East-West Center
Population Institute

ISSN: 0891-2823

ASIAN AND PACIFIC POPULATION FORUM

Volume 6, Number 1

Spring 1992

Contents

Population Aging and the Demand for Hospital Care in Thailand

Thailand's fertility and mortality trends in recent decades have produced a population structure in which the elderly represent a growing segment. Although population aging reflects the positive achievement of lower birth rates and greater longevity, it is creating new challenges, among them increased demand for health services for the elderly. This article examines the reported age patterns of illness and use of health services as documented by a 1986 health and welfare survey, discusses the United Nations' 1990 population projections for Thailand, and then applies the age-specific rates of in-patient hospital use derived from the survey to the UN projections to illustrate the impact that Thailand's growing population and changing age structure could have on hospitalization. The analysis suggests that the aging of Thailand's population that is now under way will make major demands on in-patient hospital services.

by John Knodel, Napaporn Chayovan, and Siriwan Siriboon

THE COMBINATION of high fertility and falling mortality during much of the present century in Thailand ensures that there will be large and rapid increases in the elderly population as successively larger cohorts enter the span of older ages. Furthermore, the recent sharp decline in fertility ensures that the proportionate share of the total population that is in the elderly ages will also increase substantially.

(In accordance with the definition usually applied in Thailand, the term "elderly" in this study refers to persons 60 years old and

ASIAN AND PACIFIC
POPULATION FORUM

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The U.S. Agency for International Development provided support for this issue.

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over. Selecting a somewhat older or younger age to demarcate the elderly age group would have little bearing on the basic conclusions of our analysis, however.)

The growth in the numbers of older persons and their proportionate share of the population is a reflection of the success Thailand has had in meeting the goals of improving mortality and reducing population growth rates by lowering fertility. Although the process of population aging is a welcome development in this sense, it poses a variety of new challenges to Thai society. Among the most important will be an increased demand for health services, particularly for in-patient hospital care. The increased demand is a virtually inevitable consequence, given that the elderly tend to be far more likely to need and use such services than the population in general.

To examine the contribution that population aging will make toward increased demand for hospitalization in Thailand, we apply the rates of in-patient hospital use for various age groups, as documented by the 1986 Survey of Health, Welfare and Use of Traditional Medicine, to the most recent set of projections of the Thai population issued by the United Nations. The survey, conducted by the National Statistical Office, was based on a nationally representative sample of more than 19,000 households comprising 80,000 individuals. The results of the analysis demonstrate that the process of population aging that is now under way will add significantly to the demand for in-patient hospital care in the coming decades.

Of course other factors besides changes in population size and age structure will affect future rates of hospitalization and age-specific rates of hospital use. They include changes on both the supply and the demand side. Examples are the increased availability of hospitals; the shift in population distribution from rural to urban areas, where hospitals are disproportionately concentrated; the progress of medical technology; rising income per capita; and the changing prevalence of specific diseases, especially AIDS in the case of Thailand. Several studies have considered at least some of these factors in efforts to assess the future costs of health care in Thailand (e.g., Ogawa et al. 1988; Jones and Boonpratuang 1972; Jones 1975), but we do not attempt to address those issues here. The present study thus is not intended to assess the actual amount of future hospital use but rather has the more limited goal of illustrating the important role that population aging will play in generating demand for hospital care.

Age patterns of illness and health-service use

Although life expectancy has increased from 47 to 65 years in Thailand over the last four decades, mortality declines at the older ages appear to be modest at best (United

John Knodel is Professor of Sociology and Research Associate at the Population Studies Center, The University of Michigan, Ann Arbor. Napaporn Chayovan is Associate Professor, Institute of Population Studies, Chulalongkorn, University, Bangkok, Thailand. Siriwan Siriboon is Research Staff at the Institute of Population Studies, Chulalongkorn University.

Nations 1991a; Luther et al. 1986; Chayovan et al. 1990). Moreover, mortality improvements that do occur among the elderly do not necessarily translate into better health for those who are living longer. Evidence that recent increases in life expectancy at the older ages in the more developed countries have resulted in longer periods of chronic disease and disability among the elderly (Crimmins et al. 1989) is a cause for concern. On the positive side, the spread of modern medicine and public health measures that accompany the socioeconomic development taking place in Thailand and many Third World countries today may well lead to improved health for the elderly as well as for the population in general.

A series of six household surveys conducted in Thailand between 1974 and 1986 by the National Statistical Office and focusing on health and welfare provides some basis for assessing trends in the prevalence of self-reported illness among the population, including persons aged 60 and over. One member of each sample household was asked to provide information on whether any household members had been ill during the two-week period prior to the interview. Except for an unusually high level of illness reported during the first survey, the surveys revealed little change in the proportions ill over time. Data from four of the surveys for which a comparison could be made, however, indicated that the elderly were not only twice as likely as the general population to have had a recent illness but also several times more likely than the general population to have been ill for more than two weeks (Chayovan et al 1990: Table 6).

Recent surveys indicate that the elderly are not only twice as likely as the general population to have had a recent illness but also several times more likely to have had a prolonged illness.

Table 1, which is based on retabulations of data from the 1986 Health and Welfare Survey, shows that the percentage of household members experiencing an illness during the two weeks prior to the survey was higher for each five-year age group within the 60+ age range than for any of the other age groups except children under age 5. Among the elderly themselves, however, the prevalence of illness, ranging between 11 and 14 percent, did not consistently increase with age. The overall age pattern of illness prevalence was similar for males and females. Seven percent of both males and females among the population at large and 12%of both sexes among the elderly had been ill during the two weeks preceding the survey.

The duration of illness among those reported as ill had a generally

Table 1. Morbidity rates, length of illness, and use of health sources, by age and by sex: Thailand, 1986

Age group	% ill during prior 2 weeks	Of those ill, % ill more than 2 weeks	% using any health source	% hospitalized	Among those hospitalized: % in hospital for more than 1 week	Among those hospitalized: % using government facility
0–4	14	3	56	5	19	95
5–9	9	4	43	3	26	87
10–19	5	6	27	2	22	89
20–29	4	14	28	5	25	93
30–39	5	17	35	5	28	88
40–49	6	23	35	5	33	88
50–59	8	29	37	7	40	91
60–64	12	28	43	10	45	92
65–69	11	39	41	18	38	89
70–74	14	39	46	10	46	84
75 +	13	36	38	8	55	84
All ages	7	12	36	5	28	90
Males	7	12	33	4	32	90
Females	7	13	38	5	26	91
Ages 60 +	12	35	42	9	46	88
Males	12	36	40	10	44	90
Females	12	33	43	8	47	86

Source: Original tabulations from the 1986 Health, Welfare and Use of Traditional Medicine Survey.

positive association with age and was distinctly longer than average among the elderly. Children under age 5 were the least likely to have been ill for more than two weeks (3%) and those 65–74 most likely (39%). The prevalence of prolonged illness increased rather consistently with age until age 50 (29%); thereafter it continued to rise, but less consistently. Nevertheless, the higher percentages of persons reported to have had a prolonged illness were in the 65+ age range than in the 50–64 age range. Elderly men appeared more likely than women of the same ages to have had a prolonged illness.

The 1986 survey included several questions about the use of health services by household members during the prior 12 months. Respondents were asked whether an ill person had used any service during the reference period and whether he or she had been hospitalized (that is, treated as an in-patient regardless of the type of facility used) and if so, for how long.

Only one type of service was to be recorded for each ill person; if a household member had used more than one type of service, information was recorded about the facility where the person had received most of the treatment. Tabulations of the types of services used during the reference period are thus likely to understate the percentages of Thais who actually used the health services.

In addition, household members who had used health services during the 12 months preceding the survey but had subsequently died were not recorded in the survey. If information about deceased persons had been included, the overall level of use and the percentages of patients using particular types of service might have been higher than those reported—especially for the elderly, given their greater than average risk of dying in any given year.

As Table 1 shows, a larger percentage of elderly persons than of the population in general was reported to have used a health service during the reference period. Among the elderly themselves, however, no clear age pattern of health-service use emerged; in fact, proportionately fewer of the oldest age group (persons 75+) than of the younger elderly had used a health source during the reference period. This finding may be due in part to less mobility among the oldest group, which might have deterred them from going to health service outlets for treatment (Pramualratana 1990). (The problem of limited mobility presumably increases with age.) It may also be due to greater mortality among persons in that age group who did use a health source but would not have been reported in the survey because they were deceased.

Of all age groups, however, young children made the most frequent

(continued on page 21)

CHAPEN SAENGTIENCHAI

Thailand's rapidly aging population is posing new challenges to the country's health services. Survey data indicate that the elderly, who experience longer periods of chronic illness and disability than other age groups, are twice as likely to be hospitalized as the general population.

The Conflicting Effects of Delayed Marriage and Declining Divorce Rates on Cumulative Fertility in Indonesia

Although the age at first marriage for women has been rising and divorce rates have been falling in Indonesia, many Indonesian women still marry young and divorce and remarriage rates are higher than elsewhere in Asia. In 1987, the year in which the data for this study were collected, virtually all women over the age of 30 had married at least once. Among women of reproductive age (ages 15–49), close to 20% had married before age 15 and 45% had married before age 18. The prevalence of currently married women who had been married more than once was 7% for women aged 15–24, 15% for women 25–34, and 29% for women 35–49.

These nuptiality patterns affect fertility in several ways. Earlier marriage leads to higher fertility, but being married more than once leads to lower fertility. Among Indonesian women 35–49, for example, being married more than once lessened cumulative fertility by more than one child. In the same age group, those who had first married before age 15 had cumulative fertility almost three-fourths of a child higher than those married after age 18.

Using multivariate analysis and statistically controlling for eight socioeconomic variables related to nuptiality and fertility, we found a one-year delay in age at first marriage to be associated with having approximately .2 fewer children ever born. A five-year delay thus led to having approximately one less child, net of all the other variables. Being married more than once resulted in a woman's having about two fewer children—a strong negative effect on cumulative fertility.

Both marriage variables were found to be correlated with contraceptive use, contraceptive use apparently reinforcing lower fertility for those marrying later and low contraceptive use characterizing women married more than once.

