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1979 MEXICO NATIONAL FERTILITY AND MORTALITY SURVEY: A SUMMARY OF RESULTS

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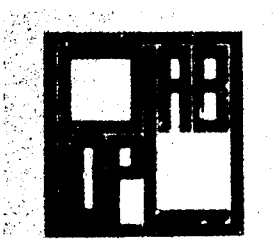

The International Program of Laboratories for Population Statistics (POPLAB) of the University of North Carolina at Chapel Hill is involved in a project entitled "Birth and Death Data Collection" sponsored by the United States Agency for International Development. The basic objective of this project is to assist developing countries in collecting and analyzing data on levels and trends in fertility and mortality through the use of sample surveys. These surveys are of three types: (1) add-on, adding fertility/mortality questions to existing household surveys, (2) new, initiating new fertility/mortality surveys, and (3) broad surveys, new or add-on, which include collection and analysis of data on variables such as socioeconomic status, labor force participation, migration, use of family planning, as well as basic fertility/mortality questions. POPLAB provides technical and financial assistance in the design, organization, implementation, and analysis of all three types of surveys.

El Programa Internacional de Laboratorios para Estadísticas de Población (POPLAB) de la Universidad de Carolina del Norte en Chapel Hill, está involucrado en un proyecto titulado 'Colección de Datos sobre Muertes y Nacimientos' financiado por la Agencia Internacional para el Desarrollo. El objetivo principal de este proyecto es el de prestar asistencia a los países en desarrollo en la colección y análisis de datos sobre niveles y tendencias de fecundidad y mortalidad por medio del uso de encuestas de muestreo. Tales encuestas son de tres tipos: (1) aumentadas, es decir agregando preguntas sobre fecundidad/mortalidad a encuestas e hogares existentes, (2) nuevas encuestas de fecundidad/mortalidad, y (3) extensas, nuevas o aumentadas, las cuales incluyen colección y análisis de datos de variables tales como nivel socioeconómico, participación en el fuerza de trabajo, migración, uso de planificación familiar, ademas de preguntas básicas sobre fecundidad/mortalidad. El POPLAB provee asistencia técnica y financiera para el diseño, organización, implementación, y análisis de estos tres tipos de encuestas.

This report is the second in a series containing the major findings of surveys in countries participating in the POPLAB program. The full report on the 1979 Fertility and Mortality Survey (in Spanish) was published by Coordinación del Programa Nacional de Planificación Familiar in June, 1980. The present summary presents the highlights of that report with some modifications based on subsequent analysis of the data. POPLAB gratefully acknowledges the cooperation of Coordinación del Programa Nacional de Planificación Familiar in publishing this summary report.

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The 1979 Mexico National Fertility and Mortality Survey: A Summary of Results.

by POPLAB Staff

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THE 1979 MEXICO NATIONAL FERTILITY AND MORTALITY SURVEY: A SUMMARY OF RESULTS*

POPLAB Staff

BACKGROUND

The high rate of population growth in Mexico during the past several decades has been the motivation for extensive demographic studies and analyses because of the socioeconomic implications associated with such growth. The impact of this rapid growth presents a challenge to those sectors responsible for satisfying the health, education, employment, and housing demands of the population.

In 1976 Mexico had an estimated population of 62 million persons and an annual growth rate of 3.2 percent. One of the principal reasons for Mexico's high rate of population growth is the decline in mortality rates in recent years coupled with relatively high fertility rates. The crude death rate declined from 26.4 deaths per thousand population in 1930 to around 8.5 in 1972-73. During the same period, infant mortality rates declined from 145.6 per 1,000 live births to about 56.6. On the other hand, the crude birth rate declined slightly from 49.4 per thousand population in 1930 to around 43.3 in 1970 (Alba, 1977; Juarez, 1977).

