prosperous city by the end of the nineteenth century. Fueled by the growing cigar-making industry and an active port, the city could afford improvements. Tampa established water works in the early 1880s, and enlarged them in 1889, 1891, and 1900 (Long 1971; Chapin 1914; Grismer 1951; Perez 1978). The result was a relatively healthy place to live. Tampa stands in stark contrast to Key West, the other largely Cuban area we have studied. In general, Florida outside Tampa had very high mortality. The explanation must come from living conditions in Key West. The problem there in the early twentieth century was widespread disease, made worse by a water shortage (Chapin 1914; Diddle 1946; Poyo 1977). Key West had no natural sources of fresh water, so residents were dependent upon rainwater collected in cisterns, or on water brought in by boat. Without fresh water, rates of gastrointestinal illness were very high. In the U.S. Census of 1900, Key West ranked fifth in the nation among 344 Death Registration cities with a diarrhea death rate of 327.4 per 100,000. It ranked third in the U.S. with an infant mortality rate of 311.8 per 1,000 live births (U.S. Census 1900a; 1900b).

The issues raised by the strong New Mexico effect calls for a final regression analysis that shows the result of the interaction between generation and state of residence. Table 8 reports those results. Third generation and greater residents of Texas make up the reference group; all coefficients are relative to that. An examination of the highlighted area in Table 8 reveals that the experiences of women of different generations was quite different in different states. In Arizona, California, and Texas, immigrant women had the highest child mortality ratios, with second and third generation women having somewhat similar ratios that were better than those of immigrants. In Texas and Arizona, the coefficients were lowest for the second generation, while in California they were lowest (implying the lowest child mortality) for the third generation.

New Mexico and Florida present dramatic differences. In Florida, conditions were the best for the immigrant generation, although even these coefficients were significantly higher than the reference group. Continuing with Florida, the second generation had higher child mortality than the immigrant generation, while the third (and later) generation group had the worst child mortality of all. In New Mexico, the immigrant and second generation groups had roughly similar coefficients, representing considerably worse child mortality than the Arizona immigrant women who make up the reference group. The third and later generation New Mexico women had higher child mortality indexes than their first and second generation counterparts, but not as high as those in the Florida third generation.

The historical literature about Hispanic life in New Mexico goes part way in answering the question of why children in New Mexico had higher chances of dying, even if they were born to native-born women, farm families, and those living in single-family homes. Many Hispanic residents of New Mexico were part of a population that was quite different from the relatively recent Mexican immigrants and their children and grandchildren who lived in other parts of the Southwestern

United States.

While it is impossible to be absolutely certain about the origins of all the families that made up the settled Hispanic population of New Mexico in 1910, a significant number of those people were the descendants of Spanish or Mexican soldier-colonists who had come to the region long before the twentieth century (Nostrand 1992; Carlson 1990). These residents of what Nostrand (1992) calls the "Hispano Homeland" had distinct living arrangements and distinct ways of using the land (Fincher 1974; Leonard and Loomis 1941; Sanchez 1967). Whether scattered among the mountains, or dry-land farming villages, or, as most were, located on the river bottoms, the physical layout of the villages seldom varied. The houses were clustered tightly together, frequently joined to each other by common walls and stretching along the sides of the plaza square. Few dwellings were separated from any other in space further than the distance across the plaza. There were no isolated houses or farms.

These crowded living arrangements were likely to have had significant consequences for the health of babies, children, and adults. Village drinking water for both livestock and humans flowed through the same irrigation ditches that usually ran near the cluster of houses. There were no sanitary facilities to speak of, not even latrines. Privies did not appear in the villages until after the First World War. Until then, the "private sides of convenient pinion and juniper bushes" (deBuys 1985: 203) were toilet sites and the job of cleaning was left to free-roaming chickens, dogs, and pigs. Much of the water was contaminated by intestinal bacteria and gastrointestinal disorders were common. The dehydration and anemia associated with infectious diseases were major causes of infant mortality. There was crowding of family members in their homes. After diarrhea, respiratory infections were the next most common causes of death (deBuys 1985: 203; Simmons 1992). The earliest published studies about infant mortality in this region, which

describe conditions in the 1930s and 1940s, consistently report it as being twice as high as that of non-Hispano areas (Forrest 1989: 11; Fincher 1974: 46). Conditions may well have been worse at the turn of the century.

The special characteristics of the Hispano population give depth to the reported results. These women were themselves overwhelmingly the native-born children of native-born parents. Their husbands were likely to be farmers. And they were likely to live in single family homes without employees or extended family. It could be argued that they constituted a separate population from other Hispanics, even in New Mexico. The immigrant and second generation Hispanic population of New Mexico were Mexicans and their children, and their living conditions may have been more like those of Hispanics living in Texas and Arizona than like those of the Hispano inhabitants of northern New Mexico.

These findings about the nativity of Hispanics in New Mexico and in the Hispanic population at large in 1910 shed some light on the differences between contemporary and historical results for immigrants. Although the native-born in New Mexico had worse mortality conditions than did immigrants, these results are almost certainly the consequence of worse living conditions and isolation, rather than of some predisposition through culture or selection to better outcomes for immigrants. Only later in the century, when sanitation conditions in the United States were improved for almost everyone, could cultural or other differences between immigrants and natives of a single ethnic origin group make a difference.

## CONCLUSIONS: HISPANIC CHILD MORTALITY IN THE EARLY TWENTIETH CENTURY.

This paper offers the first results based on a large national sample about the child mortality experience of the Hispanic population of the United States in the early twentieth century. The story is one of a population generally characterized by high child mortality among all its members. Hispanics had higher mortality than

non-Hispanic whites, but slightly lower mortality than all other non-Hispanics, most of whom were African-Americans. Within the Hispanic population there is ample evidence of groups with very high mortality, but little evidence that there were any sections of the Hispanic population in 1910 that had experienced low mortality. Hispanic families headed by farmers in Texas, Arizona, and California had the best mortality experience, but even their children were more likely to die than virtually all groups among white non-Hispanics. Mortality was high, and there were no highly favored groups.

