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An Evaluation of the Cameroon Fertility Survey 1978

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The World Fertility Survey is an international research programme whose purpose is to assess the current state of human fertility throughout the world. This is being done principally through promoting and supporting nationally representative, internationally comparable, and scientifically designed and conducted sample surveys of fertility behaviour in as many countries as possible.
The WFS is being undertaken, with the collaboration of the United Nations, by the International Statistical Institute in cooperation with the International Union for the Scientific Study of Population. Financial support is provided principally by the United Nations Fund for Population Activities and the United States Agency for International Development.
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An Evaluation of the Cameroon Fertility Survey 1978

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Preface

One of the major objectives of the World Fertility Survey programme is to assist the participating countries in obtaining high quality data through national fertility surveys. The high standards set by the WFS are expected to yield better quality data than typically obtained in the past, but this expectation in no way obviates the need for a detailed assessment of the quality of the data. It is recognized that such an evaluation will not only alert the analysts by identifying defects, if any, in the data, but also throw light on the shortcomings of the WFS approach, which can be taken into account in the design of future fertility surveys.

It is in this context that, as part of its analysis policy, the WFS is conducting a systematic programme for a scientific assessment of the quality of the data from each survey. A series of data evaluation workshops is being organized at the WFS London headquarters with the dual objective of expediting this part of the work and of providing training in techniques of analysis to researchers from the participating countries. Working in close collaboration with WFS staff and consultants, participants from four or five countries evaluate the data from their respective surveys after receiving formal training in the relevant demographic and data processing techniques.

The third such workshop, involving research on four countries – Cameroon, Haiti, Senegal and Tunisia – was held between October 1980 and January 1981. The present document reports on the results of the evaluation of the data of the Cameroon Fertility Survey of 1978 and was prepared by Albert Bioumla, who participated on behalf of Cameroon, in collaboration with Gigi Santow. Camille Tardieu, Lamine Gueye and Hedi Jemai, the other participants, contributed to the present evaluation through their ideas and discussions.

Dr Shea Oscar Rutstein, as the co-ordinator of the workshop, assumed a major responsibility in the successful completion of the work, while many other staff members also made significant contributions to it. Benoît Ferry and Maryse Hodgson provided much valuable assistance.

HALVOR GILLE
Project Director

Technical Note

During the preparatory phase of the work for this report an imputation error was discovered in the method of calculating age in the household survey when year, but not month, of birth was stated. This affected individual ages by no more than one year, but had a marked effect on the single-year (and even five-year) age distribution since one-third of all ages in the household survey were recorded only as year of birth. In exact terms, the age distribution showed artificial spikes every twelve years from age six onward.

For this reason all tabulations on the household data were prepared especially for this report, using an amended algorithm for the calculation of age. Comparison with household tabulations presented in the First Country Report reveal clear differences between the age distributions, but only slight differences between age-related measures.

Tabulations from the individual survey which were presented in the First Country Report are of course unaffected by these observations and, indeed, are a useful introduction and companion to the present report.

1 Introduction

The United Republic of Cameroon is situated on the gulf of Guinea on the west coast of Central Africa, and forms a triangle of 465,000 square kilometres between Lake Chad to the north and the Equator to the south. The population of Cameroon was assessed in the national census of 1976 to be approximately 7.7 million people, giving a density of 16.5 people per square kilometre. This population is growing at an average annual rate of 2.4 per cent. Nearly three-quarters of the population live in rural areas and the economy is thus predominantly agricultural. Illiteracy is common, the recent census indicates that 53 per cent of the people aged ten years and older are illiterate.

The Cameroon Fertility Survey (CFS) was conducted in 1978 under the auspices of the Ministry of Finance and Planning of the United Republic of Cameroon in co-operation with the World Fertility Survey. Details of sampling and questionnaire content are described at some length in the First Country Report (Ministère de l'Economie et du Plan 1983). In summary, basic demographic information was obtained from nearly 38,000 households, representing a *de facto* population of about 176,000 people, or just under 2.5 per cent of the national population (Ministère de l'Economie et du Plan 1978). Slightly more than 8000 women between the ages of 15 and 54 years in selected households answered questions on marriage, fertility and fertility regulation, child death and socio-economic characteristics. The survey was the first nationwide, detailed fertility survey conducted in Cameroon, and is thus of particular interest to planners and demographers.

In this report we analyse the quality of the data reporting in Cameroon, and attempt to derive 'best' estimates of current fertility and child mortality. The external data most frequently used here for comparative purposes come from the national census of 1976. (A series of demographic enquiries took place between 1960 and 1965 in different regions of the country, but would be difficult to use as a basis of comparison.) Major comparisons will be made, however, between the findings of the household survey and the fertility survey. For example, indirect estimates of fertility and child mortality obtained from relatively simple questions in the household survey can be compared with direct estimates from reported dates of birth and child death in the fertility survey.

There are several reasons for placing more emphasis on the usefulness of the household survey than has been done in other WFS evaluation reports. First of all, it can be anticipated that many respondents found it difficult to report exact dates of vital events, and it thus becomes important to know whether one can fall back, if necessary, on indirect vital estimates obtained from the household survey. Secondly, Cameroon is a richly diverse country in terms of climate and geography, ethnic and linguistic grouping, religion, educational attainment, and even colonial history. The fertility survey was large, and sampling probabilities were quadrupled in the sparsely populated East, where low fertility was suspected, and doubled in the cities of Yaounde and Douala. Even so, stratification on a number of background variables while controlling for demographic variables such as age may create problems of interpretation. On the other hand, the household survey provides coarser information on 41 000 women aged 15–54 years, and it is important to know just how much use can be made of these data, and whether they can be regarded as a valuable supplement to the finer data collected in the fertility survey.

The Cameroon Fertility Survey provides an opportunity to examine age reporting in some detail. It was known that many respondents would find it hard to report their age, let alone the month and year of their birth (Ware 1977). A number of questions related to age were therefore inserted at various places in the fertility survey and the responses can be compared both for internal consistency and to determine the most likely estimate. Comparisons can then be made with ages obtained from one simple question in the household survey in order to assess the returns from the more detailed questioning.

An important question arises from the First Country Report. It appears both that there is a high degree of primary sterility in Cameroon, and also that fertility has been increasing. In chapter 4 of this report we attempt to find whether the apparent increase in fertility is merely related to a possible decline in primary sterility, or whether fertile women are actually having larger families than previously.

Given the diverse nature of the country some degree of disaggregation is desirable, and this report therefore also presents analyses at the provincial level. It was felt that this was appropriate for an evaluation study because of the obvious implications for regional planning, but the analyses, of course, are not exhaustive. For example, it becomes clear early on that the North has quite distinct patterns of childbearing and primary sterility (and the worst reporting); but we do not attempt to look at the contributions to this picture of the North's religious composition (with less than one-third of the country's population but four-fifths of her Muslims) or educational composition (with nearly half the women in the whole country who have never been to school) or female labour-force participation (with three-fifths of the women who had never worked outside the home).[1] It is hoped that the findings of this evaluation report might stimulate further analyses in which such questions could be answered.

[1] Table 3.17, First Country Report.

2 The Reporting of Age

All usual members of the household were enumerated on the household schedule, and also any visitors who had spent the preceding night in the household. The interviewer asked first to speak to the head of the household, but information could be given by any adults who were not visitors and the interview did not have to be conducted in private.

The age of each person listed on the household schedule was initially sought by asking his year and month of birth. If the month of birth was unknown, year of birth alone was an acceptable answer, but if both month and year were unknown the respondent was asked the individual's age. If there was still no answer, the interviewer was instructed to obtain an estimate of age by comparing the person with