In an effort to curb population growth in Mexico the creation of the National Family Planning Plan was approved by the president of the Republic in 1977. One of the goals of this plan is to reduce the 3.2 percent annual population growth rate to 1 percent by the year 2000. The short-range target for 1982 is a growth rate of 2.5 percent. Measurement of progress toward these goals requires the close monitoring of the demographic processes of fertility and mortality. Therefore, it was necessary to rely on sample surveys for this purpose. Since 1976 two large-scale fertility and/or mortality surveys have been carried out on a representative national sample in Mexico: The National Fertility Survey of 1976 and the National Fertility and Mortality Survey of 1979. In addition to these fertility and mortality surveys, two surveys of contraceptive prevalence and use have been conducted: the National Prevalence of Contraceptive Use Survey of 1978 and the National Prevalence of Contraceptive Use Survey of 1979. The 1979 National Prevalence of Contraceptive Use Survey and the 1979 National Fertility and Mortality Survey were conducted simultaneously; questions on contraceptive prevalence were asked of a subsample of respondents to the 1979 National Fertility and Mortality Survey. This report summarizes the major findings of the 1979 National Fertility and Mortality Survey.

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*Most of the data contained in this report were obtained from (Coordinación del Programa Nacional de Planificación Familar, 1980b). In some cases, modifications based on subsequent analysis of data are included.

THE SURVEY

The 1979 National Fertility and Mortality Survey was a multipurpose survey with a two-part questionnaire. One part obtained information pertaining to the household while the other part obtained information from individual women aged 15-49 years. The household questionnaire included basic demographic questions about all members of the household, socioeconomic characteristics of the head of household, deaths which had occurred in the household, and general housing characteristics. The individual women's section collected information on fertility and infant mortality, socioeconomic characteristics of the women, nuptiality, and related matters. The survey was carried out by the National Family Planning Program Coordination (CPNPF) with technical and financial assistance from the International Program of Laboratories for Population Statistics (POPLAB).

The sample was a stratified cluster sample of 20,166 households selected with unequal final selection probability (i.e., not self-weighting). Representativeness of the sample was validated using data from the 1970 Census and the 1976 National Fertility Survey as standards of comparison. Of the total *households* in the sample, 18,505 were interviewed resulting in a nonresponse rate of 8.2 percent. Major causes of nonresponse were: (1) no one at home, and (2) knowledgeable informant not present. Among the 22,536 *eligible women* (women aged 15-49) in the household, 20,482 were interviewed resulting in a nonresponse rate of 9.1 percent. This level of nonresponse to the individual questionnaire must be kept in mind since it is likely that the fertility of non-interviewed women is different from that of interviewed women. The major reason for nonresponse was absence from the household.

FINDINGS

Age and Sex Distribution

Data on age and sex distribution of the sample population are presented in Table 1. It will be observed that the population of Mexico, as represented by the sample population, is relatively young with 45.3 percent under age 15 and only 3.9 percent aged 65 and over.

There appears to be a slight tendency towards an aging of the population over time when data from the 1970 Census and the 1976 National Fertility Survey are used for comparison. Data in broad age groups from these sources are given in Table 2 and show a slight decrease in the proportion of persons 0-14 years of age since 1976. One interpretation of this tendency is that it may be due to a decline in fertility. On the other hand, it may be a function of sampling error.

There is a tendency for respondents in Mexico, as in most other countries, to round their ages to numbers ending in certain digits. The application of two methods--Whipple's and Myers' (United Nations, 1955)--to data from the 1979 Survey indicates that:

Table 1. Percentage Distribution of Sample Population by Age Group and Sex, Mexico, 1979

Age Group	Sample Population		
	Total	Males	Females
0-4	15.7	16.0	15.3
5-9	15.8	16.3	15.3
10-14	13.8	14.0	13.6
15-19	10.9	11.0	10.8
20-24	8.6	8.4	8.9
25-29	6.8	6.6	7.1
30-34	5.3	5.4	5.3
35-39	4.9	4.9	5.0
40-44	3.9	3.7	3.9
45-49	3.4	3.3	3.3
50-54	3.0	2.7	3.3
55-59	2.3	2.3	2.4
60-64	1.7	1.6	1.7
65-69	1.4	1.4	1.5
70-74	1.1	1.0	1.1
75-79	0.8	0.8	0.8
80-84	0.3	0.3	0.4
85+	0.3	0.3	0.3
Total	100.0	100.0	100.0
Mean Age	22.6	22.4	23.1
Number of Persons	99,038	48,778	50,260

SOURCE: The 1979 National Fertility and Mortality Survey of Mexico

Table 2. Percentage Distribution of Population by Broad Age Groups, Mexico, 1970, 1976, and 1979

Age Group	1970 Population Census	1976 National Fertility Survey	1979 National Fertility/ Mortality Survey
0-14	46.2	46.4	45.3
15-64	50.1	49.7	50.8
65+	3.7	3.9	3.9

1. ages ending in 0 and 5 were preferred,
2. men showed somewhat less digital preference than women, and
3. this preference has decreased over time when compared with similar indices from the 1976 National Fertility Survey.