While there were no groups within the Hispanic population that had relatively favorable experiences, two large groups identified by state of residence had unusually unfavorable child mortality experiences. Many rural residents of New Mexico, and those Hispanic residents of Florida who did not live in Tampa, had very high rates of child mortality. In both cases, the situation was worst for families that had lived in the territory of the United States for a long time. The long-time New Mexico population had especially unfavorable child mortality experience, despite the fact that they had characteristics that associated with lower child mortality in other parts of the population. They were not immigrants, and they were farmers. While we would prefer to have more direct evidence about the living conditions in the New Mexico population that led to high mortality, what descriptions we have suggest that this population lived in crowded conditions with poor sanitation facilities and little knowledge of hygiene.

Outside the New Mexico and Florida populations, with their special characteristics, the children of immigrant women had the highest child mortality and the children of second-generation women had much more favorable mortality. Literacy and the ability to speak English were also protective of children, probably reflecting a combination of socioeconomic status, assimilation to the larger society, and knowledge of sanitation. There were occupational differences beyond

the important advantage that accrued to farmers. Of the remaining groups, the families of men with high white collar and skilled craft occupations had lower mortality than the families of low white collar and unskilled occupations. Finally, living in a single family home (and not in group quarters), or in a household with servants, was also beneficial.

The locations in which people lived had a complex impact on their child mortality. In general, rural families and those who lived in very small towns (up to a population of 4,999), had lower child mortality than all other groups. This confirms the results for occupations, in which farm families had the lowest child mortality indexes. In larger places, the story is richer. Tampa had surprisingly low child mortality, better than rural areas. It had already constructed public sanitation facilities that improved health. The other three large cities, El Paso, San Antonio, and Los Angeles, displayed a pattern of high but generally declining child mortality with size. This pattern is probably a consequence of the fact that the larger the city in this period, the more likely it was to have invested in a public health infrastructure. This we not invariably the case, because San Antonio was very late in its construction of public water and sewer facilities in the part of the city in which Hispanics lived (Blanchard 1996).

These results are important on their own, and they are important because they offer the first early-twentieth century context for some of the striking characteristics of the Hispanic population in the late twentieth century. By the late twentieth century, Mexican immigrants to the United States have come to have had lower infant and child mortality than Mexican-Americans. The results reported here do not confirm this "immigration effect", because immigrants generally experienced much worse living conditions than did those who were born in the United States.[13] The exception, of course, are the long-time U.S. residents who lived in New Mexico and Florida, who seem to have had to worst living conditions of all.

These results also provide an interesting context for another striking – and probably related – characteristic of Hispanics at the end of the twentieth century. Since at least the 1970s, some parts of the Hispanic population of the United States have shown evidence of what demographers call an "epidemiologic paradox", because they experience lower rates of infant and child mortality than other residents of the U.S., when taking into account levels of socioeconomic status. There is no strong evidence for the "epidemiologic paradox" in our early twentieth century data, because Hispanics have considerably higher child mortality than non-Hispanic whites in our population. Nevertheless, Hispanics in the 1910 population already had lower child mortality than African Americans living in the same social setting and subject to the same statistical analysis. This is an interesting starting point for understanding the long-term trend in child mortality in the major ethnic groups of the late twentieth century.

REFERENCES

Blanchard, K. S. 1996. The Decline in Diarrhea-Related Infant Mortality in San Antonio, Texas, 1935-1954: the Role of Sanitation. Unpublished Ph. D. Dissertation, University of Texas at Austin.

Cabral, H., L.E. Fried, S. Levenson, H. Amaro, and B. Zuckerman. 1990. "Foreign-born and U.S.-born black women: differences in health behaviors and birth outcomes." American Journal of Public Health 80: 70-72.

Carlson, A. W. 1990. The Spanish-American Homeland: Four Centuries in New Mexico's Rio Arriba. Baltimore: The Johns Hopkins University Press

Chapin, G. M. 1914. Florida, Past, Present and Future. Chicago: S. J. Clarke Publishing Company

Coale, A. J., and P. Demeny. 1983. Regional Model Life Tables and Stable Populations. Second Ed. New York: Academic Press.

De Buys, W. 1985. Enchantment and Exploitation: The Life and Hard Times of a New Mexico Mountain Range. Albuquerque: University of New Mexico Press.

del Castillo, R. G. 1979. The Los Angeles Barrio, 1850-1890: A Social History. Berkeley: University of California Press

Diddle, A. W. 1946. "Medical Events in the History of Key West." Tequesta, The Journal of the Historical Association of Southern Florida. Pp.14-37

El Paso. 1903. Charter and Ordinances of the City of El Paso. Published under the authority of the City Council of El Paso. Galveston: Clarke and Courts, Publishers

Fincher, E. B. 1974. Spanish-Americans as a Political Factor in New Mexico, 1912-1950. New York: Arno Press.

Fogleson, R. M. 1967. The Fragmented Metropolis: Los Angeles, 1850-1930. Cambridge: Harvard University Press

Forrest, S. 1989. The Preservation of the Village: New Mexico's Hispanics and the New Deal. Albuquerque: University of New Mexico Press.

Frisbie, W. P., M. Biegler, P. de Turk, D. Forbes, and S. G Pullum. 1997.

"Determinants of Intrauterine growth retardation and other compromised birth outcomes: a comparison of Mexican Americans, African Americans, and non-Hispanic whites." American Journal of Public Health 87(12).

Frisbie, W.P., D. Forbes, and R.A. Hummer. 1998. "Hispanic Pregnancy Outcomes: Additional Evidence." Social Science Quarterly 79: 149-169.

Garcia, M. T. 1981. Desert Immigrants: The Mexicans of El Paso, 1880-1920. New Haven: Yale University Press

Glover, J. W. 1921. United States Life Tables, 1890, 1901, 1910, and 1901-1910. Washington, D. C.: U. S. G. P. O.

Grismer, K. 1951. Tampa: A History of the City of Tampa and the Tampa Bay Region of Florida. Florida: St Petersburg Printing Company

Gutmann, M. P., and K. H. Fliess. 1996. "The Social Context of Child Mortality in the American Southwest." Journal of Interdisciplinary History 26: 589-618.

Gutmann, M. P., et al. 1998. The Hispanic Oversample of the 1910 U.S. Census of Population: User's Guide. Minneapolis: Social History Research Laboratory, University of Minnesota.