If past trends continue, rising age at marriage will lower fertility rates but lower divorce rates will tend to increase fertility.

by James A. Palmore and Masri Singarimbun

TWO FEATURES stand out when Indonesia's marriage patterns are compared with those elsewhere in Asia: Indonesian women generally have married young and have had high divorce rates (Smith 1980; Hull and Hull 1985; McDonald 1984, 1985; Palmore 1985; King et al. 1986). It has been argued that part of this pattern resulted from mate selection determined by parents rather than by the couples marrying (Geertz 1961; Cheung et al. 1985; NRC 1987). Recently, as the marriage partners themselves have had more influence in selecting their own mates, marriage ages have been rising and divorce has become somewhat less common (McNicoll and Singarimbun 1983; Hull and Hull

James A. Palmore is Professor of Sociology and Population Studies, University of Hawaii, and Research Associate at the Population Institute of the East-West Center. Masri Singarimbun is Senior Research Associate at the Population Studies Center and Professor of Anthropology, Gadjah Mada University, Yogyakarta, Indonesia.

1985, 1987; Keyfitz 1985; Hugo et al. 1987; NRC 1987; Taj 1989; Williams 1990). The increase in age at first marriage may also have been influenced by the 1974 Marriage Law, which established the minimum age at marriage as 16 for women and 18 for men, with parental permission required for anyone marrying under age 21 (CBS et al. 1989:14; McDonald and Kasto 1978). Nevertheless, substantial proportions of women are still marrying at young ages.

These trends in nuptiality are important in their own right because of the lengthened period of adolescence before marriage and its implications for education, occupational experience, and the like. But their effects on fertility are of particular interest to those concerned about the size and rapid growth rate of Indonesia's population. Early first marriage is usually associated with high fertility. High divorce rates, on the other hand, are usually associated with lower fertility.

For both of these marriage variables, one explanation for the association with fertility is a standard demographic concept: length of exposure to the risk of conception. Earlier marriage lengthens the period of exposure to the risk of conception. Divorce, because it is typically preceded by reduced sexual activity between the partners and because there is usually a delay between successive marriages, shortens exposure (Palmore and Ariffin bin Marzuki 1969; McDonald 1984).

Early marriage increases the exposure to the risk of conception, whereas divorce shortens that exposure even when it is followed by remarriage. But women who marry at younger ages are also more likely than other women to divorce and marry again.

ASCLEPIAS R. SOERJONO

A Javanese couple pose for their wedding portrait. In recent years, as Indonesian marriage partners have had more influence in selecting their mates, female age at marriage has been rising. Indonesia's 1974 Marriage Law establishing the minimum age at marriage for women at 16 and requiring parental permission for anyone marrying under age 21 has probably contributed to the trend.

A complicating factor is that women who marry at younger ages often have a greater likelihood than other women of being married more than once (see Palmore and Ariffin bin Marzuki 1969 for Malaysia; Mamas 1978 and 1989 for Indonesia; and Smith et al. 1984 for comparative information). The net effect of the two marriage variables on fertility can therefore be positive, negative, or neutral. The negative correlation between average age at first marriage and the prevalence of divorce may be due in part to the fact that many young people, and particularly young women, defer to their parents and marry a partner selected for them by their parents (Taj 1989). If the marriage is unsuccessful, they may then divorce and marry "someone more of their own choosing" (Williams 1990:57; Ihromi et al. 1973).

In this study we first review recent marriage patterns and trends in Indonesia and consider the effects of the marriage variables on fertility. Next, we look at the relationship between the marriage variables and a variety of socioeconomic factors that influence marriage behavior and also consider the net effects of the marriage variables on fertility, controlling for appropriate socioeconomic factors. Finally, we discuss the interrelationships between marriage patterns and contraceptive use.

Table 1. Percentage distribution of all women of reproductive age by current marital status and age: Indonesia, 1987

	Current marital status				
Age group	Never married	Currently married	Divorced	Widowed	Total
15–49	26	68	3	3	100
15–19	81	18	1	0	100
20–24	35	62	3	0	100
25–29	11	85	3	1	100
30–34	4	90	4	2	100
35–39	3	89	3	5	100
40–44	1	88	3	8	100
45–49	1	80	4	14	100

Source: CBS et al. (1989: Table 2.1, p. 13).

Data

The data used in this study come from the 1987 National Indonesia Contraceptive Prevalence Survey (NICPS), conducted as part of the worldwide Demographic and Health Surveys (DHS) program. Because the survey design, questionnaire, field operations, and some results are described in the usual first country report issued for every country in the DHS program (CBS et al. 1989), we do not repeat that information here. What is important for this analysis is that the 1987 NICPS was conducted according to the highest international standards for such work and was based on a probability sample covering 20 of Indonesia's 27 provinces. The excluded areas contain less than 10% of the country's population; hence the survey was essentially national in coverage.

The NICPS gathered information on age, sex, and marital status for everyone in the households surveyed, and it involved intensive interviews with ever-married women between ages 15 and 49. These intensive interviews obtained additional information on marital status and on fertility, contraceptive use, socioeconomic characteristics of the women, and related topics.

Indonesian Marriage Patterns in 1987

Age at first marriage for Indonesian women has been rising for at least two decades (King et al. 1986; Hugo et al. 1987; NRC 1987). Continuing this trend, the singulate mean age at marriage rose by more than one year between 1980 and 1985 (Mamas 1989:52; Xenos 1990), and between 1980 and 1987 the percentage of women 15–49 who had never married rose by almost 5%, from 21.5% to 26.4% (CBS et al. 1989: 14). Perhaps some of those women will never marry.

Reflecting past patterns, however, 96% of women between the ages of 30 and 34 in 1987 had married at least once, making marriage virtually universal by age 35, and more than 98% of those over age 40 had married. Furthermore, substantial proportions of Indonesian women were still marrying at young ages (Table 1). Almost one-fifth of women 15–19 had married and almost two-thirds of those 20–24 had married. Among all women between ages 15 and 49 in 1987, close to one-fifth (19%) had married before age 15 and nearly half had married before age 18 (CBS et al. 1989:15).

Indonesian women have traditionally married young. Among all women between ages 15 and 49 in 1987, 19% had married before age 15 and nearly half had married before age 18. But age at marriage has been rising in recent years, and divorce rates have fallen.

The percentage of women married more than once has fallen dramatically in recent years but is still high. Among currently married women in 1976, the percentages who had been married more than once were 15% for ages 15–24, 28% for ages 25–34, and 37% for ages 35–39 (Mamas 1989:82). Eleven years later, in 1987, the proportions of currently married women who had been married more than once were much lower but still high relative to most other countries in Asia: 7% for ages 15–24, 15% for ages 25–34, and 29% for ages 35–49 (Table 2).

Age at first marriage and the number of times married were strongly and negatively correlated in both 1976 (Mamas 1989) and 1987. Among currently married women aged 35–49 in 1987, for example, the percentage married more than once was more than twice as high for women who had first married before age 15 as it was for women who had married after age 18 (Table 2, panel 2). Comparing the mean ages at first marriage reveals that women who married more than once had married more than two years earlier, on the average, than those married only once (Table 2, panel 1).

Table 2. Mean age at first marriage, by number of times married and current age, and percentage married more than once, by age at first marriage and current age: Ever-married women of reproductive age: Indonesia, 1987

Mean age at first marriage/percentage married more than once	Current age		
	35–49	25–34	15–24
Mean age at first marriage			
All women	16.6	17.4	16.7
Women married once	17.4	17.8	16.9
Women married more than once	14.8	14.6	14.5
Percentage married more than once			
All women	29	15	7
Women first married at ages			
Under 15	45	31	21
15–17	30	16	*
18–20	18	6	*
21 or more	—	1	*

Note: Percentages and means are based on 75 or more cases unless otherwise indicated. Those based on fewer than 25 cases (indicated by a dash) have been omitted.

* Percentage is heavily affected by censoring and hence not shown.

Table 3. Mean number of live births to ever-married women of reproductive age, by current age, number of times married, and age at first marriage: Indonesia, 1987

Times married and age at first marriage	Live births, by current age		
	35–49	25–34	15–24
All women	5.1	2.9	1.3
Married only once, first married at ages			
Under 15	5.9	3.7	1.7
15–17	5.9	3.4	1.4
18–20	5.2	2.8	1.0
21 or more	—	1.1	0.6
Married more than once, first married at ages			
Under 15	4.6	3.1	1.4
15–17	4.8	2.6	1.4[a]
18–20	3.9	2.1[a]	—
21 or more	—	—	—

Note: Means are based on 75 or more cases unless otherwise indicated. Those based on fewer than 25 cases (indicated by a dash) have been omitted.

a. Mean based on 50–74 cases.

Marriage Patterns and Fertility

Notable relationships are found in the NICPS data between cumulative fertility and both age at first marriage and number of times married. Among women 35–49, for instance, being married more than once lessened cumulative fertility by more than one child. In the same age group, those who had married before age 15 had cumulative fertility almost three-fourths of a child higher than those married after age 18 (Table 3). In the younger age groups the effect of early marriage

Table 4. Percentage of ever-married women 35–49 years old who first married at specified ages, their mean age at first marriage, and percentage married more than once, by selected social and demographic characteristics: Indonesia, 1987

Social/demographic characteristic	Percentage first married at ages: Under 15	15–17	18–20	21 or more	Mean age at first marriage	Percentage married more than once
All women 35–49	37	40	23	0	16.6	29
Current residence						
Rural	40	40	21	0	16.1	32
Urban	29	41	30	0	17.9	22
Region†						
Java or Bali	41	39	10	0	16.2	35
Outer Islands I	29	42	30	0	17.5	19
Outer Islands II	21	50	30	0	18.0	21
Religion						
Muslim	38	40	21	0	16.3	31
Non-Muslim	12	34	54	0	20.5	10
Language of interview						
Bahasa Indonesia	27	44	29	0	18.0	20
Javanese	39	39	23	0	16.2	34
Sundanese	43	45	12	0	15.1	45
Madurese	70	22	8	0	13.3	47
Balinese	16	40	44	0	19.0	15
Education						
None	45	35	19	0	15.8	34
Some primary	39	42	18	0	15.9	32
Primary completed	24	48	28	0	17.0	27
Secondary or more	10	37	53	0	20.5	12
Whether worked for money before marriage						
Yes	34	39	27	0	17.4	29
No	39	41	20	0	16.0	30
Primary residence before age 12						
Village	39	39	22	0	16.3	31
Town or city	28	43	29	0	18.1	21

† The regional classification is based on the phased expansion of the national family planning program (CBS et al. 1989). Outer Islands I are the provinces of Daerah Istimewa Aceh, North Sumatra, West Sumatra, South Sumatra, Lampung, Nusa Tenggara Barat, West Kalimantan, South Kalimantan, North Sulawesi, and South Sulawesi. Outer Islands II include all the remaining provinces.

on fertility was even more pronounced.