Crude Birth Rate

The crude birth rate was estimated to be 49.4 in 1930, 44.3 in 1940. 45.5 in 1960, and 43.4 in 1970 (Alba, 1977). From the 1979 Survey data, the crude birth rate was estimated to be around 34 births per 1,000 population based on direct reports of births, and around 33 based on the Own Children method. Using similar estimation techniques applied to the 1976 National Fertility Survey data, the crude birth rate was estimated to be about 37 births per 1,000 population. If these estimates are accurate, the crude birth rate apparently has declined in recent years.

Age-Specific and Total Fertility Rates

The 1979 National Fertility and Mortality Survey included two types of questions concerning fertility: total number of children ever born to women aged 15-49 years, and age of last live birth supplemented with extensive probing to elicit the number of live births during the preceding year.

Interviewing took place from 16 September to 31 December, 1979. This long interval complicated the definition of a common reference period for births during the previous year. For the present analysis, the common reference point was set around the midpoint of the interviewing time interval with minor adjustments as needed.

Two sets of age-specific fertility rates from the 1979 Fertility and Mortality Survey are presented in Table 3. Those in the first column were derived from a question on the date of last live birth which was asked of all women aged 15-49 who were interviewed with the individual women's questionnaire. The result is a total fertility rate of 4.8 births per woman and a crude birth rate of 34 per thousand population. However, almost nine percent of eligible women could not be personally interviewed. Fortunately, it is possible to use data for all women from the household

questionnaire to indirectly estimate fertility by the Own Children method* (Cho and Feeney, 1978). These rates, which are given in the second column of Table 3, imply a total fertility rate of 4.6 children per woman and a crude birth rate of 33 per thousand population. Although the difference between the two sets of rates is slight, results from the Own Children method are given in later tables in this report, since they are based on all women. The difference in the levels of the two sets of rates may be due to the fact that women who are repeatedly not at home to be interviewed are likely to have fewer children than women who are at home.

Table 3. Age-Specific Fertility Rates, Mexico, 1979

Age Group of Women	From Direct Reports of Births to Women Interviewed	From Own Children Method Using All Women
15-19	.094	.104
20-24	.233	.220
25-29	.216	.215
30-34	.203	.186
35-39	.148	.142
40-44	.064	.051
45-49	.010	.008
Total Fertility Rate	4.83	4.63
Crude Birth Rate	34	33

*The theory behind this technique is that children less than one year of age who are enumerated in a census or survey are the survivors of births occurring in the year prior to the survey, and one-year-old children are survivors of births occurring two years previously, etc. If children can be linked to their mothers so that both the child's age and the mother's age at the time of the survey are known and, if some estimate of the number of children and mothers who have died in the interim is available, it is possible to "age" the children and women backward to produce age-specific fertility rates for years prior to the survey. The linking of children with their mothers was facilitated in the 1979 Fertility and Mortality Survey by a question asking for the line number of the mother of each child less than 15 years old.

The fertility rates derived from the Own Children method are compared with data from the 1978 National Prevalence Survey and the 1976 National Fertility Survey in Table 4. These figures indicate a rapid decline in fertility in recent years. The total fertility rate of almost 5.6 in 1976 declined to 4.6 in 1979, a decline of 18 percent in three years.