Gutmann, M. P., W. P. Frisbie, and K. S. Blanchard. 1999. "A New Look at the Hispanic Population of the United States in 1910." Historical Methods. Forthcoming.

Haines, M.R. and S.H. Preston. 1997. "The Use of the Census to Estimate Childhood Mortality: Comparisons from the 1900 and 1910 United States Census Public Use Samples." Historical Methods 30: 77-96.

Leonard, O., and C. P. Loomis. 1941. Culture of a Contemporary Rural Community, El Cerrito, New Mexico. Rural Life Studies I, Bureau of Agricultural Economics, USDA. Washington.

Long, D. 1971. "Making of Modern Tampa: A City of the New South, 1885-1911." Florida Historical Quarterly XLIX (4): 333-345

Miranda, G. E. 1990. "The Mexican Immigrant Family: Economic and Cultural Survival in Los Angeles: 1900-1945." In 20th Century Los Angeles: Power, Promotion, and

Social Conflict N. M. Klein and M. J. Schiesl (eds), Claremont: Regina Books, pp 39-60

Nostrand, R. L. 1992. The Hispano Homeland. Norman: University of Oklahoma Press.

Perez, L. A. 1978. "Cubans in Tampa: From Exiles to Immigrants, 1892-1900." Florida Historical Quarterly LVII (2):129-140

Poyo, G. E. 1977. "Cuban Revolutionaries and Monroe County Reconstruction Politics, 1868-1976." Florida Historical Quarterly LV (4): 407-422

Preston, S.H. and M.R. Haines 1991. Fatal Years. Child Mortality in Late Nineteenth-Century America. Princeton: Princeton University Press.

Preston, S.H., D. Ewbank, and M. Hereward. 1994. "Child Mortality Differences by Ethnicity and Race in the United States: 1900-1910." Pp. 35-82 in S. C. Watkins, ed., After Ellis Island: Newcomers and Natives in the 1910 Census. New York: Russell Sage Foundation.

Rios-Bustamante, A. and P. Castillo. 1986. An Illustrated History of Mexican Los Angeles, 1781-1985. Chicano Studies Research Center Publications, Monograph, No. 12. University of California, Los Angeles.

Romo, R. 1983. East Los Angeles, History of a Barrio. Austin: University of Texas Press

Ruggles, S., and M. Sobek. 1995. Integrated Public Use Microdata Series: Version 1.0. Minneapolis: Social History Research Laboratory, University of Minnesota.

Ruggles, S., and R.R. Menard. 1995. "The Minnesota Historical Census Projects." Historical Methods 28 (1995), 6-78.

Rumbaut, R. G. and J. R. Weeks. 1991. Perinatal Risks and Outcomes Among Low-Income Immigrants. Final Report for the Maternal and Child Health Research Program. Rockville: Department of Health and Human Services.

Sanchez, G. I. 1967. Forgotten People: A Study of New Mexicans. Albuquerque: Calvin Horn Publishers Inc. (Originally published 1940).

Simmons, M. 1992. "Hygiene, Sanitation, and Public Health in Hispanic New Mexico,"

The New Mexico Historical Review 62: 205-226.

Singh, G. K. and S. M. Yu. 1996. "Adverse pregnancy outcomes: differences between U.S.-born and foreign-born women in major U.S. racial and ethnic groups." American Journal of Public Health 86: 837-843.

U.S. Census. 1900a. Abstract of the 12th Census. Table 99, "Death Rates for Certain Principal Causes per 100,000: 1900."

U.S. Census. 1900b. Abstract of the 12th Census. Table 95, "Death Rates per 1000

## FOOTNOTES

1. The data will be made available as part of the Integrated Public Use Microdata Series (IPUMS) from the University of Minnesota (Ruggles and Sobek, 1995; Ruggles and Menard, 1995). The IPUMS can be found on the World Wide Web at http://www.hist.umn.edu/~ipums.

2. These figures do not include childless women, because they cannot be analyzed. There are an additional 977 Hispanic women, 459 white non-Hispanic women, and 58 non-white non-Hispanic women with appropriate marriage durations.

3. That is, mortality in the model life table system is about linear in the vicinity of the standard (West Model, both sexes combined, level 13.5).

4. But see also Preston, Hereward, and Ewbank, 1994, who include additional women.

5. In our attempt to analyze those women for whom imputed values are available in the data, we discovered that they produced unrealistic levels of child mortality. It is safer to exclude them from the analysis.

6. The Death Registration area in 1900 included Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Michigan, Indiana, the District of Columbia, and some additional cities. The Glover life tables were based only on the data for the ten states and the District of Columbia. See Glover (1921), and Preston and Haines (1991), p. 229.

7. The death registration area had higher mortality than the United States as a whole because it was more urban and eastern. It was also unrepresentative because it had relatively few African Americans and too many immigrants.

8. California was admitted in 1906, but Glover did not use those data. Florida was admitted in 1919, Arizona in 1926, New Mexico in 1929, and Texas – finally – in 1933. Even when these states were admitted, they rarely, if ever, tabulated deaths separately for the Hispanic-origin population.

9. The results for the entire U.S. for 1910 are based on our analysis, and are directly analogous and comparable to our analysis of women in the Hispanic oversample.

10. There is one county with an index above 1.5 in Florida, two each in California and Arizona, and three in Texas.

11. While it would be possible to use Poisson or tobit regression, we do not feel the added complexity would add to the effectiveness of our analysis.

12. There are so few women in the Hispanic oversample from Kansas that it is difficult to draw a conclusion based on this coefficient.

13. It is also the case that our immigrant women may have borne some of their children outside the United States, and thus been subject to different mortality conditions prior to immigration.