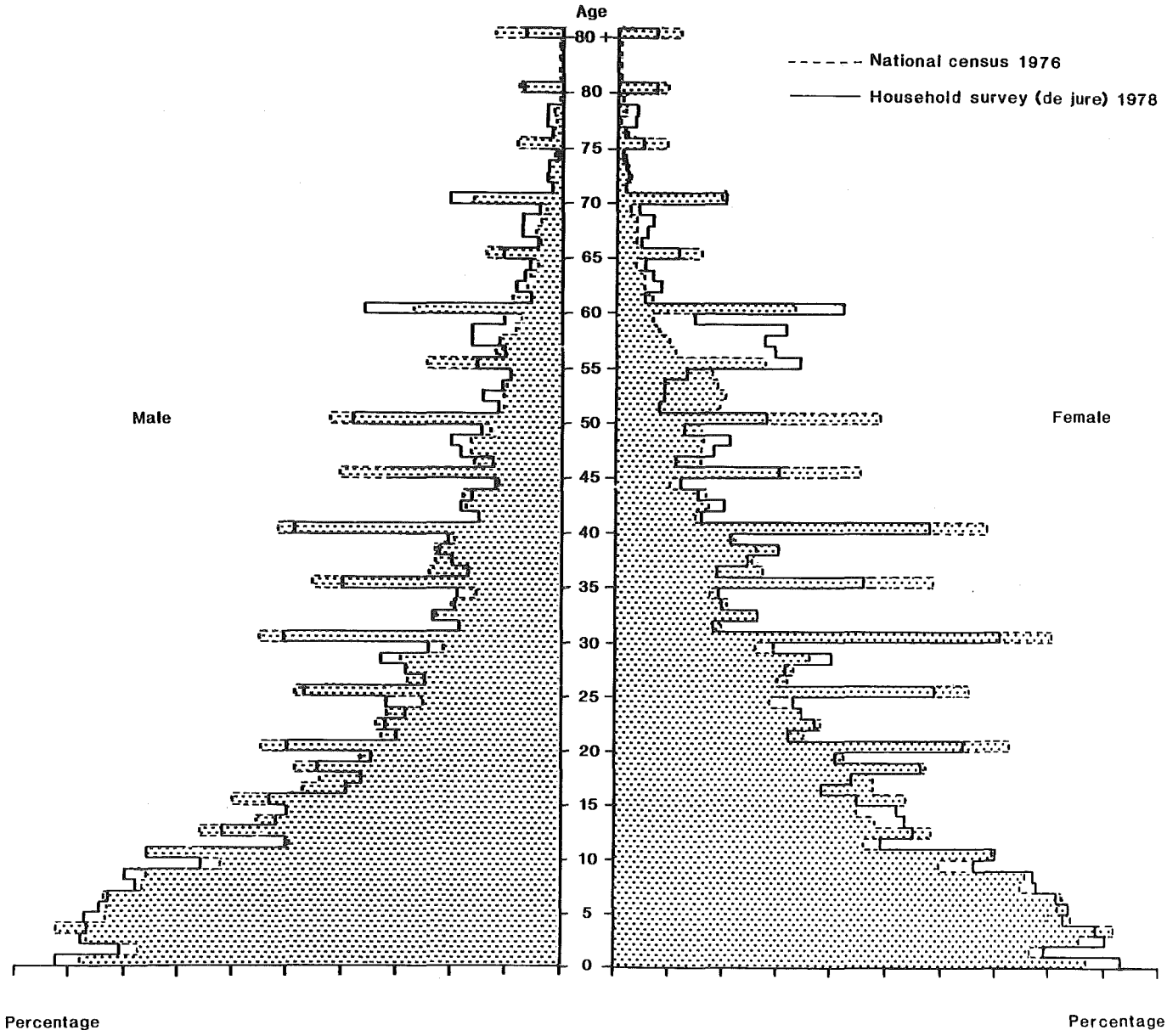

Figure 1 Single-year *de jure* population pyramid, 1978 household survey and 1976 Cameroon census

someone else, perhaps a family member, whose age was known,[2] or by seeking additional information such as age and duration of marriage. Ultimately fewer than 0.2 per cent of persons listed in the household schedules were without any age information at all.

Figure 1 contains a single-year population pyramid obtained from the *de jure* population enumerated in the 1978 household survey. Over this is superimposed a corresponding pyramid obtained from the Cameroon census of 1976. The census data exhibit a deficit of infants and, to a greater extent, one year olds, and an excess of three year olds. This has been explained by suggesting that some parents do not declare small children until they have reached a certain age, or that some children who had been weaned were said to be two years old, although they were actually only one year old (Negadi 1979). In contrast, the household survey exhibits a deficit only of one year olds which, while being less than ideal, is an improvement on the national census.

The figure also shows up a deficit of young and middle-aged men. This is discussed more fully in the First Country Report. For the purposes of this evaluation our attention is focused on data relating to women.

In general the commonest pattern of digit preference or avoidance in age reporting comes about because a person is unable to report age accurately and makes an estimate. This estimate will be made in terms of the basic unit of the person's number system and will lead to over-reporting of terminal digits that are multiples of the divisors of the base of the number system, the greatest concentrations occurring on the largest divisors. With a base-ten number system this implies the greatest heaping on numbers ending in 0, the next greatest on numbers ending in 5, and lesser heaping on even numbers not divisible by 10 or 5. In addition, since even digits 4 and 6 flank the more preferred digit 5, they will attract less heaping than 2 and 8. Work on a number of African censuses generally confirms these patterns of overselection of particular terminal digits, and exceptions to these rules appear to be related to the way in which the age data were sought, and the year in which the census was conducted (Nagi, Stockwell and Snavley 1973).

The Cameroonian data of figure 1 conform to these expectations. Heaping is greatest on terminal digit 0, and then on terminal digit 5, with tertiary heaping on 2 and 8. There is more extreme heaping on multiples of 10 in the census than the household survey, and among ages of women than ages of men. Attraction towards terminal digit 8 is stronger in the household survey than in the census.

The greatest difference between the age distributions occurs among women between the ages of 50 and 60. It is clear that in the household survey a large proportion of women actually aged 50–54 were reported as 55–59. With 54 years as the upper age limit of eligibility for inclusion in the fertility survey it appears that interviewers often shifted borderline age estimates into the higher age group presumably in order to lighten the interviewing load at the next stage of the investigation. (At the lower end of the age range it may be that the lesser avoidance of age nine among female ages than male ages in the household survey came about because the fertility questions in the household schedule were to be applied only to females aged ten and above.)

Table 1 shows the format of age reporting in the household survey according to sex and reported age. Overall, 27 per cent of ages were reported as month and year of birth, 36 per cent as year only, and 37 per cent as

[2] In a small study in the North a sophisticated version of this technique produced slightly better age data than the use of a historical calendar (Gubry 1975).

Table 1 Form of age reporting in the household survey by age and sex

Age	Male				Female			
	Month and year of birth	Year of birth only	Age only	Total	Month and year of birth	Year of birth only	Age only	Total
0–4	57	19	24	100	57	19	24	100
5–9	35	24	41	100	34	24	42	100
10–14	32	27	41	100	33	25	42	100
15–19	35	30	35	100	34	28	37	100
20–24	31	41	28	100	30	36	34	100
25–29	23	48	29	100	18	39	43	100
30–34	15	51	34	100	10	45	45	100
35–39	12	57	31	100	7	54	39	100
40–44	8	56	36	100	4	56	40	100
45–49	5	66	29	100	3	64	33	100
50–54	3	61	36	100	2	63	35	100
55–59	2	74	24	100	–	53	47	100
60–64	1	50	49	100	–	37	63	100
65–69	2	60	38	100	–	47	53	100
70–74	1	28	71	100	–	24	76	100
75+	2	22	76	100	1	22	77	100

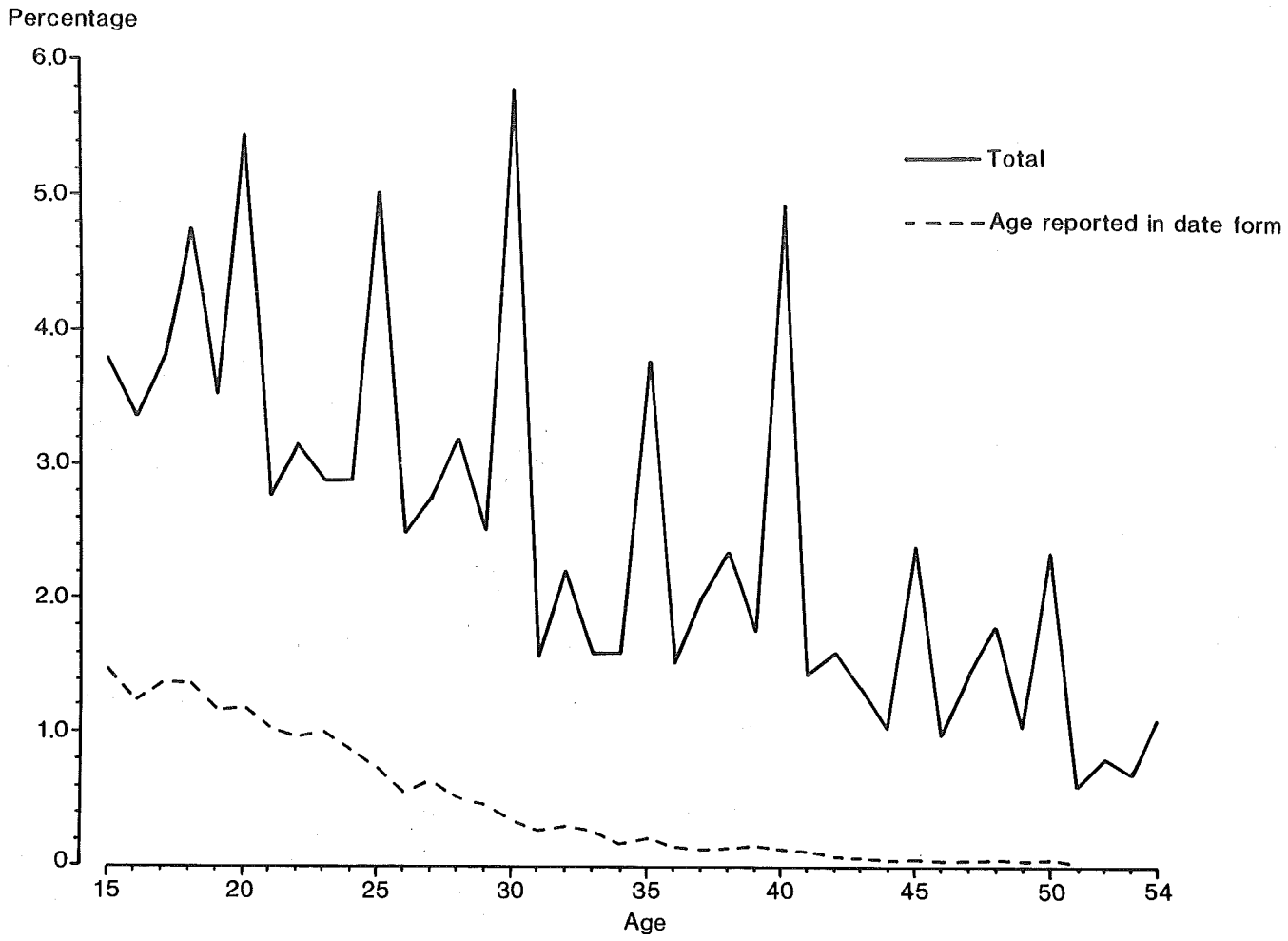

Figure 2 Single-year age distribution of women aged 15–54 by form in which age was reported, household survey

current age. As one would expect, it was much more likely for the ages of the young to be reported in date format and for those of the aged to be reported as current age. There was little variation between the format of reporting of the ages of males and females until the late twenties and early thirties. Current age was more commonly given than year of birth only, for subjects younger than 20, or older than 65 or 70.