These relationships, however, are confounded by the fact that early marriage and the number of times married are closely related to other variables that affect fertility. Therefore it is necessary to examine social and economic differentials in marriage patterns and then to assess the net effects of the marriage variables on fertility.

Socioeconomic Differentials in Marriage Patterns

In Indonesia, as elsewhere, age at first marriage is highly associated with many socioeconomic factors. The NICPS found that rural women married at younger ages than urban women, that women in Java and Bali married younger than women in other provinces, and that Muslim women, women with less education, women who did not work before marriage, women who had lived primarily in a village before age 12, and women whose language of interview[1] was Javanese, Sundanese, or Madurese all married at substantially younger ages than other Indonesian women (Tables 4 and 5).[2]

1. Language of interview is not a precise measure of ethnicity because many Indonesians speak Bahasa Indonesia, the official language of the country, in addition to their ethnic language. Nevertheless, because it is less common to speak Balinese, for example, if one is not Balinese, interview languages other than Bahasa Indonesia are likely to be reasonably accurate indicators of ethnicity.

2. We present separate tables for the two age groups because age is related to the marriage variables and also because the estimates for the younger age groups are influenced by a high probability that some women who would marry later had not yet married at the time of the survey. In view of this censoring problem, a table for the 15–24 age group is not presented.

The differences in social groups are often large. In the 35–49 age group (Table 4), the women of Java and Bali married roughly a year and a half earlier than women living on the outer islands, Muslim women married more than four years earlier on average than women of other faiths, women who were interviewed in Madurese married at the very early mean age of 13.3 years, and those with a secondary or higher education married nearly five years later than those with no formal schooling.

Table 5. Percentage of ever-married women 25–34 years old who first married at specified ages, their mean age at first marriage, and percentage married more than once, by selected social and demographic characteristics: Indonesia, 1987

Social/demographic characteristic	Percentage first married at ages: Under 15	15–17	18–20	21 or more	Mean age at first marriage	Percentage married more than once
All women 25–34	28	39	29	5	17.4	15
Current residence						
Rural	31	40	25	4	16.8	17
Urban	20	34	39	7	18.7	10
Region						
Java or Bali	32	38	26	4	16.9	18
Outer Islands I	19	41	34	5	18.2	8
Outer Islands II	18	34	41	7	18.4	10
Religion						
Muslim	29	39	28	4	17.1	16
Non-Muslim	10	31	47	12	20.4	4
Language of interview						
Bahasa Indonesia	19	38	36	8	18.5	11
Javanese	29	41	27	4	16.9	16
Sundanese	35	41	22	2	16.1	22
Madurese	67	26	6	2	13.8	31
Balinese	8	37	50	4	18.6	3
Education						
None	38	36	22	4	16.2	18
Some primary	33	41	23	2	16.4	18
Primary completed	20	42	33	5	17.5	14
Secondary or more	5	27	53	16	20.7	4
Whether worked for money before marriage						
Yes	22	39	32	8	18.3	12
No	32	39	26	2	16.6	17
Primary residence before age 12						
Village	30	39	27	4	16.9	17
Town or city	20	36	37	7	18.7	9

Even in a multivariate analysis, most of the variables just discussed prove to be significantly associated with age at first marriage (Table 6), and this small set of variables explains 27% of the variance in age at first marriage. Only the respondent's primary residence before age 12 (village or nonvillage) is not significant in the multiple regression analysis, undoubtedly because that variable is so strongly correlated with current residence and current residence is a significant independent variable.

The number of times married is also closely connected with many socioeconomic characteristics: the same groups that married at younger ages were also more likely to have higher proportions who had been married more than once. Here, again, the differences appear to be substantial, but in this case they are large only without multivariate controls. Two examples suffice, taken from the 35–49 age group: Muslim women were three times more likely to have been married more than once than were women of other faiths, and women with no education were almost three times as likely to have been married more than once than were women who had completed their secondary education or more.

These findings are altered, however, when one considers the results of a multivariate analysis that includes the variables of Table 4 and 5 along with age at first marriage in estimating the number of times married (Table 7).[3] The independent variables used in this analysis explain only 13% of the variance in the number of times married. With few exceptions, the independent variables are found to have had small net effects on the number of times married. Being Muslim had no statistically significant effect in the multivariate analysis. Being urban, living in Java or Bali, educational attainment, having lived primarily in a village before age 12, having worked before marriage, and language of interview (with one exception) had small net regression coefficients.

The important net effects were for women interviewed in Balinese (who were 11% less likely than other women to have been married more than once), age (each year of age adding 2% to the percentage married more than once), and age at first marriage (each year's delay in age at first marriage subtracting 2% from the percentage married more than once). In other words, the relationship between age, age at first marriage, and the remaining variables (with the exception of being interviewed in Balinese) accounted for the large percentage differences reported in Tables 4 and 5.

3. We used ordinary least squares regression to estimate the parameters presented in Table 7. Although logit regression is usually preferable when the dependent variable is an indicator random variable, as in this case, we had several reasons for not using logit regression here. First, the proportion of women who were married more than once was sufficiently large that a rare event was not being estimated (the dependent variable was well within the .10–.90 rule of thumb). Second, the results were more easily compared with the regression on age at marriage. Finally, we conducted a logit regression, and our interpretation of those results is fully consistent with the results reported here.

Table 6. Multiple regression parameter estimates and standard errors for estimating age at first marriage, using selected social and demographic characteristics: Ever-married women of ages 25–49, Indonesia, 1987

Variable	df	Parameter estimate	Standard error
Intercept	1	20.134002*	1.02963308
Urban	1	0.547796*	0.09450949
Java or Bali	1	−0.534038*	0.20280856
Outer Islands I	1	0.180466	0.18992927
Muslim	1	−2.025056*	0.14807627
Javanese	1	−0.393040*	0.11625608
Sundanese	1	−1.120690*	0.13832943
Madurese	1	−2.187902*	0.18596228
Balinese	1	−0.074610	0.31092573
Education	1	0.283881*	0.00885357
Whether worked for money before marriage	1	1.236424*	0.07350025
Primary residence before age 12	1	0.128216	0.10293039
Current age	1	−0.142120*	0.05682260
Current age squared	1	0.001805*	0.00077914
$R^2 = .27, p < .0001$			

* $p < .05$.

Marriage Patterns, Socioeconomic Factors, and Cumulative Fertility

Given the extensive interrelationships found between the socioeconomic variables, age at first marriage, and the number of times married, we next pose the question: How do these variables together affect cumulative fertility? A first attempt at an answer is found in Tables 8 and 9, which cross-tabulate the mean number of live births by age at first marriage, the number of times married, and each socioeconomic variable separately.

The tables show a number of striking results. First is the consistency with which age at first marriage is related to cumulative fertility in almost every socioeconomic subgroup of the population when age and number of times married are controlled. Second is the same consistency in the number of times married: women married more than once are found to have had lower cumulative fertility in almost every socioeconomic subgroup when age and age at first marriage are controlled. Third, some of the differentials in socioeconomic subgroups are small after age, age at first marriage, and number of times married have been controlled.

It is not surprising, then, that a multiple regression analysis incorporating all these variables (Table 10) shows strong net effects for the marriage variables and 36% of the variance being explained. (The high figure for explained variance is of course partly due to the inclusion of age as one of the explanatory variables.) Net of all the other variables, a five-year delay in marriage leads a woman to have between .75 and 1.1 fewer children net of all the other variables. Being married more than once leads her to have 2.1 fewer children—a strong negative effect on cumulative fertility.

With social and economic differences statistically controlled, a five-year delay in marriage leads a woman to have between .75 and 1.1 fewer children than average. Being married more than once leads her to have 2.1 fewer children.

Table 7. Multiple regression parameter estimates and standard errors for estimating number of times married using selected social or demographic characteristics and age at first marriage: Ever-married women of ages 25–49, Indonesia, 1987

Variable	df	Parameter estimate	Standard error
Intercept	1	0.003321	0.11726806
Urban	1	−0.025976*	0.01056762
Java or Bali	1	0.064667*	0.02263919
Outer Islands I	1	−0.033100	0.02119583
Muslim	1	0.020131	0.01668806
Javanese	1	−0.016863	0.01298093
Sundanese	1	0.060767*	0.01548994
Madurese	1	0.047103*	0.02090412
Balinese	1	−0.106163*	0.03469521
Education	1	−0.002334*	0.00104088
Whether worked for money before marriage	1	0.020282*	0.00832712
Primary residence before age 12	1	−0.032997*	0.01148838
Current age	1	0.023643*	0.00634581
Current age squared	1	−0.000197*	0.00008701
Age at first marriage	1	0.023596*	0.00115439
$R^2 = .13, p < .0001$			

* $p < .05$.

The other strong net effects are living in Java or Bali (which leads to having fewer children), being interviewed in Javanese or Madurese (fewer children), rural background (more children), and age (more children with increasing age). Interestingly, neither the wife's educational attainment nor her work experience before marriage has a statistically significant effect on the number of children ever born after the marriage when other variables have been controlled.

The regression analysis also tested for the interaction between number of times married and age at first marriage. Although statistically significant, the net regression coefficient for the interaction term is smaller than the main effects. Nevertheless, the term is not trivial and is a positive .07. This implies that for women married more than once, the later their first marriage, the higher was their cumulative fertility net of all the other variables. This effect may be due to attempts to "catch up" in fertility in second and later marriages.

Marriage Patterns and Contraceptive Use

Clearly, both of the marriage variables have had strong effects on cumulative fertility in Indonesia. To what extent might those effects be due to differential contraceptive use? Unfortunately, this question cannot be addressed in a multivariate analysis because of confusion in arguments about causality. The relationship between number of children ever born and contraceptive use is definitely one of both cause and effect. Some women use contraception because they have already had a large number of children. Other women have used contraception in the past and therefore have had fewer children. Without a complete history of pregnancy and contraceptive use, which is not available from the 1987 NICPS, it is difficult to unravel the causality issue.