## Table 1: Childhood Mortality Estimates. United States. 1900 and 1910(a)

| | 1900 | | | 1910 | | |
|---|---|---|---|---|---|---|
| | Mortality Index | q(5) | Implied e(0) | Mortality Index | q(5) | Implied e(0) |
| **United States** | | | | | | |
| Total | 1.009 | 0.193 | 48.3 | 1.000 | 0.180 | 49.8 |
| **Race of Woman** | | | | | | |
| White | 0.940 | 0.180 | 49.8 | 0.922 | 0.166 | 51.3 |
| African American | 1.465 | 0.280 | 39.4 | 1.486 | 0.267 | 40.7 |
| **Residence** | | | | | | |
| Rural | 0.923 | 0.176 | 50.1 | 0.942 | 0.169 | 50.9 |
| Urban | 1.126 | 0.215 | 45.9 | 1.063 | 0.191 | 48.5 |
| Cities 25,000+ | 1.281 | 0.245 | 42.9 | 1.112 | 0.200 | 47.6 |
| **Nativity of Woman** | | | | | | |
| Native White | 0.870 | 0.166 | 51.2 | 0.869 | 0.156 | 52.4 |
| Britain | 1.099 | 0.210 | 46.5 | 1.156 | 0.208 | 46.8 |
| Ireland | 1.288 | 0.246 | 42.7 | 1.223 | 0.220 | 45.5 |
| Germany | 1.198 | 0.229 | 44.5 | 0.911 | 0.164 | 51.5 |
| East Europe | 1.027 | 0.196 | 48.0 | 1.081 | 0.194 | 48.2 |
| South Europe | 1.134 | 0.217 | 45.8 | 1.266 | 0.228 | 44.7 |
| **Six Texas Counties** | | | | | | |
| Total | 0.946 | 0.185 | 49.2 | 1.025 | 0.167 | 51.2 |
| **Ethnic Origin of Mother** | | | | | | |
| African American | 1.152 | 0.226 | 44.9 | 1.278 | 0.208 | 46.7 |
| German | 0.558 | 0.109 | 58.4 | 0.652 | 0.106 | 58.8 |
| Mexican | 1.534 | 0.301 | 37.5 | 1.498 | 0.244 | 42.9 |
| All Other White | 0.908 | 0.178 | 50.0 | 0.998 | 0.163 | 51.7 |
| **Hispanic Oversample, 1910** | | | | | | |
| Hispanic | | | | 1.537 | .294 | 38.1 |
| White Non-Hispanic | | | | 0.927 | .157 | 52.3 |
| African American | | | | 1.478 | .285 | 39.0 |
| **Death Registration Area Life Tables** | | | | | | |
| Total | | 0.182 | 49.2 | | 0.161 | 51.5 |
| **Race of Woman** | | | | | | |
| White | | 0.179 | 49.6 | | 0.159 | 51.9 |
| African American | | 0.338 | 33.8 | | 0.294 | 35.8 |
| **Residence (White Population)** | | | | | | |
| Rural | | 0.140 | 54.7 | | 0.128 | 56.2 |
| Urban | | 0.207 | 45.9 | | 0.176 | 49.3 |

(a) for a definition of the mortality index, see text. Q(5) is the probability of dying between birth and exact age 5.

Sources: Preston & Haines (1991); Gutmann and Fliess (1996); Preston, Ewbank, and Hereward (1994); Glover (1921).

## Table 2: Child Mortality Index by Woman's Characteristics

| | Hispanic Oversample | | | | | | | | | U.S., Original PUMS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Hispanic** | | | **White Non-Hispanic** | | | **African American** | | | **All Women** | | |
| | Women | CEB | Index | Women | CEB | Index | Women | CEB | Index | Women | CEB | Index |
| **Total** | 7,628 | 28,199 | 1.537 | 2,607 | 6,969 | 0.927 | 261 | 791 | 1.478 | 42,075 | 120,507 | 0.937 |
| **Marriage Duration** | | | | | | | | | | | | |
| 0-4 | 1,982 | 2,174 | 1.279 | 662 | 591 | 0.590 | 62 | 49 | 0.773 | 10,273 | 9,492 | 0.836 |
| 5-9 | 1,948 | 5,519 | 1.379 | 674 | 1,369 | 0.989 | 66 | 139 | 1.808 | 10,345 | 22,746 | 0.882 |
| 10-14 | 1,647 | 7,221 | 1.483 | 530 | 1,732 | 0.982 | 60 | 206 | 1.728 | 8,464 | 27,993 | 0.911 |
| 15-19 | 1,104 | 6,570 | 1.608 | 400 | 1,617 | 0.872 | 52 | 256 | 1.300 | 7,059 | 30,350 | 0.936 |
| 20-24 | 947 | 6,715 | 1.680 | 341 | 1,660 | 0.965 | 21 | 141 | 1.359 | 5,934 | 29,926 | 1.013 |
| **Generation** | | | | | | | | | | | | |
| Native Born, Native Parents | 1,990 | 7,741 | 1.727 | 1,598 | 3,986 | 0.855 | 199 | 589 | 1.182 | 25,044 | 70,234 | 0.931 |
| Native Born, Foreign Parents | 1,537 | 5,344 | 1.309 | 469 | 1,185 | 0.761 | 13 | 33 | *** | 8,256 | 21,248 | 0.807 |
| Foreign-Born | 4,101 | 15,114 | 1.518 | 540 | 1,798 | 1.195 | 49 | 169 | 2.302 | 8,775 | 29,025 | 1.045 |
| **Literacy** | | | | | | | | | | | | |
| Not Literate | 3,268 | 13,118 | 1.611 | 185 | 686 | 1.289 | 32 | 130 | 1.498 | 3,381 | 13,616 | 1.350 |
| Fully Literate | 4,360 | 15,081 | 1.470 | 2,422 | 6,283 | 0.887 | 229 | 661 | 1.474 | 38,694 | 106,891 | 0.883 |
| **Woman's Labor Force Status** | | | | | | | | | | | | |
| Not in Labor Force | 7,066 | 26,561 | 1.552 | 2,291 | 6,175 | 0.901 | 150 | 477 | 1.196 | 37,881 | 108,995 | 0.902 |
| In Labor Force | 544 | 1,634 | 1.293 | 314 | 794 | 1.139 | 110 | 313 | 1.911 | 4,171 | 11,504 | 1.270 |
| **Language Spoken** | | | | | | | | | | | | |
| English not Spoken | 6,043 | 23,171 | 1.579 | 284 | 986 | 1.155 | *** | *** | *** | 2,731 | 9,429 | 1.257 |
| English Spoken | 1,585 | 5,028 | 1.335 | 2,323 | 5,983 | 0.890 | 261 | 791 | 1.478 | 39,344 | 111,078 | 0.910 |