Table 4. Age-Specific Fertility Rates from Three Sources, Mexico, 1976, 1978, and 1979

Age Group of Women	1976 National Fertility Survey[1]	1978 National Prevalence Survey[2]	1979 National Fertility/Mortality Survey[3]
15-19	.080	.095	.104
20-24	.273	.239	.220
25-29	.259	.258	.215
30-34	.223	.223	.186
35-39	.184	.145	.142
40-44	.070	.059	.051
45-49	.021	.016	.008
Total Fertility Rate	5.55	5.18	4.63
Crude Birth Rate	37	36	33

[1]Ordorica and Potter (1980)
[2]Coordinación del Programa Nacional de Planificación Familiar (1979)
[3]from Own Children method

One advantage of the Own Children method is that it produces estimates for several points in time and thus provides information on trends in fertility. Age-specific fertility rates for single years from 1971 to 1979 are shown in Table 5. They indicate a sharp decline in fertility from a total fertility rate of 6.7 children per woman in 1971 to 4.6 in 1979, a decline of 31 percent in less than 10 years. This decline seems to be stronger in recent years since the decline in the total fertility rate between 1975 and 1979 (22 percent) was almost double the total fertility rate for the period between 1971 and 1975 (11 percent). Although the pattern of rates by age group shows some fluctuations, the general trend over time is downward at all ages.

Table 5. Age-Specific Fertility Rates Obtained from the Own Children Method for Single Years from 1971 to 1979, Mexico

Age of Women	Year 1971	1972	1973	1974	1975	1976	1977	1978	1979
15-19	.131	.138	.137	.141	.137	.124	.114	.120	.104
20-24	.316	.305	.303	.277	.278	.266	.260	.260	.220
25-29	.319	.337	.325	.276	.270	.252	.240	.225	.215
30-34	.275	.273	.246	.271	.250	.220	.233	.178	.186
35-39	.195	.171	.160	.176	.151	.146	.152	.125	.142
40-44	.087	.092	.098	.074	.088	.067	.066	.044	.051
45-49	.020	.019	.012	.010	.014	.011	.008	.012	.008
Total Fertility Rate	6.72	6.67	6.40	6.13	5.94	5.42	5.37	4.82	4.63

SOURCE: Mendoza and Nuñez (1980)

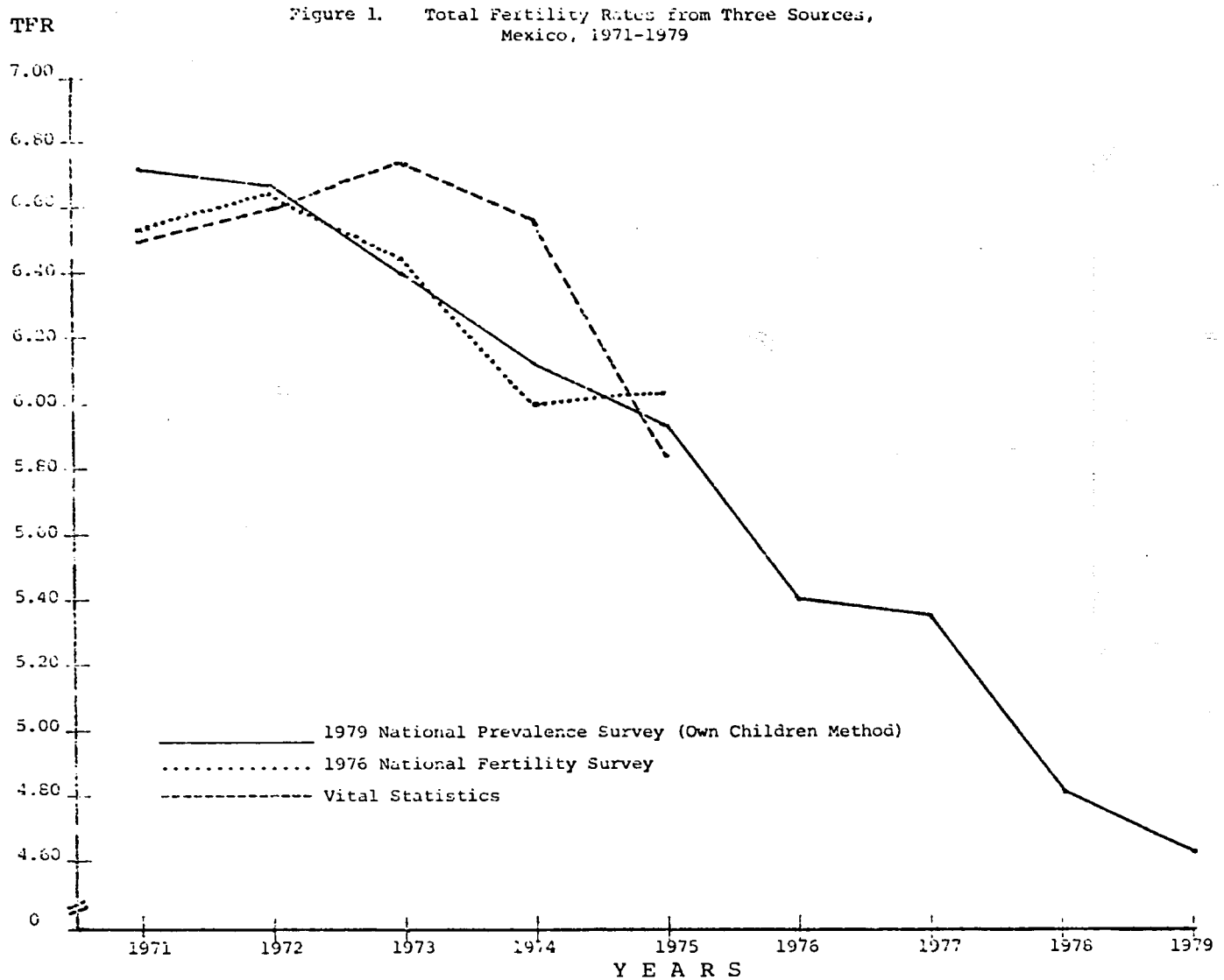
In order to evaluate this trend, insofar as possible, the total fertility rates from the 1979 Fertility and Mortality Survey were compared with data from the vital statistics system and the National Fertility Survey of 1976. This comparison is shown in Table 6 and in Figure 1. On the whole, the figures are similar except the vital statistics data for 1973 and 1974 are high due to a massive registration campaign. The comparability of the rates for the early 1970s inspires confidence in the trend shown by the Own Children results for the late 1970s.