Figure 2 indicates that the quality of age reporting is related to its form, with all the jagged irregularities in the single-year age distribution of women aged 15–54 arising from ages reported as year of birth or current age. More generally, and concisely, figure 3 shows the index of attraction to each terminal digit of age, for all ages and both sexes, according to the form in which age was reported. If there were no digital preference the index would be constant at 10 per cent. Higher values indicate attraction to the appropriate digit, while lower values indicate repulsion (Shryock and Siegel 1971).

Among directly reported ages we can confirm an overwhelming tendency to report a multiple of 10. There is also pronounced heaping on the terminal digit 5 and, to a lesser extent, 8 and 2. In contrast, the indices of attraction based on ages reported in date form show almost no variation from the expected value. Those ages reported as year of birth, while only a little less regular than these, do end disproportionately often in the digits 7 and 8. Since the survey took place in 1978, people whose year of birth was given as 1920, say, would be apparently aged 57 or 58 at the time of the interview, depending on the randomly imputed month of birth. It thus appears that some years of birth were themselves estimates, and that the extra provision of a month of birth was a better guarantee of accuracy.

In support of this point, figure 4 depicts the proportionate distribution of year of birth of people whose ages were reported only as year of birth. There is marked heaping on the years 1920, 1930 and 1940 and thus some of the age heaping on terminal digit 8 is caused by an attraction to years of birth terminating in 0. This was reflected also in table 1, where unduly large proportions of ages of males aged 45–49, 55–59 and 65–69 were given as year of birth; these age groups contain the birth years 1940, 1930 and 1920 respectively.

Figure 4 also demonstrates heaping on the years 1938, 1948 and 1958. This indicates that some of the recorded years of birth were derived from rounded ages; that is, that age was originally stated as, say, 30 years, but that what was transcribed on the schedule was a year of birth of 1948.

Table 2 shows the extent of regional variation in the

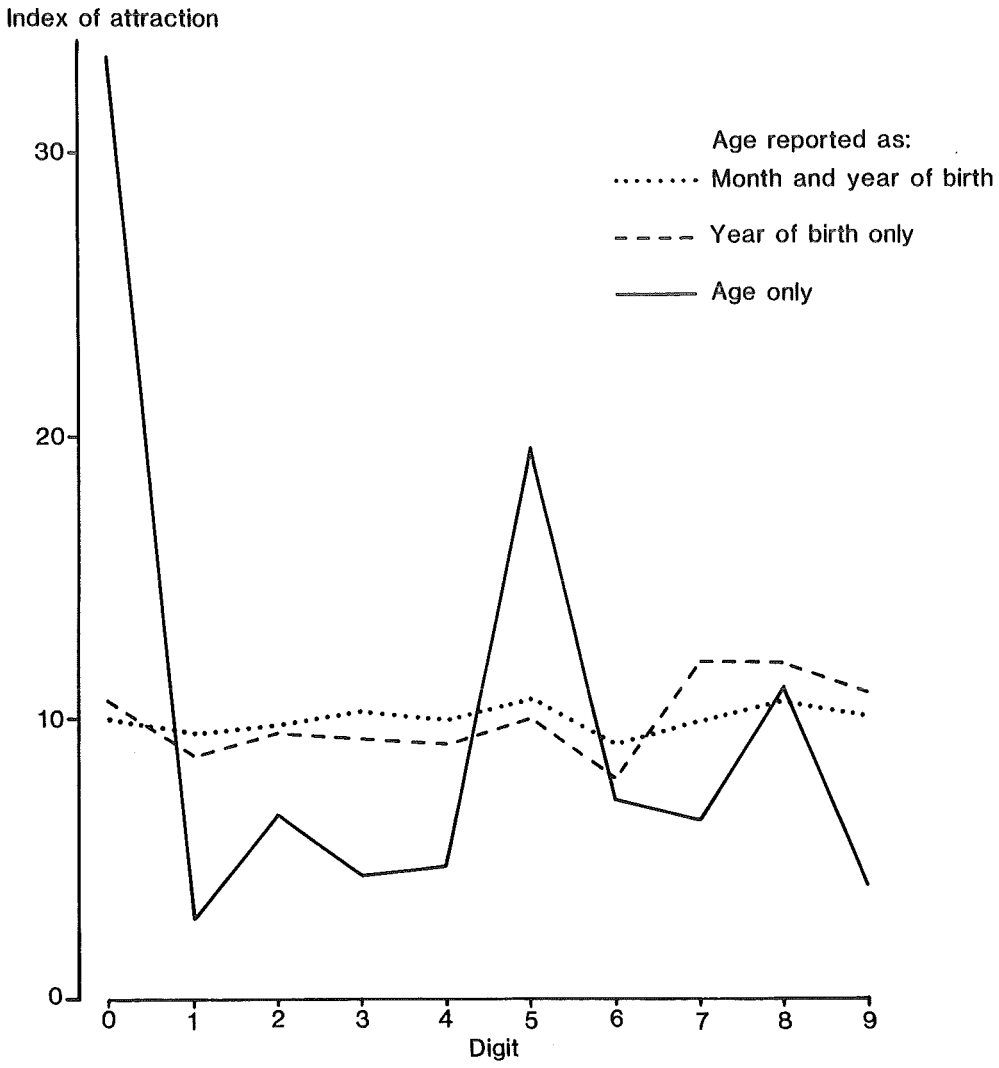

Figure 3 Index of attraction for terminal digits of age, household survey

Table 2 Form of age reporting in the household survey by region and sex

Region	Male				Female			
	Month and year of birth	Year only	Age only	Total	Month and year of birth	Year only	Age only	Total
North	8	28	64	100 (25 023)	7	17	76	100 (26 134)
North-West	11	42	47	100 (10 535)	10	39	51	100 (11 850)
South-West	20	39	41	100 (7 023)	17	36	47	100 (7 171)
West	34	37	29	100 (10 550)	28	44	28	100 (13 151)
East	38	52	10	100 (4 125)	34	55	11	100 (4 274)
Littoral[a]	48	47	5	100 (5 440)	45	49	6	100 (5 440)
Yaounde	51	32	17	100 (3 835)	57	29	14	100 (3 680)
Centre-South[b]	52	43	5	100 (13 184)	50	45	6	100 (3 785)
Douala	59	34	7	100 (5 319)	66	29	5	100 (4 902)
Cameroon	29	37	34	100 (85 033)	26	35	39	100 (90 385)

[a]Excludes Douala.
[b]Excludes Yaounde.