*** Not sufficient Children Ever born for Analysis

## Table 3: Child Mortality Index by Husband's Characteristics

| | Hispanic Oversample | | | | | | | | U.S. - Original PUMS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Hispanic** | | | **White Non-Hispanic** | | | **African-American** | | | **All Women** | | |
| | Women | CEB | Index | Women | CEB | Index | Women | CEB | Index | Women | CEB | Index |
| **Generation** | | | | | | | | | | | | |
| Foreign-Born | 1,745 | 6,839 | 1.737 | 1,487 | 3,691 | 0.800 | 169 | 519 | 1.241 | 24,122 | 68,107 | 0.934 |
| Native Born, Foreign Parents | 1,160 | 3,901 | 1.269 | 411 | 1,139 | 1.002 | 7 | 25 | *** | 7,099 | 18,704 | 0.789 |
| Native Born, Native Parents | 4,411 | 16,644 | 1.516 | 608 | 1,955 | 1.110 | 44 | 145 | 2.291 | 9,552 | 31,355 | 1.016 |
| **Literacy** | | | | | | | | | | | | |
| Not Literate | 2,283 | 8,907 | 1.555 | 113 | 450 | 1.431 | 32 | 131 | 1.727 | 3,065 | 12,029 | 1.312 |
| Fully Literate | 5,033 | 18,477 | 1.529 | 2,393 | 6,335 | 0.887 | 188 | 558 | 1.361 | 37,708 | 106,137 | 0.890 |
| **Husband's Labor Force Status** | | | | | | | | | | | | |
| Not in Labor Force | 95 | 356 | 1.642 | 38 | 125 | 0.796 | 2 | 2 | *** | 479 | 1,171 | 1.003 |
| In Labor Force | 7,221 | 27,028 | 1.536 | 2,468 | 6,660 | 0.926 | 218 | 687 | 1.426 | 40,293 | 116,995 | 0.932 |
| **Occupation Categories)** | | | | | | | | | | | | |
| Farmers | 993 | 4,728 | 1.469 | 643 | 2,139 | 0.723 | 26 | 141 | 0.686 | 11,033 | 40,641 | 0.837 |
| High White Collar | 415 | 1,616 | 1.496 | 497 | 1,177 | 0.997 | 9 | 20 | *** | 5,905 | 14,439 | 0.850 |
| Low White Collar | 194 | 644 | 1.577 | 229 | 506 | 1.075 | 5 | 23 | *** | 3,387 | 6,510 | 0.771 |
| Skilled Manual | 2,242 | 7,999 | 1.519 | 792 | 1,982 | 1.019 | 58 | 184 | 1.971 | 12,269 | 33,367 | 0.983 |
| Unskilled Manual | 3,377 | 12,041 | 1.578 | 307 | 856 | 1.048 | 120 | 319 | 1.513 | 7,700 | 22,038 | 1.138 |
| Other | 95 | 356 | 1.642 | 38 | 125 | 0.796 | 2 | 2 | *** | 479 | 1,171 | 1.003 |
| **Language Spoken** | | | | | | | | | | | | |
| English not Spoken | 4,894 | 18,964 | 1.578 | 218 | 741 | 1.185 | 0 | 0 | *** | 1,769 | 5,640 | 1.294 |
| English Spoken | 2,422 | 8,420 | 1.445 | 2,288 | 6,044 | 0.892 | 220 | 689 | 1.430 | 39,004 | 112,526 | 0.915 |

*** Not sufficient children ever born for analysis

## Table 4: Child Mortality Index by Characteristics of the Area and Housing

| | Hispanic Oversample | | | | | | | | | U.S. - Original PUMS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Family & Household** | **Hispanic** | | | **White Non-Hispanic** | | | **African-American** | | | **All Women** | | |
| | Women | CEB | Index | Women | CEB | Index | Women | CEB | Index | Women | CEB | Index |
| **Type of Housing** | | | | | | | | | | | | |
| Single Family | 6,835 | 25,988 | 1.537 | 2,348 | 6,400 | 0.917 | 237 | 736 | 1.413 | | | ** |
| Multiple Family | 746 | 2,117 | 1.531 | 216 | 528 | 1.087 | 17 | 46 | 2.313 | | | ** |
| Group Quarters | 47 | 94 | 1.601 | 43 | 41 | 0.613 | 7 | 9 | *** | 307 | 425 | 1.309 |
| **Home Ownership** | | | | | | | | | | | | |
| Owns | 2,701 | 11,257 | 1.625 | 1,304 | 3,921 | 0.898 | 62 | 215 | 1.071 | 17,130 | 53,880 | 0.837 |
| Rents | 4,913 | 16,921 | 1.476 | 1,281 | 3,024 | 0.967 | 199 | 576 | 1.637 | 24,727 | 66,304 | 1.020 |
| **Household Composition** | | | | | | | | | | | | |
| Family Only | 5,290 | 20,876 | 1.544 | 1,786 | 5,203 | 0.960 | 139 | 494 | 1.464 | 28,305 | 87,653 | 0.925 |
| Extended Family | 1,575 | 5,075 | 1.531 | 397 | 940 | 0.855 | 53 | 152 | 1.566 | 6,655 | 16,066 | 0.949 |
| Lodgers & Unrel. non-emp. | 437 | 1,298 | 1.630 | 240 | 439 | 0.827 | 43 | 85 | 1.804 | 3,586 | 8,483 | 1.152 |
| Employees | 85 | 288 | 1.433 | 75 | 170 | 0.467 | 1 | 1 | *** | 1,740 | 4,712 | 0.685 |
| Multiple Family Types | 241 | 662 | 1.212 | 109 | 217 | 1.000 | 25 | 59 | 0.932 | 1,789 | 3,593 | 1.005 |
| **Characteristics of Place** | **Hispanic** | | | **White Non-Hispanic** | | | **African-American** | | | **All Women** | | |
| | Women | CEB | Index | Women | CEB | Index | Women | CEB | Index | Women | CEB | Index |
| **State** | | | | | | | | | | | | |
| Arizona | 717 | 2,694 | 1.384 | 259 | 649 | 1.021 | 10 | 25 | 1.979 | 73 | 175 | 1.071 |
| California | 792 | 2,545 | 1.396 | 345 | 758 | 0.825 | 14 | 28 | 0.572 | 1,096 | 2,352 | 0.739 |
| Kansas | 12 | 29 | *** | 21 | 47 | 0.465 | 0 | 0 | *** | 706 | 2,177 | 0.713 |
| New Mexico | 1,637 | 6,832 | 1.904 | 533 | 1,379 | 0.933 | 11 | 25 | *** | 168 | 621 | 1.925 |
| Texas | 3,041 | 11,362 | 1.406 | 949 | 2,642 | 0.731 | 107 | 335 | 0.756 | 1,687 | 5,637 | 0.869 |
| *Total Mexican Origin States* | *6,199* | *23,462* | *1.549* | *2,107* | *5,475* | *0.826* | *142* | *413* | *0.839* | *3,730* | *10,962* | *0.874* |
| Florida | 1,429 | 4,737 | 1.474 | 500 | 1,494 | 1.298 | 119 | 378 | 2.185 | 277 | 849 | 1.047 |
| **Size of Place** | | | | | | | | | | | | |
| Rural (under 2,500) | 4,222 | 16,789 | 1.534 | 1,432 | 4,079 | 0.830 | 68 | 286 | 0.941 | 21,340 | 69,653 | 0.878 |
| *Total Urban* | *3,406* | *11,410* | *1.542* | *1,175* | *2,890* | *1.066* | *193* | *505* | *1.786* | *20,735* | *50,854* | *1.017* |
| 2,500 - 4,999 | 335 | 1,186 | 1.585 | 126 | 293 | 0.874 | 8 | 10 | *** | 1,923 | 4,872 | 0.896 |
| 5,000 - 24,999 | 1,133 | 3,891 | 1.593 | 364 | 961 | 1.138 | 67 | 225 | 2.175 | 4,748 | 11,909 | 0.996 |
| 25,000 - 49,999(Tampa, El Paso) | 1,202 | 3,872 | 1.480 | 431 | 1,052 | 1.055 | 80 | 189 | 1.758 | 1,929 | 4,626 | 0.967 |
| 50,000 - 99,999(San Antonio) | 522 | 1,785 | 1.568 | 166 | 389 | 1.038 | 30 | 62 | 1.149 | 2,131 | 5,249 | 1.023 |
| 100,000 + (Los Angeles) | 214 | 676 | 1.451 | 88 | 195 | 1.121 | 8 | 19 | *** | 10,004 | 24,198 | 1.060 |