It is possible, however, simply to look at the association between the marriage variables and contraceptive use. It is obvious from Table 11 that women who were married more than once used contraception and sterilization less than those married only once—both in the past and currently, in 1987. Women married

Table 8. Mean number of live births to ever-married women of ages 35–49, by age at first marriage, number of times married, and selected social and demographic characteristics: Indonesia, 1987

Social/demographic characteristic	Married only once, first married at ages: Under 15	15–17	18–20	Married more than once, first married at ages: Under 15	15–17	18–20	All women
All women 35–49	5.9	5.9	5.2	4.6	4.8	3.9	5.1
Current residence							
Rural	5.9	5.9	5.2	4.6	4.9	4.1	5.2
Urban	5.8	6.0	5.0	4.5	4.4	3.3[b]	4.8
Region							
Java or Bali	5.4	5.4	4.6	4.4	4.5	3.5	4.6
Outer Islands I	7.1	6.7	5.8	5.7[a]	5.5[a]	4.9[b]	5.9
Outer Islands II	7.5[b]	7.0	6.0	—	6.0[b]	—	6.1
Religion							
Muslim	5.9	5.9	5.2	4.6	4.8	3.8	5.1
Non-Muslim	7.4[b]	5.6	5.2	—	4.4[b]	—	4.7
Language of interview							
Bahasa Indonesia	6.7	6.5	5.5	5.0	5.5	5.3[b]	5.4
Javanese	5.3	5.3	4.6	4.4	4.2	3.5[a]	4.6
Sundanese	6.2	5.6	5.0[b]	5.2	4.8	—	5.2
Madurese	4.1[a]	—	—	3.2[a]	—	—	3.5
Balinese	—	5.5	4.3	—	—	—	4.5
Education							
None	5.7	5.5	5.0	4.4	5.0	3.9[a]	5.0
Some primary	6.3	6.4	5.3	4.8	4.4	3.6[b]	5.4
Primary completed	5.4	5.8	5.2	4.6[a]	5.0	4.1[b]	5.1
Secondary or more	—	5.6	5.1	—	4.8[b]	—	4.4
Whether worked for money before marriage							
Yes	5.8	6.0	5.0	4.4	4.9	4.0	4.9
No	6.0	5.9	5.3	4.7	4.6	3.9[a]	5.2
Primary residence before age 12							
Village	5.8	5.8	5.2	4.6	4.8	3.9	5.1
Town or city	6.2	6.4	5.1	4.8	4.6	—	5.0

Note: Mean number of live births is based on 75 or more cases unless otherwise indicated. Means based on fewer than 25 cases have been omitted, including the means for all women who first married at age 21 or older. Omitted means are indicated by a dash.

a. Mean based on 50–74 cases.

b. Mean based on 25–49 cases.

more than once may have thought contraceptive use inappropriate because their cumulative fertility was substantially lower than that of women married only once. As mentioned previously, women married more than once may have been trying to catch up with the women married only once.

The relationship between age at first marriage and contraceptive use is less clear-cut. Among women of ages 35–49, those who had married later had higher contraceptive use rates. For women under age 25, however, the relationship was negative; that is, the higher their age at first marriage, the less contraception they had used. This finding undoubtedly reflects the shorter marriage durations for younger women at the time of the survey.

The relationship between age at first marriage and contraceptive use is less clear-cut, but contraceptive use may have contributed to the low-fertility effect of later marriage.

Overall, however, it seems safe to say that marriage patterns in Indonesia are related to contraceptive use, and it is reasonable to speculate that contraceptive use may have played a reinforcing role in producing the low-fertility effect of later marriage.

Discussion and Conclusions

Knowing about trends and differentials in women's age at first marriage and their divorce and remarriage rates is critical to understanding fertility trends and differentials in Indonesia. After statistically controlling for eight socioeconomic variables related to both fertility and nuptiality, we found that a five-year delay in age at first marriage was associated with bearing between .75 and 1.1 fewer children than average. Being married more than once, in the same multivariate analysis, was associated with having 2.1 fewer children. Both marriage variables were also correlated with contraceptive use, contraceptive use probably reinforcing the effect of later marriage (lower fertility) and low rates of contraceptive prevalence characterizing women who had been married more than once.

Understanding the mechanisms leading to changes in the marriage variables is central to understanding how and why the socioeconomic changes and policy directives in Indonesia are changing the marriage patterns. We are interested in knowing, for example, to what extent shifts from arranged marriages to "love matches" are occurring and how these shifts vary by region, ethnic group, and educational attainment. To what extent, how, and where is the 1974 Marriage Law being enforced? Are government agencies, particularly through their change agents in the villages, actively promoting later marriage and attempting to influence marital dissolution? If so, how important are these governmental efforts relative to other social changes in affecting marriage patterns? Unfortunately, the NICPS data contain little information suitable for investigating these important issues.

If past trends continue, rising age at marriage in Indonesia will lead

(continued on page 25)

Table 9. Mean number of live births to ever-married women of ages 25–34, by age at first marriage, number of times married, and selected social and demographic characteristics: Indonesia, 1987

Social/demographic characteristic	Married only once, first married at ages: Under 15	15–17	18–20	21 or more	Married more than once, first married at ages: Under 15	15–17	18–20	All women
All women 25–34	3.7	3.4	2.8	1.1	3.1	2.6	2.1[a]	2.9
Current residence								
Rural	3.6	3.4	2.8	1.0	3.1	2.5	2.1[b]	3.0
Urban	4.0	3.5	2.9	1.1	3.0[a]	3.0[a]	—	2.8
Region								
Java or Bali	3.5	3.1	2.7	1.0	3.0	2.4	1.8[b]	2.7
Outer Islands I	4.4	4.0	3.2	1.1[b]	3.5[b]	3.7[b]	—	3.3
Outer Islands II	4.5[b]	4.1	3.2	—	—	—	—	3.3
Religion								
Muslim	3.7	3.4	2.8	1.1	3.1	2.6	2.2[a]	3.0
Non-Muslim	4.3[b]	3.3	2.8	1.1[b]	—	—	—	2.5
Language of interview								
Bahasa Indonesia	4.2	3.9	3.0	1.1	3.4	3.0	2.8[b]	3.0
Javanese	3.5	3.0	2.6	1.0[a]	3.0	2.1[a]	—	2.7
Sundanese	3.7	3.2	2.9	—	3.6[b]	2.6[b]	—	3.1
Madurese	2.8[a]	2.5[b]	—	—	2.2[b]	—	—	2.4
Balinese	—	2.9	2.5	—	—	—	—	2.6
Education								
None	3.8	3.3	2.9	1.2[b]	2.8[a]	2.6[b]	—	3.0
Some primary	3.8	3.5	2.8	0.8[b]	3.4	2.8	1.9[b]	3.2
Primary completed	3.4	3.4	2.9	1.3[b]	2.4[b]	2.2[a]	—	2.9
Secondary or more	—	3.3	2.8	1.0	—	—	—	2.4
Whether worked for money before marriage								
Yes	3.9	3.4	2.7	1.1	3.1	2.8	2.2[b]	2.8
No	3.6	3.4	3.0	1.0[a]	3.0	2.5	2.0[b]	3.1
Primary residence before age 12								
Village	3.6	3.4	2.8	1.1	3.0	2.6	2.0[a]	3.0
Town or city	4.2	3.6	2.9	1.0	3.6[b]	2.8[b]	—	2.9

Note: Mean number of live births is based on 75 or more cases unless otherwise indicated. Means based on fewer than 25 cases have been omitted, including, for women married more than once, the means for all women who first married at age 21 or older. Omitted means are indicated by a dash.

a. Mean based on 50–74 cases.

b. Mean based on 25–49 cases.

Reviews and Publication Notes

Births and Power: Social Change and the Politics of Reproduction edited by W. Penn Handwerker. Boulder, San Francisco, and London: Westview Press, 1990. vi, 227 pp. ISBN 0-8133-7787-0 (paper), US $27.50. Available from Westview Press, 5500 Central Avenue, Boulder, CO 80301, U.S.A.

Births and Power: Social Change and the Politics of Reproduction is a collection of articles about the social and political aspects of events related to birth, from contraception to birth itself, to the value of children. Its thesis is that the birth of a child is a political event, and this thesis is underscored by the choice of articles included. It should be noted that politics in this context is used not in the narrow sense of the word but rather to signify the importance of power—the power of individuals, families, communities, and governments—to determine sequences of events surrounding birth.

The articles vary in quality. Unfortunately, the introductory article, "Politics and Reproduction: A Window on Social Change," by Handwerker, is weaker than many others in the collection. Its purpose seems to be to advance the main thesis, that birth is a political event, and to argue that fertility and fertility changes can generate social change. The latter argument, which Handwerker makes through a series of sections with cute subtitles (e.g., "A Leader Without Followers Has No Power," "Sweetness Can Be Calculated"), has been made before—and better—by other researchers, including John Caldwell and many economic demographers.

The argument that birth and its associated behaviors is political is made effectively, however, by the cumulative evidence presented in the 11 articles that make up this collection. One of the strengths of the book is that it includes pieces about a wide variety of societies.

Caroline Bledsoe's chapter on child fosterage in Sierra Leone is particularly interesting; she argues cogently that in that society, at least, attempts to weigh the costs and benefits of biological fertility are not useful. Where fosterage occurs, children are viewed as potential sources of achievement and status improvement through their connections with foster parents. Fostering (both fostering in and fostering out) provides a way for parents in that society to lessen the costs of reproduction.

Carolyn Sargent's chapter on the politics of birth in Benin is important for its contribution to research on how Western practices influence cultural change in many unexpected ways. She studies the role and value of pain in Bariba society and argues that Western medicine, which attempts to control pain, including that involved in childbirth, may interrupt the cultural traditions of that society.

John O'Neil and Patricia A. Kaufert, writing on Inuit experience in northern Canada, add to our understanding of how foreign (in this case southern Canadian) practices impinge on traditional experience. Ostensibly in the interest of reducing maternal and infant mortality (the authors argue that other factors were at play as well), obstetric practices have undergone great change. Whereas birth was once a community event, Inuit women in the communities studied are now evacuated to hospitals in the south and give birth away from their families and friends. This innovation causes disruption in the women's lives and in the community as a whole.