Table 6. Total Fertility Rates by Year from Three Sources, Mexico, 1971 to 1975

Year	Vital Statistics[1]	1976 National Fertility Survey[2]	1979 National Fertility/Mortality Survey[3]
1971	6.5	6.5	6.7
1972	6.6	6.7	6.7
1973	6.7	6.5	6.4
1974	6.6	6.0	6.1
1975	5.9	6.0	5.9

[1]Dirección General de Estadística, Estadísticas Vitales (1978)
[2]Coordinación General del Sistema Nacional de Información, ISUNAM (1978)
[3]Coordinación del Programa Nacional de Planificación Familar, (1980b)

Figure 1. Total Fertility Rates from Three Sources, Mexico, 1971-1979



Sources: Dirección General de Estadística (1978) Estadísticas Vitales, *Los Niveles de la Fecundidad en Mexico 1960- 1974*, Secretaría de Programación y Presupuesto, Series I, No. 3, Mexico. Table 21, p. 32.

Coordinación General del Sistema Nacional de Información, ISUNAM, (1978) *Encuesta Mexicana de Fecundidad*, Secretaría de Programación y Presupuesto, Mexico, Volume I, Table VII.I, p. 133 and Tables 5 and 8.

Several other techniques were applied to the 1979 data to indirectly estimate fertility. A method developed by El-Badry (1961) to adjust the direct reports of recent births for nonresponse produced a total fertility rate of 4.7 which is midway between the unadjusted rate of 4.8 and the Own Children estimate of 4.6. Other methods used include the Brass P/F procedure and its modification for first births (Brass, 1974), Mortara's method (Camisa, no date), and a regression technique (United Nations, 1967). However, since all these methods assume that fertility has been constant in the recent past, which clearly is not the case in Mexico, they tend to overestimate fertility.

Crude Death Rate

Mortality was measured directly by asking about deaths of members of the household which occurred in 1978 and 1979. Using only the number of deaths occurring in the 12 months before the survey, a crude death rate of 6 per thousand population resulted. Not only was this rate implausibly low but the age-specific rates showed serious irregularities as well.

Because deaths appeared to have been incompletely reported, it was necessary to rely heavily on indirectly derived estimates of mortality levels. Although the nature of the methods used makes it difficult to reach a sound conclusion about the level of mortality, especially for adults, the results of these indirect techniques suggest that the crude death rate in Mexico is approximately 8 per thousand population.