**This information not available for Original 1910 PUMS

***Not sufficient Children Ever Born for Analysis

## Table 5: Child Mortality Index by Woman's Language, Literacy and Employment Status by State and Generation - Hispanic Women Only

| | All Women | Fully Literate | Not Literate | English Spoken | English Not Spoken | In Labor Force | Not in Labor Force |
|---|---|---|---|---|---|---|---|
| **All States** | **1.537** | **1.611** | **1.470** | **1.579** | **1.335** | **1.552** | **1.293** |
| Native Born, Native Parents | 1.727 | 1.837 | 1.624 | 1.813 | 1.397 | 1.733 | 1.581 |
| Native Born Foreign Parents | 1.309 | 1.292 | 1.321 | 1.277 | 1.367 | 1.312 | 1.263 |
| Foreign Born | 1.518 | 1.591 | 1.450 | 1.549 | 1.230 | 1.538 | 1.219 |
| **Arizona** | **1.384** | **1.456** | **1.305** | **1.485** | **0.947** | **1.394** | **1.062** |
| Native Born, Native Parents | 0.945 | 1.248 | *** | 1.348 | 0.296 | 0.992 | *** |
| Native Born Foreign Parents | 1.301 | 1.521 | 1.177 | 1.366 | 1.215 | 1.295 | *** |
| Foreign Born | 1.449 | 1.454 | 1.442 | 1.519 | 0.678 | 1.461 | 1.039 |
| **California** | **1.396** | **1.471** | **1.314** | **1.475** | **1.193** | **1.415** | **0.777** |
| Native Born, Native Parents | 1.228 | 1.331 | 1.178 | 1.572 | 1.073 | 1.235 | *** |
| Native Born Foreign Parents | 1.335 | 1.309 | 1.346 | 1.230 | 1.384 | 1.346 | *** |
| Foreign Born | 1.452 | 1.507 | 1.359 | 1.488 | 1.039 | 1.476 | 0.679 |
| **Florida** | **1.474** | **1.486** | **1.473** | **1.535** | **1.343** | **1.462** | **1.624** |
| Native Born, Native Parents | 1.339 | *** | 1.349 | *** | 1.367 | 1.324 | *** |
| Native Born Foreign Parents | 1.462 | *** | 1.472 | 1.817 | 1.295 | 1.460 | 1.478 |
| Foreign Born | 1.485 | 1.520 | 1.481 | 1.510 | 1.378 | 1.469 | 1.674 |
| **Kansas** | *** | *** | *** | *** | *** | *** | *** |
| Native Born, Native Parents | *** | *** | *** | *** | *** | *** | *** |
| Native Born Foreign Parents | *** | *** | *** | *** | *** | *** | *** |
| Foreign Born | *** | *** | *** | *** | *** | *** | *** |
| **New Mexico** | **1.904** | **2.005** | **1.798** | **1.932** | **1.714** | **1.898** | **2.104** |
| Native Born, Native Parents | 1.955 | 2.059 | 1.848 | 1.985 | 1.746 | 1.950 | 2.195 |
| Native Born Foreign Parents | 1.610 | 1.805 | 1.504 | 1.598 | 1.636 | 1.600 | *** |
| Foreign Born | 1.781 | 1.816 | 1.725 | 1.791 | *** | 1.772 | *** |
| **Texas** | **1.406** | **1.468** | **1.318** | **1.420** | **1.296** | **1.436** | **1.060** |
| Native Born, Native Parents | 1.202 | 1.205 | 1.198 | 1.202 | 1.201 | 1.214 | 1.041 |
| Native Born Foreign Parents | 1.196 | 1.192 | 1.200 | 1.143 | 1.435 | 1.199 | 1.161 |
| Foreign Born | 1.533 | 1.620 | 1.401 | 1.555 | 1.230 | 1.578 | 1.017 |