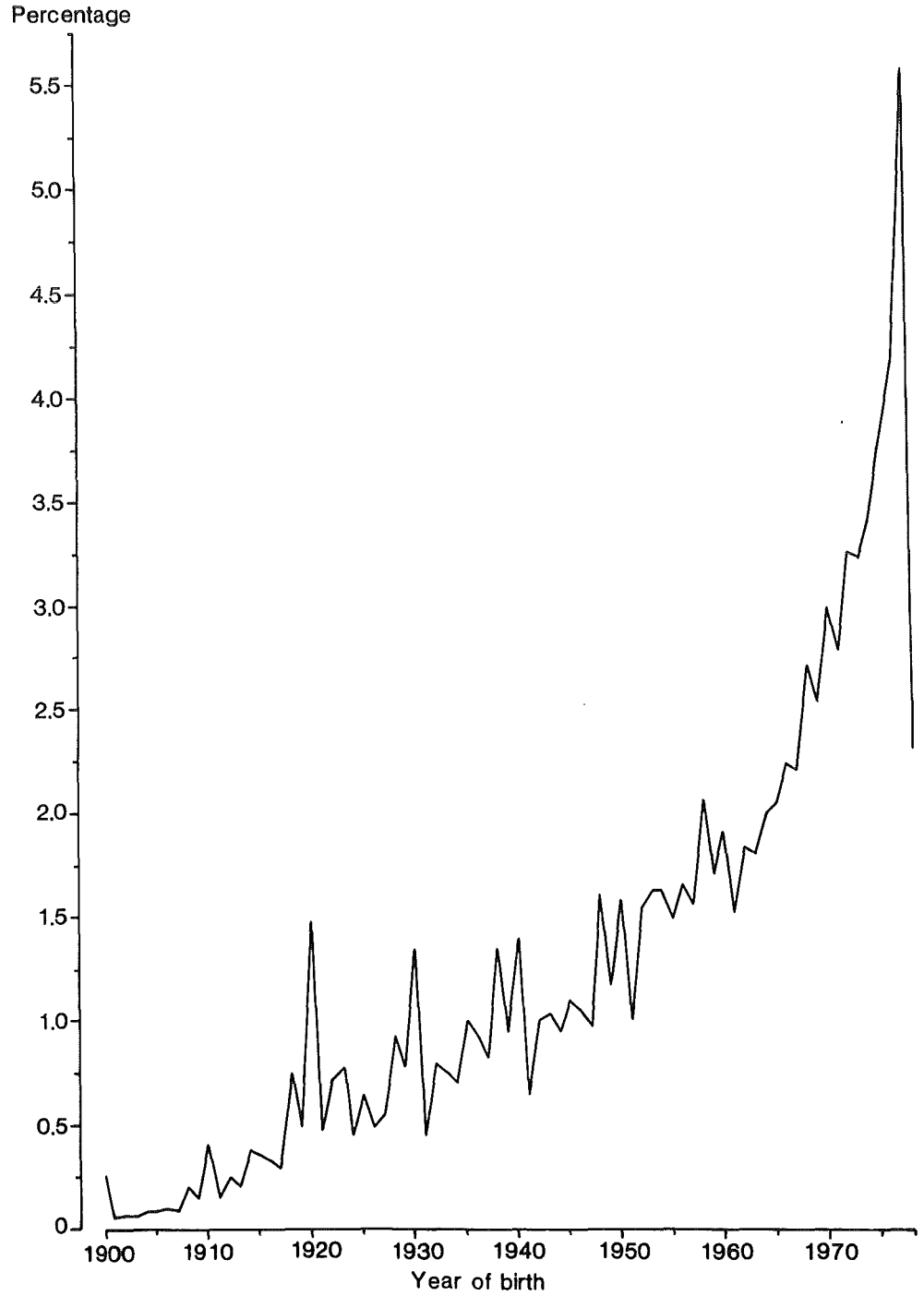

Figure 4 Single-year distribution of year of birth of females whose ages were recorded as year of birth only, household survey

form in which age was reported in the household survey. The regions are arranged in increasing order of the proportion of ages of males which were reported in date form, which rises from a low of 8 per cent in the North to a high of 59 per cent in Douala.

This table should be examined in conjunction with table 3, which presents Myers' indices for each region by sex, ranked from the highest index for male ages to the lowest (Shryock and Siegel 1971). Thus 27 per cent of male ages were misreported in the North, and 4 per cent in the Centre-South. The smaller the proportion of ages reported in date form, the larger the extent of mis-statement, and thus the ordering of the regions in table 3 is similar to that in table 2. Nevertheless, that an age was given as month and year of birth does not absolutely guarantee its accuracy. In the North-West, for example, only 11 per cent of male ages were reported as dates of birth, and 14 per cent of these were misreported, while 52 per cent were reported in date form in the Centre-South but only 3 per cent of these were misreported. In other words, the accuracy of date reporting was related to the proportion of ages which were reported in date form.

The identity of the person who provided information on each woman was noted on the schedule, and it is thus

Table 3 Myers' index according to form of age reporting in the household survey and sex

Region	Male					Female				
	Month and year of birth	Year only	Age only	Total	(Census)[a]	Month and year of birth	Year only	Age only	Total	(Census)[a]
North	8.0	6.1	42.8	27.3	(29.1)	8.3	9.8	36.8	30.9	(33.8)
North-West	13.5	6.5	33.0	19.6	(18.5)	11.6	8.6	31.1	19.6	(21.8)
South-West	10.3	5.8	30.0	13.0	(13.8)	11.3	6.7	29.0	13.1	(15.8)
West	9.0	8.6	28.2	9.6	(10.4)	7.7	8.1	25.4	11.1	(14.5)
Littoral[b]	6.8	8.0	33.5	5.9	(4.9)	2.8	7.4	25.1	6.2	(7.5)
Yaounde[b]	6.3	4.7	18.9	4.7	–	4.9	3.0	20.8	5.4	–
Douala[b]	2.9	5.2	22.7	4.7	–	2.9	4.1	26.3	3.9	–
East	2.3	5.0	22.5	4.3	(7.0)	2.7	7.0	25.2	6.9	(10.0)
Centre-South[b]	2.8	3.9	28.3	4.1	(4.4)	3.5	5.8	32.6	4.9	(7.4)
Cameroon	2.4	4.7	35.9	13.6	(15.0)	2.3	6.5	33.4	15.4	(18.9)

[a]Ministère de l'Economie et du Plan (1978).
[b]Littoral includes Douala and Centre-South includes Yaounde.

possible to determine, among women at least, those ages which were self-reported and those which were reported by another member of the household. This information is given in table 4. Close to 30 per cent of ages of women aged 20 and above were self-reported, and a higher proportion of self-reported ages were given in date form than ages reported by other people in the household. For example, at ages 25–29 25 per cent of self-reported ages but only 16 per cent of ages reported by other people, were given as month and year of birth.

Figure 5 presents the proportionate age distribution of women aged 15–54 in the household survey, and also the distribution of self-reported ages. While there are still concentrations of self-reported ages, primarily on multiples of five, the extent of such heaping, at least among those reporting themselves younger than 30, is less than in the sample as a whole. At the higher ages there is little improvement in the quality of the data.

After the original enumeration, certain households were randomly selected to supply respondents for the fertility survey. Eligible women were identified from the household schedules as women aged 15–54 who slept in a selected household on the night preceding the household survey. The individual questionnaires were applied by a different interviewer from the one who applied the household schedule and on a later occasion, although not very long afterwards.

Table 4 Self-reporting of age, all females, household survey

Age	Percentage in date form		Percentage self-reported
	Of self-reported ages	Of other reported ages	
0–4	0.0	56.9	0.0
5–9	0.0	34.0	0.0
10–14	28.0	33.3	3.8
15–19	40.0	33.2	18.1
20–24	38.8	26.1	27.0
25–29	24.8	15.5	27.4
30–34	16.2	8.4	26.0
35–39	9.3	5.6	27.6
40–44	5.6	3.6	26.6
45–49	4.4	2.8	28.8
50–54	2.7	1.7	30.5
55–59	0.5	0.5	29.3
60+	0.3	0.8	28.0

Great efforts were made in the fertility survey to obtain the best possible age data. One question (Q106) asked the month and year of the respondent's birth, and required that the source of information be noted. Seventy-eight per cent of these ages were directly stated by the respondent, and 18 per cent were taken from an official document. Subsequently Q118 asked specifically whether the respondent possessed an official document containing her name and age, and noted the type of document and the date of birth indicated on it. Only 46 per cent of the respondents possessed such a document, and almost all of these were identification cards or marriage certificates (97 per cent) rather than birth certificates (2 per cent). Q201 sought the respondent's age at first menstruation, and then asked her current age. Much later, in the residence history section, Q620 sought the date of arrival in each place of residence, the first entry being place and date of birth. Further questions sought the date of all marriages or, if not known, how long ago they commenced, while in the pregnancy history the interviewer asked the date of each pregnancy termination or, if not known, the woman's age at termination or how long ago it occurred.

Even at the interview stage it is impossible to view the responses to the various questions on age, or related to age, as independent. For example, the interviewers were provided with a chart on which they entered dates of events occurring in the life of the respondent, such as her date of birth and dates of marriages and pregnancies, and were told of the importance of ensuring that responses were consistent. Subsequently, the data passed through stages of verification, hand-editing in Yaounde (Nkoungourou Ebongue 1979) and London, and machine-editing. For example, after coding and punching, the stated dates of birth of some 5 per cent of women were completely incon-