Other chapters deal more directly with the political nature of birth and contraception. Warren M. Hern writes about abortion in the United States, Martha C. Ward discusses the politics of adolescent pregnancy in one area of the United States (Louisiana), and Barbara Pillsbury advances arguments supporting the controversial family planning and sterilization program in Bangladesh. These articles, perhaps because of their polemical stance, are less successful in persuading the reader of the political nature of these behaviors than are those that argue through the presentation of data.

This book will be of interest to readers from many fields. For demographers interested in the social context of fertility, the articles lend support to previous studies focusing on the social, political, and economic context of fertility behavior. Public health researchers and practitioners will benefit from descriptions of how varying social and political influences can affect the distribution and use of family planning, abortion, obstetric, and maternal and child care services. There is much here to interest policymakers as well, as most of the articles deal explicitly (as in the case of Jeanne M. Simonelli on Hungary and O'Neil and Kaufert on the Inuit experience) or implicitly (in almost all the articles) with the role of policy in creating, limiting, and shaping options.

After reading the varied and richly textured material in this volume, one comes away with a sense that birth and reproduction are indeed political events. For this reason the book makes an important contribution to all fields that deal with birth and reproduction.

—Nancy E. Riley
Project Fellow
Population Institute
East–West Center

Handbook on International Migration
edited by William Serow, Charles B. Nam, David F. Sly, and Robert H. Weller. New York: Greenwood Press, 1990. xi, 385 pp. ISBN 0-313-26117-2, US $59.95. Available from Greenwood Press, 88 Post Road West, Westport, CT 06881, U.S.A.

This work, like its earlier counterpart—*International Handbook on Internal Migration* (New York: Greenwood Press, 1990), reviewed in the *Asian and Pacific Population Forum*, Vol. 4, No. 2—provides an overview of contemporary migration and case studies of migration in a variety of national settings. Here, however, the focus is on international population movements, who the movers are, what motivations impel them to move, and how their movements are documented.

Movement by individuals, families, or larger groups can be motivated by economic opportunity, family reconstitution, political instability, natural disasters, or persecution. Some movement involves the illegal crossing of national borders or staying in a country when a visa expires.

Population movements directly affect the country of destination by increasing its numbers, changing its ethnic makeup, and requiring new jobs and public services for entrants. Countries of origin can be affected by the loss of professional or skilled labor.

Even in the most economically advanced nations, the quality and completeness of data on international migration are issues of concern. Comparisons between nations are difficult to achieve, not only because of inadequate data, but also because of differences in their immigration policies. For example, members of the European Community permit their citizens free access to all member nations. Other countries, such as the United States, have more restrictive immigration laws.

Individual chapters of this volume focus on such principal receiving nations as Australia, Canada, and the United States (Chapters 1, 3, and 19); countries whose recent experience with immigration has been primarily with the short-term importation of labor, e.g., the Federal Republic of Germany (Chapter 4); countries such as the Netherlands and the United Kingdom, whose history as colonial powers has led to an influx of migrants from former colonies (Chapters 13 and 18); and countries that receive immigrants mainly for noneconomic reasons such as religion, Israel being a prime example (Chapter 8), or that receive immigrants as refugees (Nigeria, Chapter 14, and Pakistan, Chapter 15).

Other chapters deal with countries whose history as colonies has influenced their current immigration and emigration patterns—for example, Botswana, French West Indies, India, and Kenya (Chapters 2, 5, 6, 11); and countries where emigration has long been a way of life (Ireland and Italy, Chapters 7 and 9). Finally, several chapters deal with some of the principal sending nations of current international flows—Jordan, Mexico, the Philippines, and Turkey (Chapters 10, 12, 16, 17).

As they had done for the volume on internal migration, the editors provided the authors with an outline of topics to follow so that some transnational comparisons could be made. Missing, however, is a chapter summarizing general trends and patterns. The editors believe that both short-term and permanent migration is economically beneficial to the sending nations. For receiving nations also, the economic and social benefits appear to be favorable, except when countries are forced—as in the recent case of Pakistan—to accept large numbers of refugees without adequate resources to handle them.

The editors conclude that international migration will continue as long as economic disparities exist between nations. They recommend the coordination of immigration policies worldwide to balance the interests of receiving and sender nations.

Although this book makes no startling revelations, it does assemble information from a variety of countries, in a readable and orderly format. It should be of interest to anyone doing comparative migration studies and a useful addition to collections serving readers interested in migration issues.

Alice D. Harris
former Resource Materials Specialist for the East–West Population Institute

ALSO NOTED

"The Demographic Situation in Cambodia" by Jerrold W. Huguet. Published in the *Asia-Pacific Population Journal*, Vol. 6, No. 4, December 1991, pp. 79–91. Available from the Population Division, Economic and Social Commission for Asia and the Pacific, United Nations Building, Rajadamnern Nok Avenue, Bangkok 10200, Thailand.

Piecing together Cambodian government and UN statistics based on various sources and assumptions, this report provides a demographic profile of one of the countries in the Asian–Pacific region about which little has been published in recent years. The Department of Statistics, Ministry of Planning, projects Cambodia's population to reach 9.0 million in 1992 and estimates it to be growing at a rate of 2.5% per year. The United Nations gives somewhat smaller estimates, 8.6 million in mid-1992 and a 2.2% growth rate. Mortality and fertility remain high; the crude death rate is about 15 per thousand population, the infant mortality rate "well over 100" per thousand live births, and the crude birth rate about 40 per thousand.

Huguet notes, however, (p. 79) that "all of these figures are actually only reasonable assumptions . . . and not based on any existing data. During the period 1970–1979, statistical work came to a complete stop. Most, if not all, statistical documents were destroyed."

Owing to the Indochinese War and its aftermath, the Cambodian sex ratio exhibits a severe distortion, 80 males per 100 females, in the 18–64 age span, with the result that 20% of adult females are single, widowed, separated, or divorced.

The capital of Phnom Penh, the only large city, is 18 times as large as the second largest city of Battambang. Its population, estimated to be growing at about 5% a year, fluctuates between 800,000 during the rainy season and 1.0 million during the dry months, for an average of 900,000 (as of 1991).

A large number of Cambodians, both within and outside Cambodia, have been displaced from their homes. According to one estimate, nearly 170,000 persons were displaced in Cambodia's nine provinces in 1991. Some 350,000 more living in refugee camps in Thailand were expected to begin returning to Cambodia in early 1992.

Sociological Studies on the Vietnamese Family edited by Tuong Lai. Hanoi: Social Sciences Publishing House in association with the Institute of Sociology, National Center for Social Sciences, and the Department of Sociology, Gothenburg University, 1991. 193 pp. (paper). Available from: Khoa Hoc Xa Hoi (Social Sciences Publishing House), 61 Phan Chu Trinh, Hanoi, Vietnam.

This collection of 12 studies, all but one of which are by Vietnamese authors, examines Vietnamese family structure and functions in the context of the country's recent political, social, and economic changes. The focus is on rural families, who constitute about 80% of Vietnam's population, and specifically on the Viet ethnic group, although ethnic minorities are also described.

Several papers consider cultural influences, such as Confucianism, on family institutions; others concentrate on women's roles and status, the rural family as a productive agricultural unit, or peasant families' adaptation to the country's new economic conditions. One paper, by Pham Bich San, assesses Vietnam's modern population trends and prospects, drawing upon a variety of sources including the 1989 census.

Population Statistics of China compiled by Yasuko Hayase and Seiko Kawamata. I.D.E. Statistical Data Series, No. 55. Tokyo: Institute of Developing Economies, 1990. (In English and Japanese.) xiv, 298 pp. (paper). Available from Asian Economic Press, Ltd., 42 Ichigaya-Hommura-cho, Shinjuku-ku, Tokyo 162, Japan.

During the 40 years since the founding of the People's Republic in 1949, the population of China doubled, growing from 540 million to 1.12 billion. This volume presents a series of statistical tables derived from China's population censuses of 1953, 1964, 1982, and 1987, by province and major demographic, social, and economic variables. Augmenting the tables are age pyramids of the Chinese population by province for the four census years, instructions for interpreting the tables and age pyramids, and four brief articles on China's population statistics, its educational system, minority nationalities, and population projections for 1987–2057. According to an East-West Population Institute researcher, this book is very useful.

Vasectomy: New Opportunities by Laurie Liskin, Ellen Benoit, and Richard Blackburn. Population Reports, Series D, No. 5. Baltimore: Population Information Program, Center for Communication Programs, The Johns Hopkins University, 1992. 23 pp. (paper). Available from Center for Communication Programs, The Johns Hopkins University, 527 St. Paul Place, Baltimore, MD 21202, U.S.A.

According to the authors, vasectomy—voluntary male sterilization—is a major family planning method in the United States and five other developed countries and in three developing countries (China, India, and South Korea). Worldwide, however, it is among the least known and least used methods. Only 42 million couples rely on vasectomy, compared with 140 million couples using female sterilization, 100 million using IUDs, 65 million using oral contraceptives, and 45 million using condoms. Yet for the couple who want no more children, vasectomy offers a simple procedure, effectiveness, permanent protection, convenience, little risk of complications, no long-term effect on the man's health or sexual performance, and no health risks for his wife.

The authors suggest that low levels of use may not lie, as is often supposed, in men's irresponsible attitudes toward the problem of unwanted pregnancy "but rather in policy-makers' and providers' lack of attention to vasectomy—and sometimes even prejudices against it" (p.2). Where high-quality vasectomy services are offered, they attract clients.

Conventional vasectomy requires one or two small incisions in the scrotum. A new no-scalpel technique substitutes a tiny puncture for the incisions and results in "little or no bleeding, fewer infections, fewer buildups of blood under the skin (hematomas), less postoperative pain, and contraception that is just as effective" (p. 2).

The report recommends that vasectomy services be made convenient for men by being offered where men are and when they can use the services; that they be offered in facilities where men feel comfortable; and that they be provided by well-trained staff and supported by good counseling to enable men to make an informed choice.

CENSUS REPORTS

The following census reports are available from countries in the region.