*** Not sufficient children ever born for analysis

## Table 6: Child Mortality Index by Occupational Group of Husband, State and Generation Hispanic Women Only

| | High Wh. Collar | Farmers | Low White Collar | Skilled Manual | Unskilled Manual | Other |
|---|---|---|---|---|---|---|
| **All States** | **1.496** | **1.469** | **1.577** | **1.519** | **1.578** | **1.642** |
| Native Born, Native Parents | 1.769 | 1.681 | 1.445 | 1.540 | 1.787 | 1.909 |
| Native Born, Foreign Parents | 1.333 | 1.185 | 1.424 | 1.395 | 1.288 | 1.664 |
| Foreign Born | 1.466 | 1.324 | 1.688 | 1.547 | 1.549 | 1.540 |
| **Arizona** | **1.189** | **1.279** | **1.514** | **1.344** | **1.425** | **2.356** |
| Native Born, Native Parents | *** | *** | *** | *** | 0.990 | *** |
| Native Born, Foreign Parents | 1.359 | 1.408 | *** | 1.056 | 1.445 | *** |
| Foreign Born | 1.158 | 1.399 | *** | 1.423 | 1.455 | *** |
| **California** | **1.067** | **0.925** | **1.926** | **1.493** | **1.433** | ******* |
| Native Born, Native Parents | *** | *** | *** | 1.292 | 1.336 | *** |
| Native Born, Foreign Parents | *** | *** | *** | 1.457 | 1.235 | *** |
| Foreign Born | *** | 0.935 | 2.317 | 1.577 | 1.484 | *** |
| **Florida** | **1.474** | ******* | **1.322** | **1.477** | **1.494** | ******* |
| Native Born, Native Parents | 1.387 | *** | *** | 1.242 | *** | *** |
| Native Born, Foreign Parents | 1.708 | *** | *** | 1.440 | *** | *** |
| Foreign Born | 1.423 | *** | 0.682 | 1.496 | 1.491 | *** |
| **Kansas** | *** | *** | *** | *** | *** | *** |
| Native Born, Native Parents | *** | *** | *** | *** | *** | *** |
| Native Born, Foreign Parents | *** | *** | *** | *** | *** | *** |
| Foreign Born | *** | *** | *** | *** | *** | *** |
| **New Mexico** | **1.723** | **1.857** | **1.648** | **1.721** | **1.969** | **2.215** |
| Native Born, Native Parents | 2.000 | 1.879 | 1.823 | 1.722 | 2.031 | 2.031 |
| Native Born, Foreign Parents | 1.018 | 1.312 | *** | 2.026 | 1.711 | *** |
| Foreign Born | *** | 2.094 | *** | 1.592 | 1.759 | *** |
| **Texas** | **1.540** | **1.182** | **1.554** | **1.608** | **1.422** | **1.223** |
| Native Born, Native Parents | 1.562 | 1.053 | 1.115 | 1.434 | 1.156 | *** |
| Native Born, Foreign Parents | 1.384 | 1.131 | 1.450 | 1.226 | 1.193 | *** |
| Foreign Born | 1.607 | 1.269 | 1.690 | 1.712 | 1.563 | 1.421 |

*** Not sufficient children ever born for analysis

## Table 7: Child Mortality Regression Analysis: Oversample Data Only

| | Ethnicity | | Woman's Additional Characteristics | | Add Husband's Characteristics | | Add Family and Area Characteristics | |
|---|---|---|---|---|---|---|---|---|
| Number of Women | 9,010 | | 9,010 | | 9,010 | | 9,010 | |
| Number of Children | 35,975 | | 35,975 | | 35,975 | | 35,975 | |
| R-Squared | 0.0256 | | 0.0398 | | 0.0440 | | 0.0645 | |
| Adjusted R-Squared | 0.0256 | | 0.0395 | | 0.0425 | | 0.0637 | |
| Variable/Value | Coefficient | Sig. | Coefficient | Sig. | Coefficient | Sig. | Coefficient | Sig. |
| Constant | 0.9206 | *** | 0.6298 | *** | 0.4206 | *** | 0.3868 | *** |
| **Woman's Ethnicity** | | | | | | | | |
| Non-Hispanic White (Omitted) | N.I. | | N.I. | | N.I. | | N.I. | |
| Hispanic | 0.6247 | *** | 0.4824 | *** | 0.4509 | *** | 0.3848 | *** |
| Other Non-Hispanic | 0.5469 | *** | 0.5315 | *** | 0.5065 | *** | 0.5238 | *** |
| **Marriage Duration (Years)** | | | 0.0175 | *** | 0.0191 | *** | 0.0166 | *** |
| **Woman's Generation** | | | | | | | | |
| Immigrant Generation (Omitted) | | | N.I. | | N.I. | | N.I. | |
| Native Born, Foreign Parents | | | -0.1504 | *** | -0.1116 | *** | -0.1165 | *** |
| Native Born, Native Parents | | | 0.1138 | *** | 0.0172 | *** | -0.0170 | |
| **Woman's Literacy** | | | | | | | | |
| Fully Literate (Omitted) | | | N.I. | | N.I. | | N.I. | |
| Not Fully Literate | | | 0.0873 | *** | 0.0910 | *** | 0.1330 | *** |
| **Woman's Language** | | | | | | | | |
| Speaks English (Omitted) | | | N.I. | | N.I. | | N.I. | |
| Does Not Speak English | | | 0.1828 | *** | 0.1687 | *** | 0.1261 | *** |
| **Woman's Labor Force Participation** | | | | | | | | |
| Not in Labor Force (Omitted) | | | N.I. | | N.I. | | N.I. | |
| In Labor Force | | | -0.0215 | | -0.0371 | | -0.0239 | * |
| **Husband's Occupation** | | | | | | | | |
| Farmer (Omitted) | | | | | N.I. | | N.I. | |
| High White Collar | | | | | 0.2244 | *** | 0.1047 | * |
| Low White Collar | | | | | 0.3960 | *** | 0.3079 | ** |
| Skilled Manual | | | | | 0.2306 | *** | 0.0736 | * |
| Unskilled Manual | | | | | 0.1954 | *** | 0.1448 | *** |
| Other Occupations/No Occupation | | | | | -0.5568 | *** | -0.5955 | |
| **Husband's Language** | | | | | | | | |
| Husband Speaks English (Omitted) | | | | | N.I. | | N.I. | |
| Husband Does not Speak English | | | | | 0.0658 | ** | 0.0850 | *** |