Estimates of Childhood Mortality

In the 1979 Fertility and Mortality Survey, women interviewed with the individual questionnaire were asked about the number of children ever born and the number of children surviving. Ages of the women at the time of the survey were also recorded. These data were used to obtain estimates of infant and childhood mortality using a number of indirect models. These models were pioneered by Brass (1968) who postulated that the proportion dead among children ever born to women of a certain age group can be transformed into the probability of surviving from birth to a certain age. The transformation factors depend on assumptions made regarding fertility and are the major differences between the original Brass model and later developments by Sullivan (1972) and Trussell (1975).

Results derived from these three methods are presented in Table 7 and, as expected, they closely approximate each other. The infant mortality rates are 61 per thousand live births for the Brass and Sullivan models and 62 per thousand from the Trussell model. In general, the estimates for male children exceed those for female children. All three methods assume that mortality has been relatively constant; however, there is evidence that it has declined in recent years. The estimates in Table 7 should be interpreted as representing some average of mortality levels prevailing in the previous 5 to 15 years.

Table 7. Indirect Estimates of Childhood Mortality Using Various Methods, Mexico, 1979

Age Group	Proportion Dead Among Children Ever Born	Probabilities of Dying Between Birth and Selected Ages: Age	Method: Brass	Sullivan	Trussell
Both Sexes					
20-24	.069	2	.071	.072	.072
25-29	.088	3	.088	.086	.087
30-34	.097	5	.098	.094	.096
Implied Infant Mortality Rate: (q_0)			61	61	62
Males					
20-24	.075	2	.077	.078	.078
25-29	.087	3	.088	.085	.087
30-34	.104	5	.105	.101	.103
Implied Infant Mortality Rate: (q_0)			66	66	66
Females					
20-24	.064	2	.065	.066	.066
25-29	.088	3	.089	.086	.087
30-34	.090	5	.091	.087	.088
Implied Infant Mortality Rate: (q_0)			56	57	57

Data from the 1979 Fertility and Mortality Survey indicate that infant mortality in Mexico has been declining in recent years. Table 8 presents infant mortality rates for several points in time using two methods (Coale and Trussell, 1978; and Feeney, 1977) to estimate the number of years prior to the survey to which the rates refer. Both methods assume that the mortality decline has been linear. Although the Feeney estimates are considerably lower than Trussell's, both sets of rates indicate that infant mortality has fallen about 18 percent in the 8 or 9 years prior to the survey.

Table 8. Infant Mortality Rates at Specific Points in Time Prior to the Survey Using the Trussell and Feeney Models, Mexico, 1979

Age Group of Women	Infant Mortality Rates		Number of Years Prior to Survey	
	Trussell	Feeney	Trussell	Feeney
20-24	62	55	2.8	2.5
25-29	69	60	4.7	4.4
30-34	70	61	6.6	6.5
35-39	76	67	8.3	9.1
40-44	--	63		12.1
45-49	--	69		15.3

This decline in mortality is corroborated by analyzing data from the 1976 National Fertility Survey and the 1978 National Contraceptive Prevalence Survey. For simplicity, the Feeney model was used. Results in Table 9 for the 1976 and 1979 surveys indicate considerable declines in infant mortality on the order of 20-25 percent in 12-15 years. The substantially lower estimates from the 1978 Survey, relative to the other two surveys, suggest possible underestimation of the proportion dead among children ever born.

Table 9. Infant Mortality Rates for Different Years from Three Sources Using Feeney Method, Mexico 1976, 1978, and 1979

Year	1976 National Fertility Survey	1978 National Prevalence Survey	1979 National Fertility/ Mortality Survey	Age Group of Women
1976			55	20-24
1975		56	60	25-29
1974				
1973	64	48		30-34
1972			61	
1971	64	58		35-39
1970			67	
1969	70	51		40-44
1967			63	
1966	69	51		
1964			69	
1963	77	53		45-49
1960	83			

Estimates of Adult Mortality

Because of the nature of the techniques used to indirectly estimate adult mortality, it is difficult to select one set of rates that reflects current mortality in Mexico. However, results from the application of these methods to data from the 1979 Fertility and Mortality Survey suggest that male mortality in the recent past is approximated by levels 17-18 in the Coale-Demeny West Family model life tables; female mortality is best represented by levels 18-19. The techniques used to analyze adult mortality included the death distribution technique (Brass, 1977) as well as the orphanhood (Brass and Hill, 1973) and widowhood methods (Hill and Trussell, 1977).