People's Republic of China:

10 Percent Sampling Tabulation on the 1990 Population Census of the People's Republic of China by China Statistical Publishing House. Beijing: China Statistical Publishing House, 1991. (In Chinese.) ii, 708 pp. (cloth). ISBN 7-5037-0630-9/C-377; 60 yuan in China, 350 yuan elsewhere. Available from China Statistical Publishing House, 38 Yuetan Nanjie, Sanlihe, Beijing, People's Republic of China. Also available on tape and diskette.

This first volume of tabulations from China's 1990 population census, summarizing data from a 10% sample, contains more than 100 tables providing basic descriptive statistics on population size by province, rural–urban distribution, and population characteristics such as age, marital status, ethnicity, education level, and occupation. Additional tables present statistics on household composition, fertility, and migration. The census data on migration should be of special interest because new questions shedding light on intra- and inter-provincial migration and on reasons for migrating were included in the census during the 1990 round.

According to these new figures, as of the census date (1 July 1990), China's total population was 1,131,876,050. The total fertility rate for the country as a whole was 2.253. The differential effects of the family planning policy are evident in a broad range of total fertility rates for the provinces, from a low of 1.332 in Beijing to a high of 4.222 in the province of Tibet.

Federated States of Micronesia:

Kosrae State 1986 Census Report by the Division of Statistics, Office of Planning and Statistics, Pohnpei. Kolonia, 1989. xvi, 110 pp. (paper). Available from Division of Statistics, Office of Planning and Statistics, Kolonia, Pohnpei, Eastern Caroline Islands 96941.

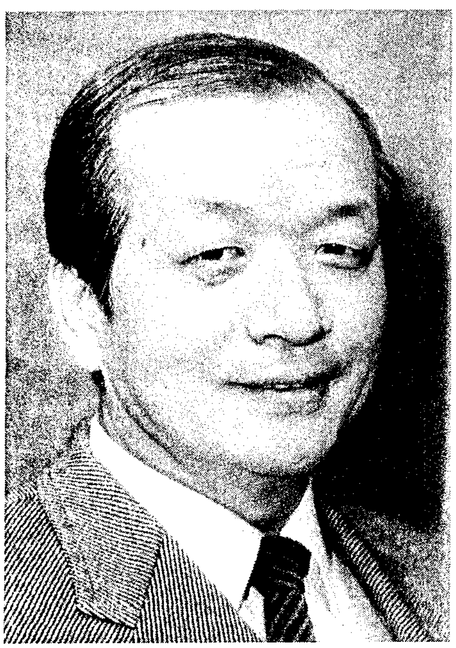
The report describes the population characteristics of Kosrae State, the second largest island in the Federated States of Micronesia. The census taken on 15 September 1986 was the first to deal exclusively with Kosrae since Kosrae separated from Pohnpei in 1977 and is the second in the round of censuses conducted throughout the Federated States of Micronesia (FSM). The FSM national government and the Kosrae State government worked together on the census.

(continued on page 27)

Activities and Announcements

Lee-Jay Cho to Leave Population Institute and Head Northeast Asia Program for East-West Center

Dr. Lee-Jay Cho, 56, vice president for academic affairs at the East-West Center since 1987 and director of the Center's Population Institute since 1974, assumed a new Center post as vice president for program development on 22 April 1992 and announced his intention to resign the institute directorship as of 1 July. During the next two years Cho will be free of administrative and research duties so that he can devote his time to developing a new program focusing on economic development and cooperation in Northeast Asia, a topic on which he has already spent much effort.


DEBORAH BOOKER

Lee-Jay Cho, director of the Population Institute and former vice president for academic affairs of the East-West Center, has been named vice president for program development and will head a new program focusing on development in Northeast Asia.

The Center's new president, Dr. Michel Oksenberg, stated in a letter to Cho that he expected Cho to have successfully developed and launched the new program within two years, "having garnered external support to sustain the bulk of this program," after which Cho would remain as vice president for program development and become director of the new program. Oksenberg also stated that Cho will have the additional title of senior advisor to the president.

Oksenberg noted his own and Cho's common desire to make the world a safer place and pledged his best efforts to assist Cho. Acknowledging Cho's contributions to the Center over the past two decades, Oksenberg stated that "in many ways you are the Center."

Oksenberg appointed Dr. Bruce Koppel, interim director of the Institute of Economic Development and Policy, as interim vice president of academic affairs. A new director of the Population Institute has not yet been named.

Robert C. Schmitt, State Statistician for Hawaii, Retires

Robert C. Schmitt, 70, Hawaii's state statistician for more than 35 years and "a walking encyclopedia," according to a columnist for one of


CHARLES OKAMURA, HONOLULU ADVERTISER

Bob Schmitt, retiring state statistician, is a fount of information about Hawaii.

Honolulu's leading newspapers, retired from that post at the end of April 1992. Schmitt, who serves on the editorial board of the *Asian and Pacific Population Forum,* has been an invaluable resource to East-West Center researchers, the academic community at large, government officials, the business community, news media, and the public. Cheerfully and with amazing alacrity he has answered literally millions of questions about Hawaii. Schmitt's *Demographic Statistics of Hawaii, 1778–1965* and *Historical Statistics of Hawaii* (both published by the University of Hawaii Press) are widely cited.

When asked what he planned to do after retiring, he replied that he was off to Europe for a few weeks and then would resume work on several writing projects, one of which is a kind of Guinness book of first accomplishments in Hawaii.

International Population Conference Planned by IUSSP for Summer 1993

The International Union for the Scientific Study of Population (IUSSP) will hold the XXIInd International Population Conference in Montreal, Canada, from 24 August to 1 September 1993. The conference will take place under the auspices of the governments and Canada and Quebec and at the invitation of the Federation of Canadian Demographers. The program will consist of three plenary sessions on broad themes and some 50 ordinary sessions on specialized topics. Poster sessions and related meetings will be held in conjunction with the general conference.

The conference will provide a forum for current thinking of the scientific community on population issues and for influencing future directions in the population field. The sessions will deal with such topics as population in the twenty-first century, the relationship between population and the environment, health and mortality, population aging, fertility and the status of women, international migration, population policies, labor markets, minorities, HIV transmission and AIDS, and data collection and methodology.

The conference will be open to all interested individuals. It is not necessary to be member of the IUSSP to participate or to submit a paper for presentation at the conference. For authors wishing to have their papers considered for publication, the deadline for submission to the session organizers is 31 August 1992; and for authors wishing to contribute papers at a later stage, the deadline is 30 June 1993.

For more information, contact:

Bruno Remiche, Executive Secretary
IUSSP
rue des Augustin, 34
4000 Liège, Belgium
(Fax: 041 22–38–47)

India's Population Likely to Reach One Billion by Century's End

The 1991 Indian census recorded a population of 844,324,222 and an average annual growth rate for the 1981–91 decade of 2.1%, according to Amulya Ratna Nanda, registrar-general and census commissioner of India, who presented a summary of the census results to staff of the East-West Center's Population Institute during a visit in January. India currently accounts for 16.0% of the world's population (as compared with China's 21.6% and Africa's 12.1%). By the year 2000, Nanda stated, India's population will pass the one billion level, and by 2041 it is projected to reach 1.5 billion. Between 2030 and 2040, India will overtake China as the world's most populous country.

The Indian government had hoped to bring down the country's net reproduction rate to 1, or replacement level, by the year 2001, but now expects a delay of another 10 to 15 years. High growth rates in eastern India are due in part to immigration from neighboring Bangladesh.

Urbanization has slowed somewhat since the 1981 census, from an annual rate of 4.6% to 3.6%. The urban population grew from 23.3% to 25.7% of the total population during the intercensal period. India now has 23 cities with populations of 1 million or more, their combined population totaling 73 million. Five megacities each have populations of 5 million or more. Despite the rapid growth of cities, more than 627 million Indians continue to live in rural areas.

The ratio of females to males, historically low in India, fell again between 1981 and 1991, from about 935 to 929 females per 1,000 males. The causes are not fully understood.

In past censuses women's economically productive work has not been adequately reported. During the 1991 census the Indian government made a special effort to publicize the importance of women's work, and this led to better figures on women's labor force participation, Nanda said. In response to a question about contraceptive prevalence, he stated that about 45% of married women of reproductive age now use some form of birth control.

Nanda spent January 18–20 as a visiting fellow at the East-West Center's Population Institute to confer with institute staff about collaborative research on India's population involving the Office of the Registrar General and the institute. The project is supported by a grant from the U.S. Agency for International Development. □

Population Aging . . .

(continued from page 4)

use of health services. A higher percentage of children under age 5 used the services did than any of the elderly age groups, and the percentage of children in the 5–9 age group who used a service slightly exceeded that of the elderly population overall during the reference period. Women, both in the population at large and in the elderly age groups, were somewhat more likely to have used a health service than were men.

Although proportionately more children than elderly had used health services during the reference period, the elderly were the most likely age group to have been hospitalized. They were almost twice as likely to have been inpatients than was the general population (9% versus 5%). Among the elderly themselves, however, no distinct age pattern of hospitalization is evident from the survey data. Of those hospitalized, 46% of persons 60+ years old had been hospitalized for more than one week, compared with only 55% of those aged 75+. Again, limited mobility and higher mortality among the oldest group may account for the lack of a clearer positive association between age and hospital admissions at the older ages.

Regardless of age group, the vast majority of Thais who were hospitalized depended on government facilities. Use of government hospitals was somewhat lower among the elderly, however, than among the population at large (88% and 90%, respectively). Gender differences in the use of health services were small.

Nine percent of the elderly had recently been hospitalized, compared with 5% of the general population, according to the 1986 Health and Welfare Survey. Regardless of age group, the vast majority of those hospitalized depended upon government facilities.

Projected population size and age structure

Although the absolute size of Thailand's elderly population has grown substantially over the recent past, the age structure has changed only modestly, with the proportion of elderly remaining low. According to United Nations estimates, the share of the total population in the 60+ age group increased from 4.8% to only 5.4% between 1950 and 1980 (UN 1991a). Given the rapid decline in fertility that has taken place over the past two and a half decades, however, the age structure will undergo major changes in the future. If fertility remains low, not only will the absolute numbers of elderly continue to rise but so will their relative share of the population.