## Table 7, Continued

| Variable/Value | Ethnicity Coefficient | Sig. | Woman's Additional Characteristics Coefficient | Sig. | Add Husband's Characteristics Coefficient | Sig. | Add Family and Area Characteristics Coefficient | Sig. |
|---|---|---|---|---|---|---|---|---|
| **Home Ownership** | | | | | | | | |
| Owns Home (Omitted) | | | | | | | N.I. | |
| Rents Home | | | | | | | -0.0294 | * |
| Onwership Data Missing/Illegible | | | | | | | 0.4459 | * |
| **Family Structure** | | | | | | | | |
| Family Only (Omitted) | | | | | | | N.I. | |
| Extended Family | | | | | | | 0.0069 | |
| Lodgers & other Unrelated non-Employee | | | | | | | 0.0939 | ** |
| Employees | | | | | | | -0.1001 | |
| Multiple family types | | | | | | | -0.1855 | *** |
| **Type of Housing** | | | | | | | | |
| Single Family (Omitted) | | | | | | | N.I. | |
| Multiple Family | | | | | | | 0.0423 | |
| Group Quarters | | | | | | | -0.0887 | |
| **State** | | | | | | | | |
| Arizona | | | | | | | 0.1695 | *** |
| California | | | | | | | 0.0722 | * |
| Florida | | | | | | | 0.4530 | *** |
| Kansas | | | | | | | -0.0882 | |
| New Mexico | | | | | | | 0.5560 | *** |
| Texas (Omitted) | | | | | | | N.I. | |
| **Size of Place or City ID** | | | | | | | | |
| Under 5,000 (Omitted) | | | | | | | N.I. | |
| 5,000-24,999 | | | | | | | 0.0693 | * |
| Tampa (25,000-49,999) | | | | | | | -0.2218 | *** |
| El Paso (25,000-49,000) | | | | | | | 0.3530 | *** |
| San Antonio (50,000-99,999) | | | | | | | 0.3258 | *** |
| Los Angeles (100,000+) | | | | | | | 0.1246 | * |

N.I. = Not Included (Omitted Category)
*** Significant at the .001 Level
** Significant at the .01 Level
* Significant at the .1 Level

## Table 8: Child Mortality Regression Analysis with Interaction of Generation and State of Residence: Oversample Data

| | | | | | |
|---|---|---|---|---|---|
| Number of Children | 35,975 | R-Squared | 0.0662 | Adjusted R-Squared | 0.0651 |
| Number of Women | 9,010 | | | | |

| Variable/Value | Coefficient | Sig. | Variable/Value | Coefficient | Sig. | Variable/Value | Coefficient | Sig. |
|---|---|---|---|---|---|---|---|---|
| **Interaction of Generation and State** | | | | | | | | |
| **Immigrant Generation** | | | **Native Born, Foreign Parents** | | | **Native Born, Native Parents** | | |
| Arizona | 0.2666 | *** | Arizona | 0.2161 | *** | Arizona | 0.2611 | *** |
| California | 0.2125 | *** | California | 0.1212 | * | California | 0.1079 | * |
| Florida | 0.4915 | *** | Florida | 0.5624 | *** | Florida | 0.7983 | *** |
| Kansas | 0.2642 | | Kansas | -0.4442 | | Kansas | -0.1328 | |
| New Mexico | 0.5299 | *** | New Mexico | 0.4834 | *** | New Mexico | 0.6893 | *** |
| Texas | 0.1930 | *** | Texas | -0.0369 | | Texas (Omitted) | N.I. | |
| Constant | 0.2853 | *** | | | | | | |
| | | | | | | **Home Ownership** | | |
| **Woman's Ethnicity** | | | **Husband's Occupation** | | | Owns Home (Omitted) | N.I. | |
| Non-Hispanic White (Omitted) | | | Farmer (Omitted) | N.I. | | Rents Home | -0.0296 | * |
| Hispanic | 0.3574 | *** | High White Collar | 0.1041 | *** | Ownership Data Missing/Illeg. | 0.4292 | * |
| Other Non-Hispanic | 0.5104 | *** | Low White Collar | 0.3036 | *** | | | |
| | | | Skilled Manual | 0.0827 | ** | **Family Structure** | | |
| **Marriage Duration (Years)** | 0.0166 | *** | Unskilled Manual | 0.1375 | *** | Family Only (Omitted) | N.I. | |
| | | | Other Occupations/None | -0.5938 | *** | Extended Family | 0.0084 | |
| **Woman's Literacy** | | | | | | Lodgers & other Unrelated | 0.0936 | ** |
| Fully Literate (Omitted) | | | **Husband's Language** | | | Employees | -0.0926 | |
| Not Fully Literate | 0.1232 | *** | Husband Speaks English (Omitted) N.I. | | | Multiple family types | -0.1796 | *** |
| | | | Husband Doesn't Spk. English | 0.0831 | *** | | | |
| **Woman's Language** | | | | | | **Type of Housing** | | |
| Speaks English (Omitted) | | | | | | Single Family (Omitted) | N.I. | |
| Does Not Speak English | 0.1401 | *** | | | | Multiple Family | 0.0476 | |
| | | | | | | Group Quarters | -0.0928 | |
| **Woman's Labor Force Participation** | | | | | | | | |
| Not in Labor Force (Omitted) | | | | | | **Size of Place or City ID** | | |
| In Labor Force | -0.0194 | | | | | Under 5,000 (Omitted) | N.I. | |
| | | | N.I. = Not Included (Omitted Category) | | | 5,000-24,999 | 0.0595 | * |
| | | | *** Significant at the .001 Level | | | Tampa (25,000-49,999) | -0.2228 | *** |
| | | | ** Significant at the .01 Level | | | El Paso (25,000-49,000) | 0.3163 | *** |
| | | | * Significant at the .1 Level | | | San Antonio (50,000-99,999) | 0.3242 | *** |

| | |
|---|---|
| Los Angeles (100,000+) | 0.1100 * |