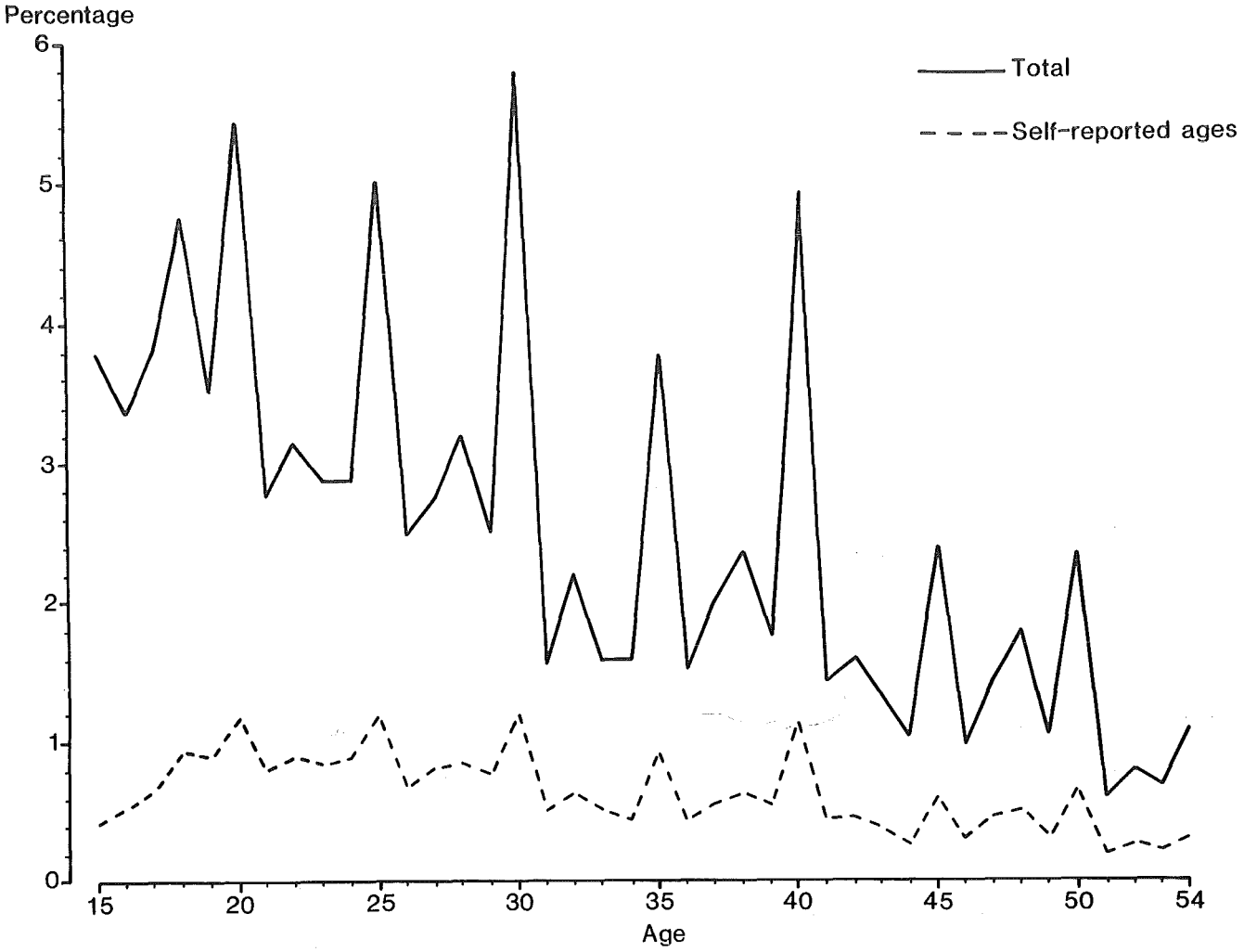

Figure 5 Single-year age distribution of women aged 15–54 by identity of informant, household survey

sistent with their stated ages. These were edited by hand after examining each individual's data, stated year being altered in one-third of cases and stated age in two-thirds. Sixteen per cent of women had a full date of birth which was consistent with their age, and 14 per cent had a full date which became consistent when the stated year of birth was reduced by one; the original error occurred because of naive subtraction of current age from 1978, without taking month of birth – which we assume was correctly reported – into account.

Figure 6 contains a graphical comparison of the proportionate age distributions of women aged 15–54 from the household survey (*de facto*), and the fertility survey. The immediate impression is that the distributions are remarkably similar, but there are nevertheless some subtle differences. The increased emphasis on accurate age reporting in the fertility survey inevitably led to greater urgency for discovering a date of birth. We thus see a subtle change in the pattern of heaping, with slightly smaller peaks on ages ending in 0 and 5, but noticeably greater peaks on ages ending in 8. Compare, for instance, the shifts in concentration on ages 25 and 28, 35 and 38, and 45, 48 and 50. We may likewise compare the two lower curves in figure 6 which show age distributions of women with ages given as month and year. It is clear that proportionately more ages were given in date format in the fertility survey than the household survey. Nevertheless, it is less clear that the date-form age data are any better in the fertility survey than the household survey. Indeed, they show more pronounced peaks on 18, 23 and 28 than do the household ages.

Ages were obtained from a single question in the household schedule which was posed to any resident adult and was largely untestable against other household data (except for rough checks such as, for example, that a fertile female must be at least, say, ten years old). In contrast, the age data we have examined from the fertility survey can be viewed as the end-product of a series of checks and comparisons of related information, of editing for consistency and imputation of missing data within ranges defined by these previous steps. The density of age-related questions in the fertility survey, and these sophisticated procedures of cross-checking and editing, did not obviously improve the age data, at least at the aggregate level. Individual ages may have been reported more precisely; but differences between the age distributions are minor.

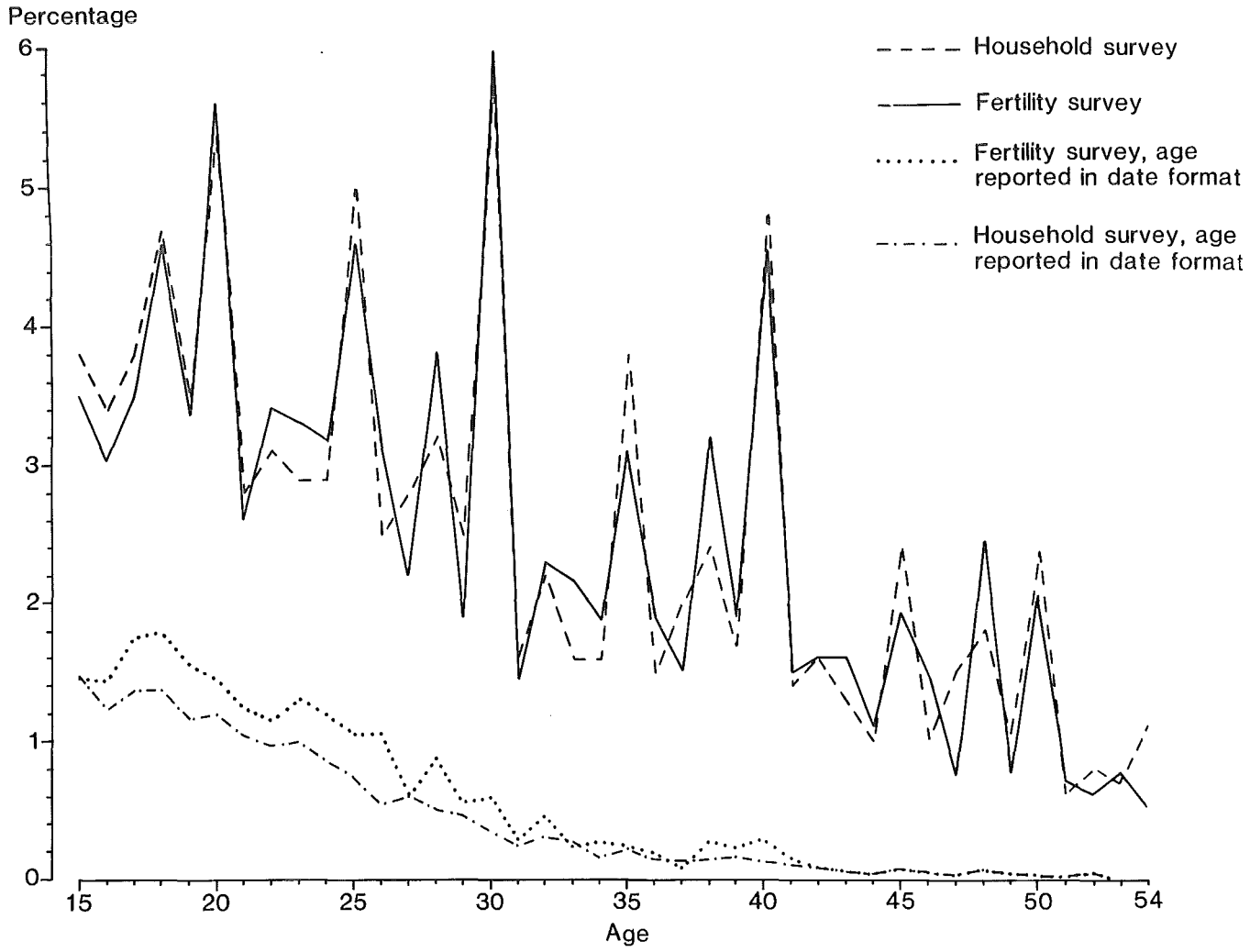

Figure 6 Comparison of single-year age distributions from the household survey and the fertility survey

3 Nuptiality and Exposure to Risk of Childbearing

Since the sample for the fertility survey was determined by considerations of age alone, and not of marital status, the data set is potentially useful for studying marriage patterns. As a convenient starting place, figure 7 depicts the proportionate distribution of ever-married women by age at their first marriage. There is a sharp peak on age 15, and indeed half the respondents reported that they were first married between the ages of 14 and 17 years. There is a slight evidence of avoidance of ages 11, 21, 23 and 27, and slight upturns at ages 10, 20 and 25.

It is in some respects more difficult to evaluate the reasonableness of a distribution of age at first marriage than one of age alone. In the latter, obvious regularities in the pattern of heaping (most strikingly on multiples of ten) made it clear that ages were misreported. The distribution of ages at first marriage, however, is unimodal and it may actually be the case that most women marry at age 15, or only a little later.