As of 1980 Thailand's age structure resembled fairly closely that of the world's less developed regions, where only 6% of the total population was in the 60+ age group. But Thailand has been experiencing unusually rapid growth of its elderly population segment in comparison with other less developed countries. During the 1970s its elderly population grew by 3.9% per year, while in the less developed regions as a whole the elderly population grew by 2.7% annually.

Assessing the population prospects for all countries in 1990, the United Nations produced alternative population projections to the year 2020 based on high, medium, and low assumptions about the course of fertility, a single set of mortality assumptions, and the as-

JOHN KNODEL

Thailand's elderly population segment is growing much more rapidly than that of most developing countries. Here a village elder practices a traditional Thai instrument in preparation for a festival in Chainat Province.

sumption of no international migration (United Nations 1991a, 1991b). The results of the projections for Thailand, incorporating the medium fertility variant, are summarized in Table 2 for selected years. The medium fertility variant assumes that fertility will level off at approximately the replacement level by the first half of the 1990s. Given that fertility in several other Asian countries has already fallen below the replacement level, the medium variant projection is probably conservative from the standpoint of anticipating population aging.

By the year 2010 Thailand's population is projected to increase by a little more than 50% over that of 1980, but during the same 30 years the elderly share of the population is projected to increase by 167%. By the year 2020 the growth in the 60+ population will exceed 300% whereas the total population will have increased by just two-thirds. Among the 75+ age group the proportionate increase will be even higher than among the 60+ population as a whole.

Between 1980 and 2020 Thailand's population is projected to increase by two-thirds, but the 60+ age groups will triple in number and their share of the total will rise from 5% to 13%.

Table 2. Projected trends in selected demographic measures of the elderly population in Thailand, based on United Nations projections, 1980–2020

	1980	1990	2000	2010	2020
Assumptions[a]					
TFR[b]		2.60	2.11	2.07	2.07
e_0, male		63.0	66.6	69.1	71.3
e_0, female		67.1	70.6	73.7	76.0
Population (thousands)					
Total	46,718	55,702	63,670	71,594	78,118
60+	2,527	3,453	4,928	6,737	10,258
65+	1,649	2,175	3,173	4,429	6,538
75+	484	671	925	1,427	2,020
% increase over 1980					
Total	19	36	53	67	
60+	37	95	167	306	
65+	32	92	169	296	
75+	39	91	195	317	
% of total population					
60+	5.4	6.2	7.7	9.4	13.1
65+	3.5	3.9	5.0	6.2	8.4
75+	1.0	1.2	1.4	2.0	2.6
Population 75+ as % of					
60+	19.2	19.4	18.8	21.2	19.7
65+	29.4	30.9	29.2	32.2	30.9
Men per 100 women					
60+	83	83	84	83	85
65+	78	78	80	80	80
75+	71	67	68	66	67

Source: Calculated from data provided in United Nations (1991a, 1991b).
a. Assumption refers to the five-year period prior to the date shown.
b. Medium variant of total fertility rate (TFR).

The disproportionately large increases projected for the elderly mean that their share of the total population will grow—from 5% in 1980 to 9% by 2010 and to 13% by 2020 for the elderly age group at large. Thus the Thai population will become noticeably older in the next few decades if fertility remains low and mortality continues to improve. The elderly population itself will age somewhat, persons 75+ representing a slightly larger percentage of the 60+ age span in the future.

The sex ratio of the elderly (males per 100 females) is projected to change little over the projection period, the deficit of men persisting at about the same level. The "feminization" of the elderly population that has been observed in many of the economically more developed countries does not appear to be an emerging phenomenon in Thailand, at least as implied by the UN projections.

Implications of an aging population for hospital demand

In view of the elderly population's disproportionate use of hospital services documented by the 1986 Health and Welfare Survey, the projected increase in the absolute and relative numbers of elderly persons in Thailand's population has important implications for the extent and pattern of demand for in-patient hospital care. A simple exercise illustrates just how profound these implications are.

From the survey data it is possible to estimate the number of days per person spent in a hospital during 1986 for each age group of the population.[1] If we assume that these age-specific levels of hospitalization will remain constant, the total number of days spent in hospitals can be estimated for future years by multiplying these rates by the projected number of persons in each age group. Table 3 presents the results of such an exercise, comparing the situation in 1990 with that estimated for 30 years later. (The calculations are based on the medium fertility variant of the latest UN projections for Thailand.) Although we made the calculations for each five-year age group, for ease of presentation we show only the broader age groups in Table 3.

Table 3. Projected number of days spent in hospitals, by age, based on 1986 hospitalization rates and the 1990 United Nations medium-variant population projections

Age	Days in hospitals (10,000s)		% distribution of days in hospitals		% change,	% of total change accounted for
	1990	2020	1990	2020	1990–2020	by age group
0–14	457	438	18	10	–4	–1
15–39	1,039	1,209	41	27	+16	9
40–59	592	1,545	23	34	+161	48
60+	451	1,337	18	30	+196	45
Total	2,539	4,529	100	100	+78	100

Given the substantially greater proportionate increase anticipated in the number of elderly compared with the rest of the population and the fact that the elderly tend to spend more days per person in hospitals, the number of days spent in hospitals will increase almost twice as much as the total population. Overall the population is projected to increase by 40% between 1990 and 2020 (see Table 2), but the number of days spent in hospitals is projected to increase by 78%. In addition, the relative share of hospital use by the various age groups will shift radically. Adults in the 40–59 age group and the elderly (60+) will account for far more of total in-patient care, whereas children of ages 0–14 and younger adults (15–39) will use far less.

Other things being equal, hospital in-patient days will increase by 78% over the projection period while total population grows by only 40%. Growth of the elderly population segment will account for 45% of the rise in in-patient days.

In the case of the 0–14 age group, the absolute number of days

1. The numbers of in-patient days are coded on the data tape for the survey as intervals rather than as exact numbers of days. For the purpose of calculating the average number of days per person, we assigned the values shown in parentheses to the following intervals: 1–7 days (4); 8–14 days (10); 15–28 (21); 29–42 (35); 43–56 (49); 57+ (70); unknown (10). Persons who were not hospitalized were assigned a value of 0 days.

A comparison of the amount of time spent hospitalized in the prior year as reported in the 1986 survey agrees reasonably well with information provided by service statistics collected by the Ministry of Public Health (MOPH) and suggests that the survey provided generally accurate data on this matter. On the basis of the values assigned to the time intervals indicated above, the survey implies 22.7 million in-patient days for the Thai population as a whole during the year prior to the survey (1985–86).

Service statistics on in-patient days for health institutions outside Bangkok that operate under the MOPH are issued in the annual publication series *Public Health Statistics*. Those institutions represented exactly 50% of all health facility beds in Thailand in 1985–86, the other 50% being represented by Bangkok facilities and those provincial private and government facilities not under the jurisdiction of the MOPH. Thus an estimate of total in-patient days for the country as a whole can be derived roughly by doubling the number of in-patient days reported for MOPH institutions outside Bangkok. This calculation produces an annual estimate of 24.7 million in-patient days, or 9% more than implied by the 1986 survey.

We have already noted several reasons for suspecting that the survey data understate the extent of hospital use. The comparison with service statistics suggests that the amount of understatement is rather modest. In any case, it is the accuracy of the age pattern of hospital use rather than the amount of hospital use that is more important for the purpose of the present exercise. Unfortunately, the ages of patients are not available from the service statistics for comparison with the age-specific survey data.

spent in hospitals will actually decline according to these calculations, which reflect the low levels of fertility that are projected during the period under consideration. In contrast, the swelling of the population in the 60+ age group implies an almost 200% increase in the number of days spent in hospitals by the elderly. The growth in the number of the elderly accounts for 45% of the total increase in the number of days spent in hospitals by the entire population, even though that age group accounts for only 30% of the total population growth over the projection period.

Summary and conclusion

The results demonstrate that population aging will increase substantially the need for hospital services beyond the increase that can be expected simply from population growth. As we noted at the outset, the exercise reported here is intended only to illustrate the independent role that population aging will play in hospital-care demand rather than to represent a realistic projection of hospital use in the future. Our underlying assumption that the 1986 age-specific rates of days hospitalized will remain constant was made for heuristic purposes only and ignores other factors likely to affect hospital use.

Both supply and demand factors lead us to expect that age-specific use of health services, including hospitalization, will change in the next few decades. The current rapid spread of HIV infection will undoubtedly put severe new strains on the health care system and alter the age pattern of hospital use as more and more of those infected fall ill (Muecke 1990; Myers and Ashakul 1991). Whereas victims with active AIDS or ARC are likely to increase the rate of hospitalization mainly of younger and middle-aged adults, other factors may reinforce the preeminence of the elderly as hospital patients. For example, increased levels of smoking and alcohol consumption in recent years are likely to result in a rise in the prevalence of chronic illnesses, mainly among the elderly (Chayovan et al. 1990; Preston 1970). Social trends such as urbanization, declining family sizes, and changing proclivities of adult children to be caretakers for ill elderly parents can all influence the demand for in-patient hospital care.

In short, predicting actual demand for hospitalization is a complex task. It seems unlikely, however, that developments in the foreseeable future will alter the basic pattern in which the elderly make disproportionate use of in-patient hospital services and thus the conclusion that population aging itself will contribute in a major way to an increased demand for hospital services. Any planning for the future health care of the Thai population will need to take this reality into account.

ACKNOWLEDGMENTS

This article was prepared at the Institute of Population Studies, Chulalongkorn University, as part of the project The Elderly in Four Asian Countries, coordinated by the Population Studies Center, University of Michigan. We gratefully acknowledge the assistance of the National Statistical Office of Thailand, which made available the raw data tape for the 1986 Survey of Health, Welfare and Use of Traditional Medicine.

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The Conflicting Effects of Delayed Marriage . . .

(continued from page 14)

to lower fertility and lower divorce rates will lead to higher fertility. The net influence of the two marriage variables is difficult to predict because it is impossible to know which trend (rising age at marriage or declining divorce rates) will predominate. Furthermore, until efforts are made to collect more detailed information on why Indonesia's marriage patterns are changing, our ability to make informed comments on future trends will be limited.