Two variants of the death distribution technique were applied. In the first variant, the annual rate of growth, r, and the correction factor for registered deaths, f, were estimated. In the second variant, r, and the crude death rates were estimated. Details of the methodology are included in (Coordinación, 1980b). Application of the method indicated that underregistration of deaths in the population 5 years and over was between 11 and 25 percent. Appropriate adjustments were made to the crude death rate and the annual growth rate. The adjusted crude death rate was estimated to be between 6.8 and 7.4 per thousand population and the adjusted growth rate between 2.8 and 3.1 percent in the population 5 years and over.

In the 1979 Survey, information was obtained from all respondents as to whether their fathers and mothers were still alive and from all respondents who had ever been married as to whether their first spouse was still alive. These data are presented in Table 10. The principles behind these methods are similar: the parents and spouses of the respondents are known to have been alive at a previous point in time (birth for mothers, conception for fathers, and marriage for spouses). If some estimates of the average ages of mothers at birth, fathers at conception, and men and women at first marriage can be obtained, it is possible to transform the proportions of respondents reporting these relatives as alive into probabilities of surviving from one age (e.g., average age of childbearing) to another age in adulthood (e.g., the average age of childbearing plus the age of the respondent). These conditional survivorship probabilities can be linked to estimates of childhood mortality to produce life tables.

The survivorship probabilities by age and sex resulting from these methods are shown in Table 11, along with similar data for 1970 from the civil registration system. All three sets of figures show a plausible pattern--the values decreasing with age. Similarly, all of the sources indicate that male mortality is higher than female mortality. However, with regard to the general level of mortality, discrepancies exist between methods. While the overall comparability between the orphanhood results and the civil registration data is reassuring, the widowhood method produces estimates of male mortality that are uniformly high compared to the other two sources and estimates of female mortality that are uniformly low.

Table 10. Proportions of Respondents with Father Alive, Mother Alive, and Proportion of Ever-Married Women and Men with First Spouse Alive, by Age Group of Respondent, Mexico, 1979

Age Group of Respondents	Orphanhood		Widowhood	
	Proportion of Respondents with Father Alive	Proportion of Respondents with Mother Alive	Proportion of Wives with First Husband Alive	Proportion of Husbands with First Wife Alive
5-9	.9666	.9836	--	--
10-14	.9338	.9609	--	--
15-19	.8929	.9564	--	--
20-24	.8305	.9177	--	--
25-29	.7523	.8702	.9696	.9913
30-34	.6585	.8218	.9592	.9838
35-39	.5270	.7175	.9371	.9677
40-44	.4066	.6189	.8839	.9540
45-49	.3046	.4830	.8527	.9376
50-54	.1969	.3719	*	.9168
55-59	.1181	.2455	*	.8676
60-64	--	--	*	.8224

*Information not obtained for women 50 and over.

Table 11. Survivorship Probabilities from Birth to Age x by Sex Using Orphanhood and Widowhood Techniques and 1970 Civil Registration Data, Mexico, 1970 and 1979

Age x	Orphanhood		Widowhood		Civil Registration	
	Males	Females	Males	Females	Males	Females
20	.8714	.8968	--	--	.8735	.8878
25	.8531	.8835	.8266	.8950	.8605	.8783
30	.8339	.8697	.8197	.8897	.8436	.8661
35	.8137	.8552	.8024	.8750	.8232	.8511
40	.7906	.8387	.7650	.8645	.7989	.8327
45	.7631	.8189	.7464	.8536	.7690	.8105
50	.7282	.7937	--	.8414	.7311	.7832
55	.6818	.7597	--	.8092	.6834	.7475
60	.6203	.7137	--	.7820	.6237	.6996
65	.5347	.6466	--	--	.5506	.6333
70	.4245	.5536	--	--	.4615	.5432
75	.2860	.4206	--	--	.3574	.4344
80	.1504	.2617	--	--	.2501	.3140
85	.0565	.1205	--	--	.1495	.1952

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