The questions used to elicit marriage histories once again put a certain stress on dates. Thus currently married women were asked 'In what month and year did you and your husband begin living together?', with age at the beginning of the current union as an acceptable alternative response. Ever-married women who had been married more than once or were not in union at the time of the survey were asked 'In what month and year did your first (second etc)

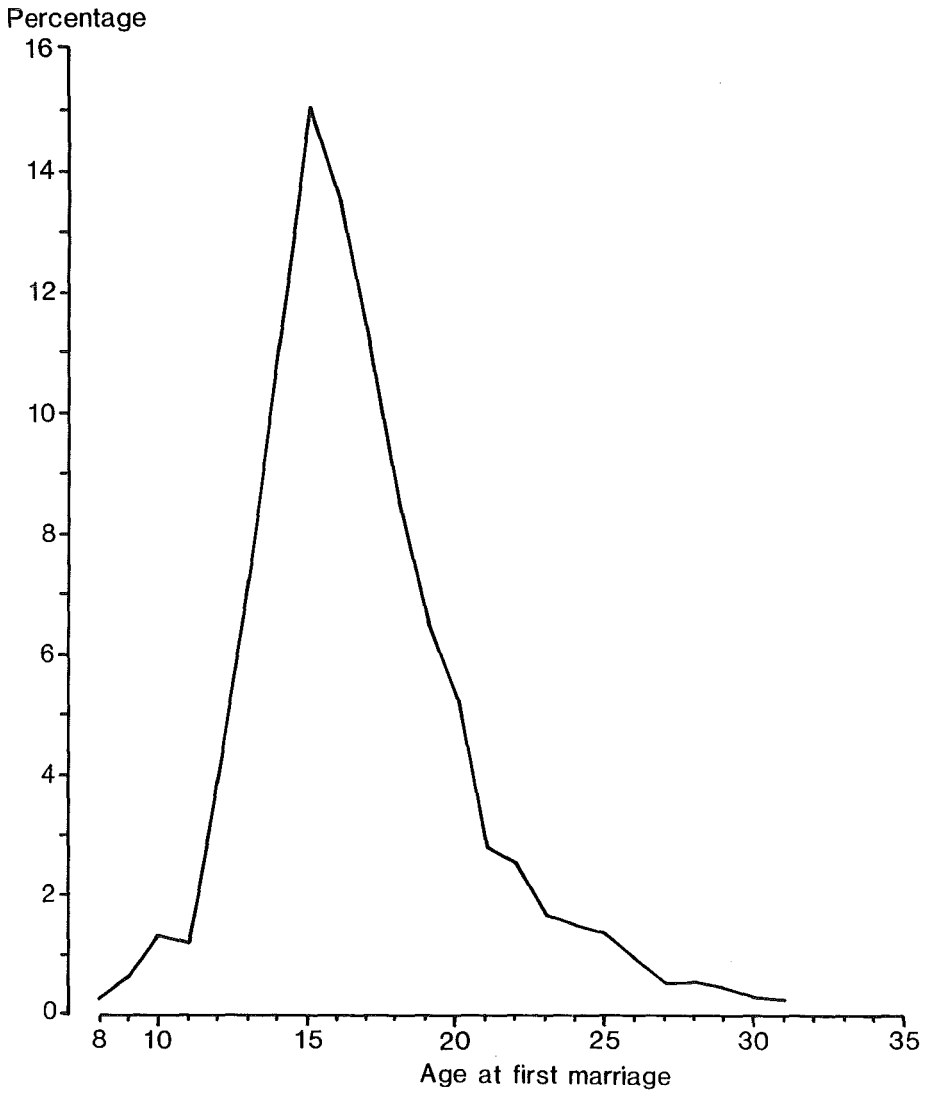

Figure 7 Single-year distribution of ever-married women by age at first marriage, fertility survey

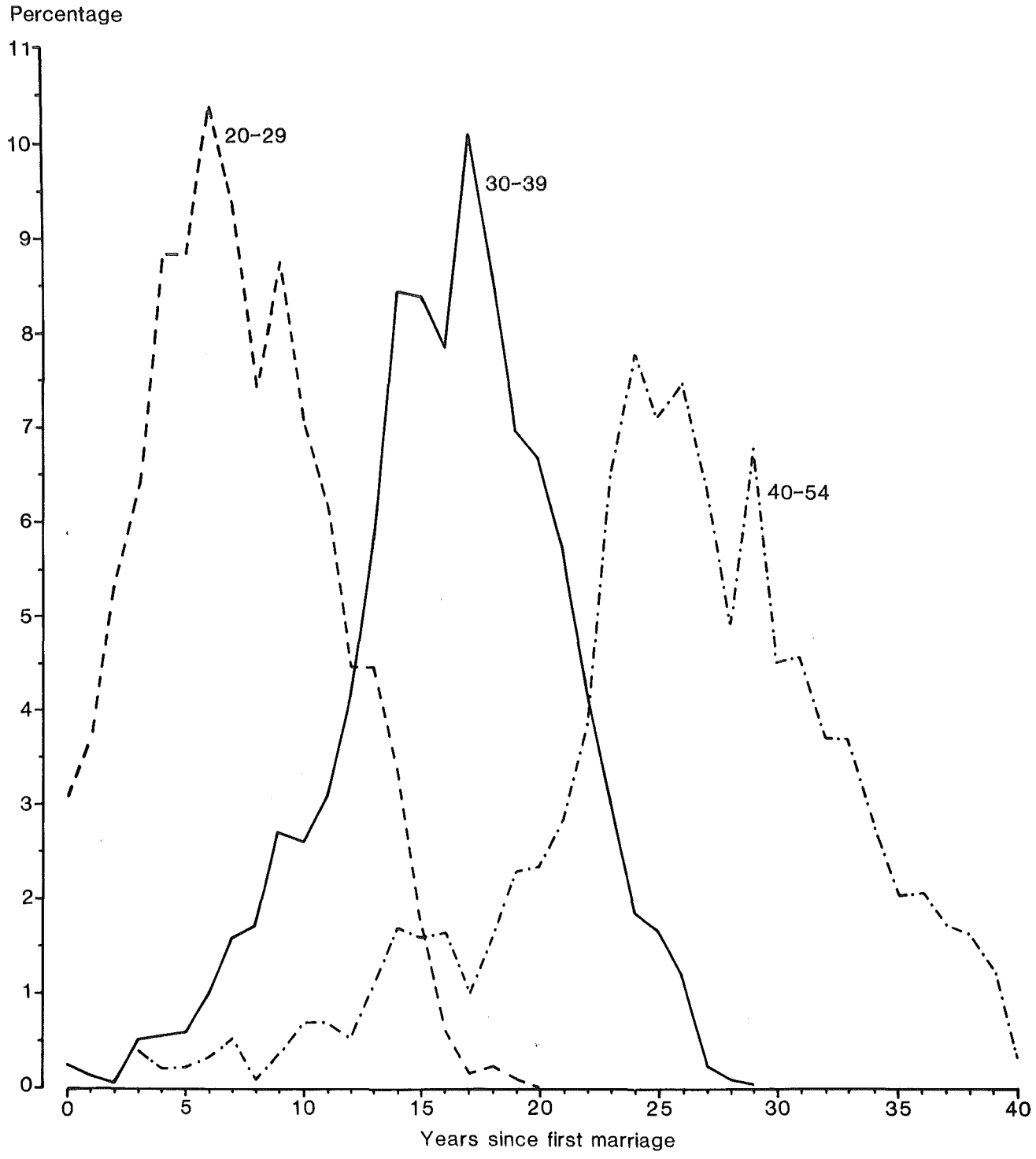

Figure 8 Single-year distribution of marital duration for ever-married women by age at interview, fertility survey

marriage begin?', with a secondary question, if they were unable to answer, of 'How long ago were you married?'.

Respondents experienced similar difficulties in reporting the month and year in which they first married to those encountered in reporting their date of birth. Thus a date of first marriage was given by 26 per cent of ever-married women aged 20–29, by 11 per cent of those aged 30–39 and only 6 per cent of those aged 40–54. Moreover, the forms of reporting were related, in that the 17 per cent of ever-married women who reported a date of first marriage contained 54 per cent of those who reported their month and year of birth, but only 9 per cent of those who reported their age in some other form.

Distributions of ever-married women by marriage duration are similar to age distributions, and may thus prove helpful in detecting patterns of systematic clustering on preferred digits. Three such proportionate distributions are shown in figure 8 and indicate heaping on 4 and 9 among