ACKNOWLEDGMENTS

This article resulted from cooperative research among the National Family Planning Coordinating Board, Jakarta; the Population Studies Center, Gadjah Mada University, Yogyakarta; and the Population Institute of the East-West Center, Honolulu. Funding from the Office of Population, U.S. Agency for International Development, is gratefully acknowledged. We also thank Terence Hull, Andrew Kantner, Peter McDonald, Karen Mason, Restu Pratiwi, Sandra Ward, and Peter Xenos for helpful comments.

Table 10. Multiple regression parameter estimates and standard errors for estimating number of children ever born, using selected social or demographic characteristics, age at first marriage, number of times married, and the interaction between number of times married and age at first marriage: Ever-married women of ages 25–49, Indonesia, 1987

Variable	df	Parameter estimate	Standard error
Intercept	1	−1.580772*	0.62431370
Urban	1	0.021007	0.05620591
Java or Bali	1	−0.897630*	0.12041697
Outer Islands I	1	−0.173664	0.11269251
Muslim	1	0.090568	0.08890710
Javanese	1	−0.424697*	0.06902243
Sundanese	1	−0.003151	0.08242715
Madurese	1	−1.609693*	0.11138168
Balinese	1	−0.088558	0.18458295
Education	1	−0.008270	0.00554761
Whether worked for money before marriage	1	−0.004672	0.04428378
Primary residence before age 12	1	0.137672*	0.06110189
Current age	1	0.421057*	0.03376918
Current age squared	1	−0.003486*	0.00046287
Age at first marriage	1	−0.218423*	0.00676569
Number of times married	1	−2.084315*	0.24375950
Interaction‡	1	0.069250*	0.01568803
$R^2 = .36, p < .0001$			

* $p < .05$.

‡ Interaction between age at first marriage and number of times married.

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Table 11. Percentage of ever-married women of reproductive age ever using contraception or sterilized, and percentage currently using contraception or sterilized, by age, number of times married, and age at first marriage: Indonesia, 1987

	Percentage, by current age		
Characteristic of women	35–49	25–34	15–24
Ever using contraception or sterilized			
All women	56	72	56
Married only once, first married at ages			
Under 15	47	72	66
15–17	61	76	56
18–20	63	79	54
21 or more	—	52	38
Married more than once, first married at ages			
Under 15	45	62	24
15–17	49	61	38[a]
18–20	52	74[a]	—
21 or more	—	—	—
Currently using contraception or sterlized			
All women	37	53	40
Married only once, first married at ages			
Under 15	28	56	51
15–17	41	56	38
18–20	46	60	41
21 or more	—	42	29
Married more than once, first married at ages			
Under 15	25	42	24
15–17	27	41	38[a]
18–20	33	42[a]	—
21 or more	—	—	—

Note: Percentages based on fewer than 25 cases (indicated by a dash) have been omitted.

a. Percentage based on 50–74 cases.

Reviews and Publication Notes

(continued from page 18)

The report consists of nine chapters describing the census and the Kosrae's population, focusing on its composition, marital status, fertility, mortality, education, economic activity and socioeconomic status, and projected trends. Numerous tables and figures augment the text. The remainder of the report presents 15 basic tables, five technical appendixes, definitions and abbreviations, the census questionnaire, a census base map, and references.

A volcanic island with a total area of only 109.6 km² and 70% of that area unsuitable for development, Kosrae has experienced more rapid population growth in recent decades than the FSM as a whole. The 1986 de facto census recorded a total of 6,607 persons on Kosrae, representing an annual growth rate of 3% since the 1980 de jure census. Mean age of the population was 16.6 years in 1986, indicating a high level of fertility in recent years. But the percentage of the population in the youngest age group (0–4) declined between 1980 and 1986, from 18.5% to 16.8%, suggesting that fertility may be declining. Total fertility rates derived from census data also indicate that the mean number of children per women has fallen, the adjusted figure for 1986 being 5.46.

Pohnpei State 1985 Census Report by the Division of Statistics, Office of Planning and Statistics, Pohnpei State. Kolonia, 1988. xv, 132 pp. (paper). Available from Division of Statistics, Office of Planning and Statistics, Kolonia, Pohnpei State, Eastern Caroline Islands 96941.

The report documents what was initially intended to be a pilot census of Pohnpei State, the first census undertaken by any government of the Federated States of Micronesia, on 15 September 1985. The planned follow-up census in 1986 did not take place, so that the 1985 census became the final census for the decade.

The census recorded a total population of 28,671, representing an exceptionally high 5.2% average annual growth rate over the previous five years. The mean age was 21.7 years. Average household size was 7.1 persons.

The report states that fertility declined in Pohnpei between 1973 and 1985, the total fertility rate dropping from 7.96 to 5.15 children per woman. The number of children born each year continues to rise, however, because the number of women of childbearing age is growing, owing to the high fertility rates that existed until recently.

Infant mortality has fallen only slightly since 1973, from 29.7 deaths per 1,000 infants, to 28.7. Life expectancy at age 1 was 61.9 for females and 58.3 for males.

Republic of Korea:

Preliminary Count of Population and Housing Census As of Nov. 1, 1990 by the National Statistical Office, Republic of Korea. Seoul, 1991. In Korean and English. 189 pp. (paper). Available from National Statistical Office, 90 Kyongun-dong, Chongno-gu, Seoul 110–310, Republic of Korea.

The first part of this report briefly traces the history of census taking in Korea and outlines the organization of the 1990 census. Subsequent sections present preliminary tabulations for the whole country and its provinces, by administrative district.

The total population, according to the preliminary count, was 43,520,199, including 20,525 foreigners, as of midnight on 1 November 1990. Seoul, the capital, had a population of 10,627,790.

The census enumerated a total of 11,357,160 ordinary households and 19,239 institutional households. Ordinary households contained an average of 3.78 members.

Advance Report of 1990 Population and Housing Census Based on Two Percent Sample Tabulation by the National Statistical Office, Republic of Korea. Seoul, 1991. In Korean and English. 121 pp. (paper). Available from National Statistical Office, 90 Kyongun-dong, Chongno-gu, Seoul 110–310, Republic of Korea.

This report presents a description of the basic characteristics of the population, households, and housing units in the Republic of Korea, based on the results of a 2% sample tabulation of the 1990 census. The text contains an outline of the 1990 Population and Housing Census, explanations of terms used in the census, and an outline of the sample design. The remainder of the report consists of statistical tables and appendix tables.

According to the report, the total population at the time of the census was 43,499,674, the number of males exceeding the number of females by 100.77 to 100. One-fourth (25.4%) of the population belonged to the age group under 15; only 5.1% was in the age group of 65+.

Other population characteristics presented in the nine statistical tables on population include school attendance and educational attainment, marital status, migrants, number of own children by age of mother, and the ever-married population by age, sex, and age at first marriage. Six tables focus on household characteristics and four tables describe housing units.

Singapore:

Census of Population 1990: Advance Data Release by Census of Population Office, Department of Statistics, Singapore. Singapore: Department of Statistics, 1991. xviii, 71 pp. ISBN 9971-914-33-6 (paper). Price unknown. Available from SNP Publishers Pte Ltd, Ministry of Trade and Industry, Department of Statistics, 8 Shenton Way No. 10-01, Treasury Building, Singapore 0106, Rep. of Singapore.

This report on Singapore's third census since independence analyzes the main characteristics of the population in 1990 and changes during the last decade. It contains advance information on basic demographic characteristics such as age, sex, citizenship status, ethnic group, and marital status of Singapore citizens and permanent residents based on the complete enumeration. Information on economic and other characteristics of the population such as housing, education, transport, religion, and employment is based on data from a 10% sample of households.

Numerous tables and figures augment the text, which is followed by two appendixes, the first containing 22 statistical tables and the second presenting concepts and definitions.

A few statistics from the 1990 census: The population of Singapore as of 30 June 1990 totaled 3,002,800, of whom 90%, or 2,690,100, were citizens and permanent residents. The total population grew at an average annual growth rate over the previous decade of 2.2%, the resident population (consisting of citizens and permanent residents) grew at 1.7%, and the citizen population grew at 1.6%.

The city-state's ethnic composition remained stable over the decade. Chinese constituted 78% of the resident population, Malays 14%, and Indians 7%.

As a result of declining fertility and increased longevity, the median age of the resident population rose from 24 to 30 years between 1980 and 1990. The proportion of persons 60+ years grew from 8% to 9%. Among the three main ethnic groups, the Malays had the most youthful population (mean age of 26 years) because of their higher fertility; among the Chinese and Indians the mean ages were 31 and 30, respectively.

Average family size shrank from 3.4 children born to resident ever-married women to 2.9 children. Malays still had the largest number of children: 3.4 compared with 2.9 for Chinese and 2.8 for Indians.

The proportion of single persons grew among males and females of all age groups between 25 and 44. Among women, the proportion single rose in the 35-39 age group from 9% to 14% and in the 40-44 age group from 6% to 11%.

Tonga:

Kingdom of Tonga, Population Census 1986 by Statistics Department, Tonga. Nuku'alofa, June 1991. 231 pp. (paper). Available from Statistics Department, P.O. Box 149, Nuku'alofa, Tonga.

This first volume from Tonga's 1986 census presents the main findings, 151 pages of general statistical tables on the population's characteristics, and the household and personal schedules, with instructions to enumerators.

The 1986 census counted all persons who were actually in Tonga on the night of November 28, in contrast to the 1976 *de jure* census. Mapping of census blocks was greatly improved, and for the first time Tonga had its own computing facilities for processing census data.

The questionnaire included new questions and modified some concepts, in particular the measurement of migration, fertility, mortality, and the labor force. For example, a new question on place of usual residence helped to distinguish migrants who had actually changed their usual residence from short-term movers counted away from their usual residence. Although the census did not try to enumerate persons who had migrated overseas, it did ask about countries where respondents had lived for six months or longer to provide insights into return migration.

The census recorded a population of 94,649 and an intercensal growth rate 0.5% per year (indicating a high rate of overseas emigration). More than 67% of the population was enumerated on Tongatapu Island, one of five main islands. Using various demographic techniques to analyze the census data, the Statistics Department estimates the intercensal birth rate at 30.0 births per thousand population per year, the death rate at 6.5 deaths per thousand, the rate of natural increase at 23.5 per thousand, and the net migration rate at 18.5 per thousand. □