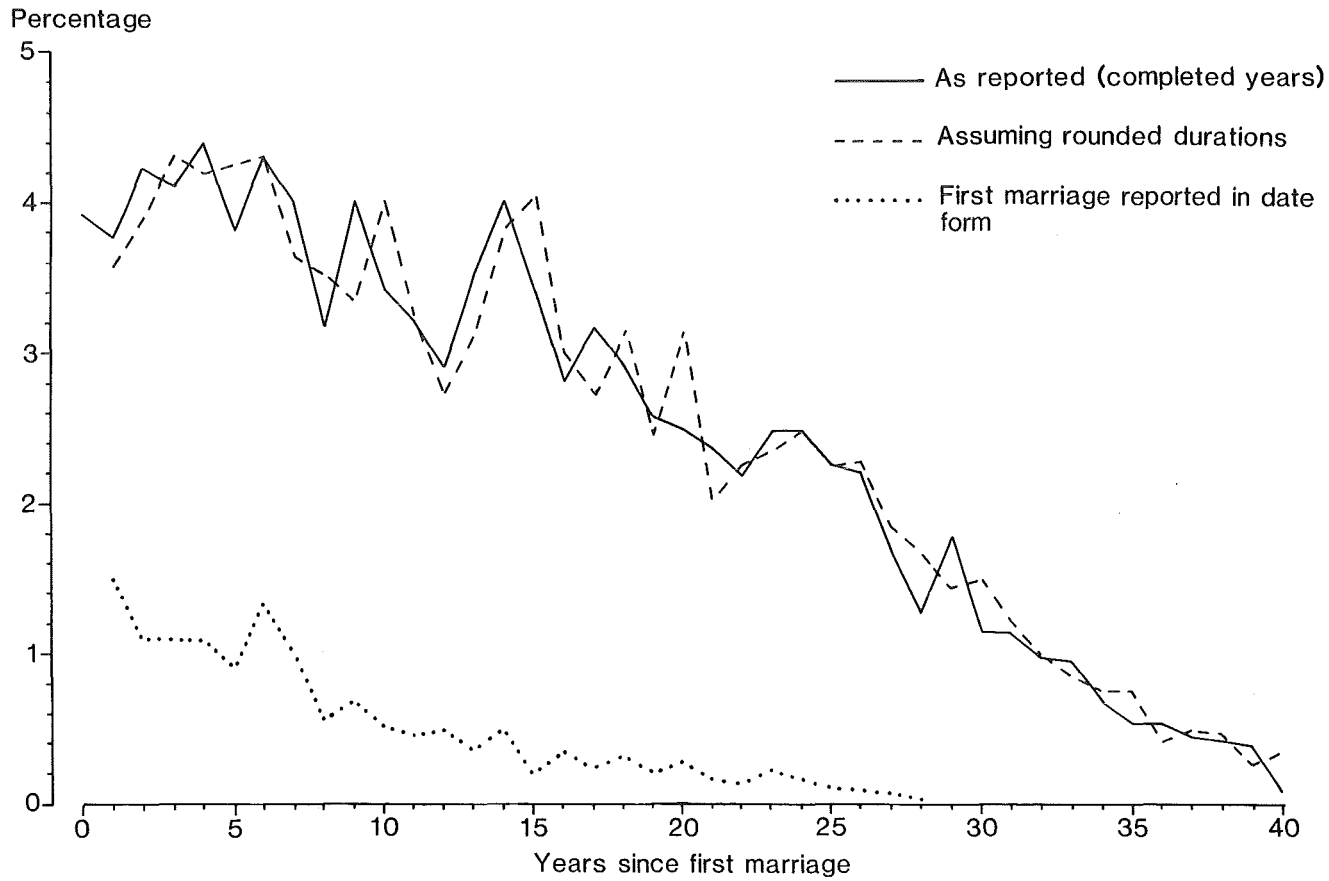

Figure 9 Single-year distribution of marital duration for ever-married women, fertility survey

women aged 20–29, on 9 and 14 among women aged 30–39, and on 14, 19, 24 and 29 among women aged 40–54.

The most probable explanation for this unexpected heaping is that if a woman said she was first married 30 years ago, the interviewer would write down a year of marriage of 1948. At the editing stage it is found that no month of marriage was given, and the imputation program sets up a range from month one to month 12, the average being six completed months. Interviewing actually took place between months one and ten (January and October) 1978, at an average of 4.2 completed months. Taking the average month of interview and the average imputed month of marriage the duration of marriage would be calculated as 29 years. The error in such a situation is twofold. First, the respondent did not know her marriage date and her response of 30 years was in all probability a rounded approximation. Secondly and more seriously, the interviewer transcribed not the respondent's original statement, but the result of a simplistic subtraction from the year of interview.

We cannot make a real adjustment to the date of first marriage because it is not reasonable to assume that every response in the form of year of first marriage was in fact calculated by the interviewer. Nevertheless it is instructive to look at marital duration in a slightly different way, as in figure 9. The adjusted distribution incorporates rounded (rather than completed) marriage durations in those cases in which duration since first marriage was not calculated from a stated date of occurrence.[3] One now observes sharp heaping on 10, 15 and 20 years and a small peak on 30 years, while an additional peak on 18 years (year of marriage 1960) becomes apparent.

Very few women were able to report a date of first marriage, but their contribution is shown by the lower curve on the figure. A single peak occurs on six years, and is apparent even when we restrict our attention to woman who also reported their age in terms of month and year of birth. After the referendum of May 1972 North-West and South-West provinces were reunified with the rest of the country, and Cameroon moved from being a federation to a united republic. While some of the concentration on six years may thus represent attraction to a well-known and popular date of national significance, it is also possible that more marriages than average did indeed take place during the celebrations.[4]

Another useful approach to the analysis of nuptiality is to link marital status and age at interview (Hajnal 1951). Figure 10 compares the proportions of ever-married women at successive ages in the national census of 1976, the household survey and the fertility survey. From age 21 onward the proportions married derived from the household survey are similar to smoothed proportions derived from the national census, although at younger ages they somewhat exceed those from the census. Comparisons with

[3] Related work has been done on the sensitivity of the interpretation of the 'years ago' response to the WFS core question on date of birth as completed years or rounded years (Chidambaram and Pullum 1981).

[4] Personal communication, Mme Njeck, June 1983.

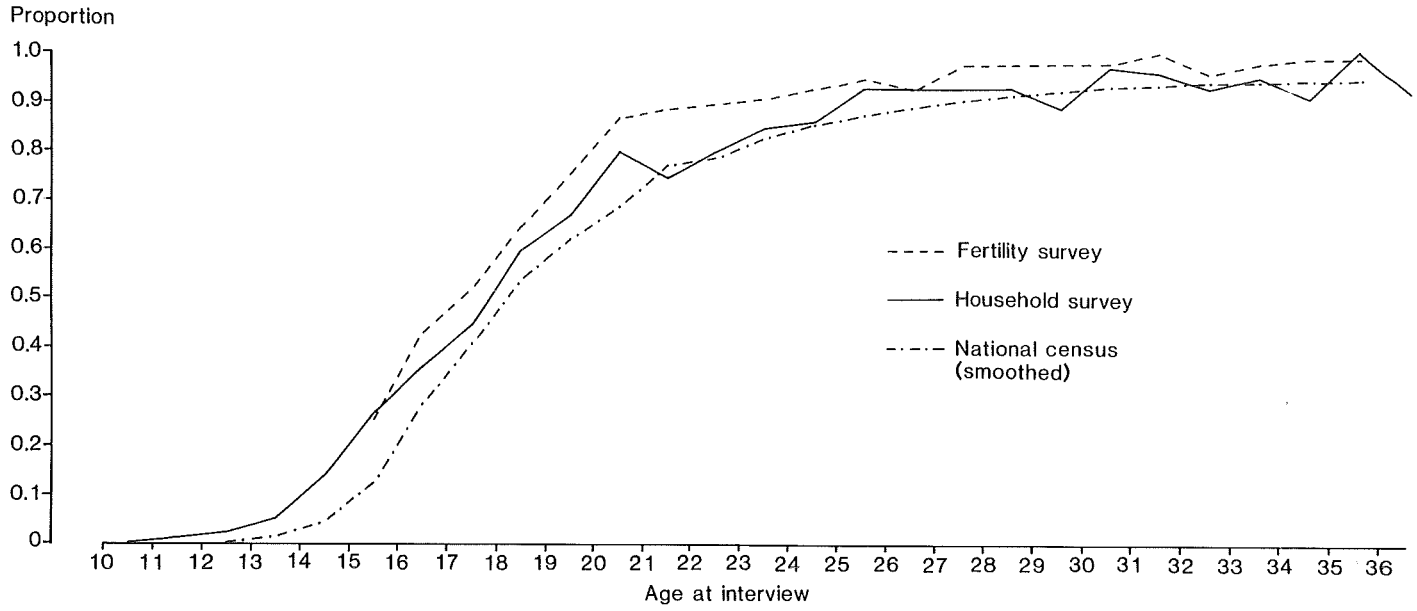

Figure 10 Single-year proportions of ever-married women by age at interview

data from the fertility survey, however, indicate higher proportions again. It is interesting that the household survey identified proportionately more married women than the census since both enquiries employed a similar brief question on marital status. Nevertheless, the results from the fertility survey indicate that more complete reporting results from the application of a series of questions on all marriages.

Figure 11 compares the age-specific proportions of ever-married women obtained from current marital status in the fertility survey with those obtained from the stated ages at first marriage of women aged 30–39 and 40–54. If marriage patterns have been constant (and all women marry before the age of 30) then the three curves should be identical. Indeed, the curve derived from the reported age at first marriage of women aged 30–39 is very similar to the curve based on the current marital status of women aged 15–30 at the time of the survey, an encouraging finding since the curves are based on different types of data obtained from distinct groups of women.

One notable divergence occurs around age 20 where a higher proportion of women reported they were married than were calculated from the reported ages at first marriage of women aged 30–39. It will be remembered from

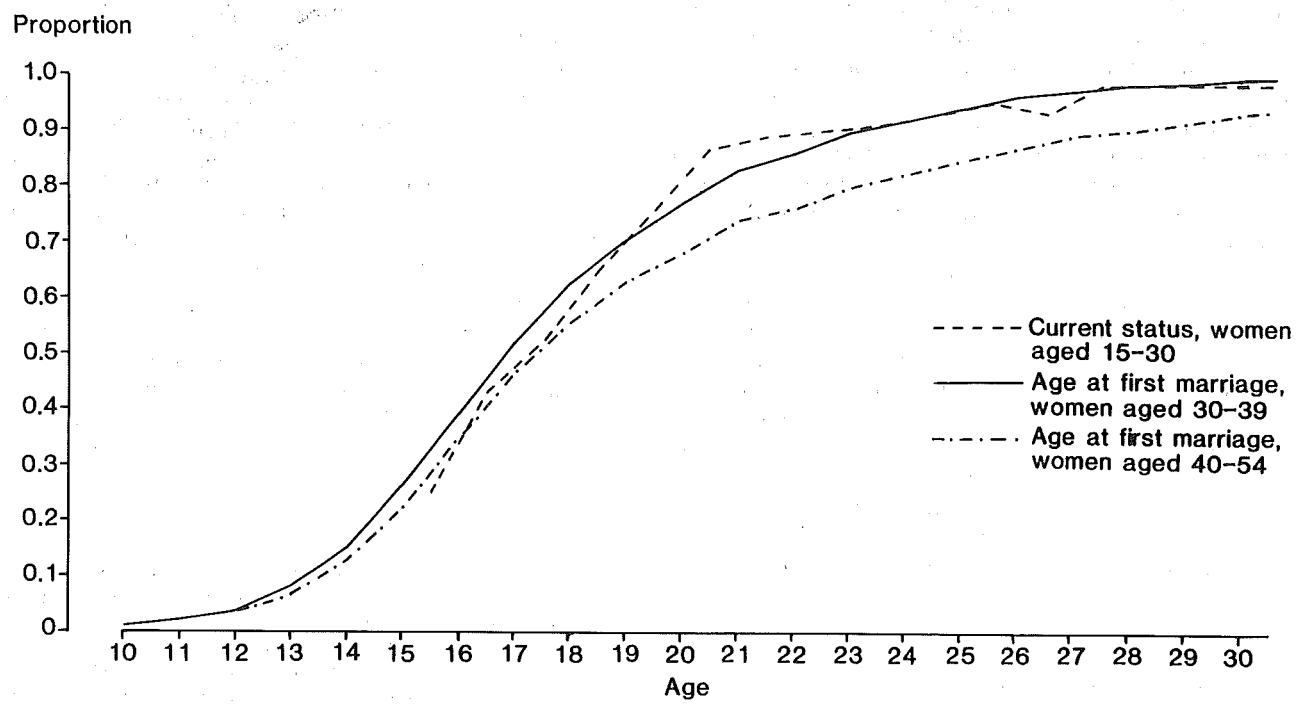

Figure 11 Comparison of proportions married at consecutive ages estimated from current status and retrospective reports, fertility survey

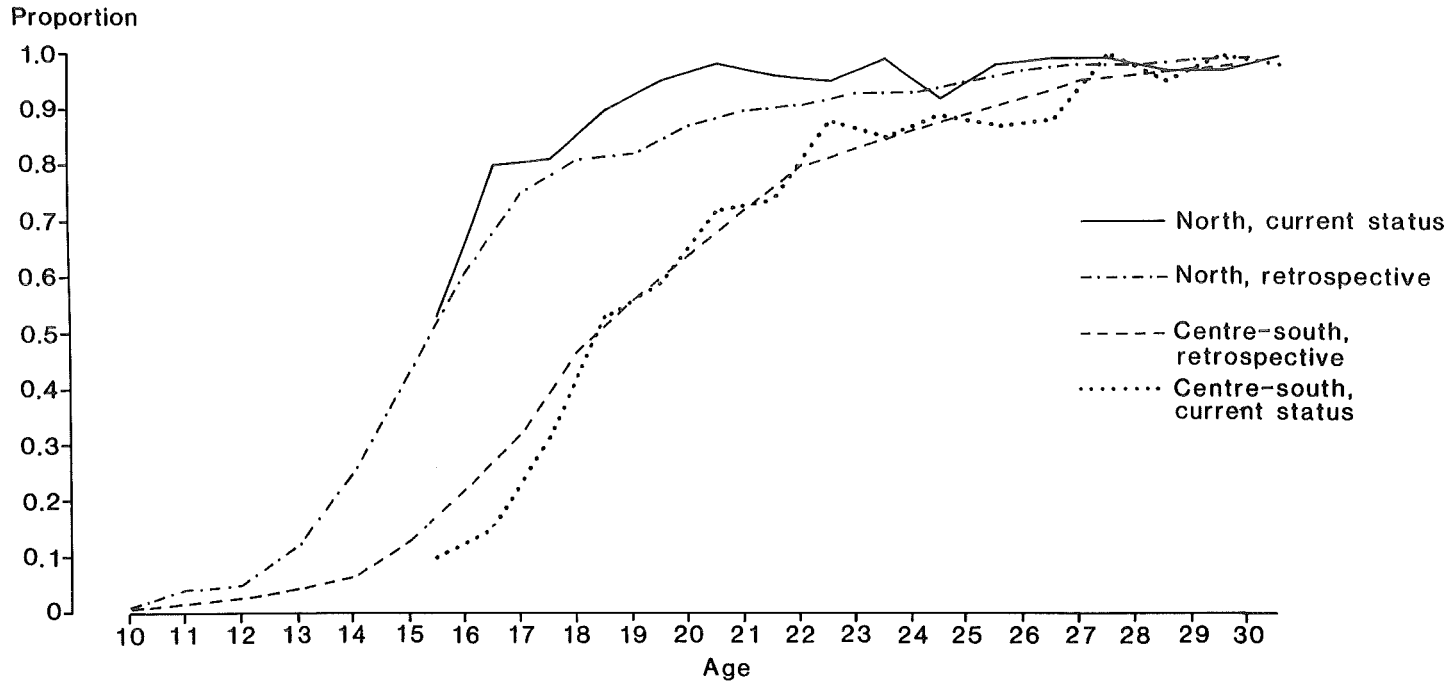

Figure 12 Comparison of proportions married at consecutive ages in the North and Centre-South, estimated from current status and reported age at first marriage of women aged 30–39, fertility survey

chapter 2 that 20 was a very popular age, and an immediate explanation for the unexpectedly high proportion of ever-married 20 year olds is that the reporting of age might be tied to marital status, with married teenagers more likely to be shifted up to age 20 than single teenagers. Nevertheless, this explanation is completely speculative. The true explanation is somewhat subtler, while still being related to the mis-statement of age. It will also be recalled that the North had the worst age reporting. Indeed, women from the North accounted for 21 per cent of 19 year olds and 26 per cent of 21 year olds, but 40 per cent of 20 year olds in the entire sample. Women from the North also tended to marry at an early age and the high overall proportion married at age 20 is caused simply by the over-representation at that age of women from the North, most of whom were married. No such discontinuity appears in the curve of proportions married if data from the North are excluded.

The marriage curve of women aged 40–54 lies below that of women aged 30–39. Even given the effect of truncation it might appear that there has been a decline in the mean age at first marriage and perhaps also in the proportion remaining single. It is more likely, however, that the oldest women either displaced the timing of their first marriage towards the interview date, or erroneously reported some second or current marriages as first marriages. This latter suspicion is strengthened by an examination of figure 8 which depicts an unexpectedly large left-hand tail in the distribution of marital duration of the oldest women.

Having touched on regional variations in marriage patterns we present in figure 12 a comparison of the proportions married among women aged 15–30 at interview with nuptiality curves derived from the stated age at first marriage of women aged 30–39 at interview, for two regions. The North had the worst age reporting while the Centre-South (which here includes the city of Yaounde to increase the sample size) had the best age reporting. Not only are the marriage patterns of the two regions quite distinct[5] but so are reporting patterns, even bearing in mind that less weight should be assigned to fluctuations in the current-status proportions than in figure 11 because of the reduction in the numbers on which the proportions are based. In the North, more women aged between 16 and 23 reported they were married than we would expect from the retrospective data. This strongly suggests retrospective omission of first marriages by these women, something which appeared at the national level only among the data from women aged 40–54. First marriages are commonly arranged in the North, and marital dissolution and remarriage are relatively common (Ware 1977; Table 4.12 First Country Report). It may be that current first marriages were reasonably completely reported, but that with many first marriages being fairly shortlived they were likely not to be reported at all after their dissolution.

In contrast, the age-specific proportions of married women in the Centre-South are remarkably consistent, with much better reporting of first marriages by women in their thirties. The only obvious divergence occurs in the teens, and probably represents a real recent increase in the age of first marriage.[6]

[5] Table 4.6 of the First Country Report indicates that the greatest regional variation in marriage patterns occurs between the North and all the other provinces.

[6] A similar increase has taken place in Littoral province. It is worth noting that these are the two provinces which have undergone by far the greatest advances in female education with census proportions with no or only Koranic schooling falling from 32 per cent of women aged 25–34 to 7 per cent aged 15–24 in the Centre-South, and from 42 per cent to 10 per cent in the Littoral province.

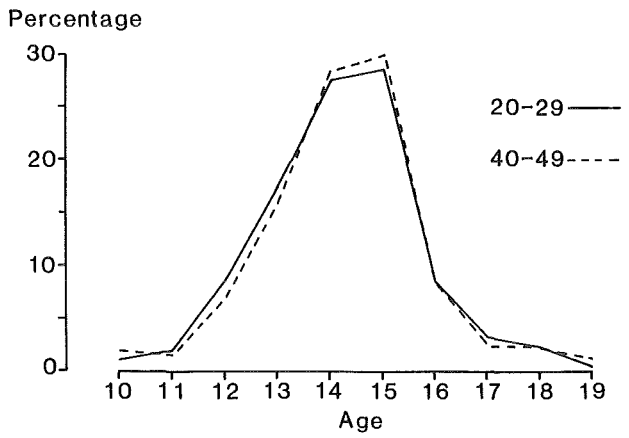

Figure 13 Distribution of reported age at menarche by current age, fertility survey

In a society in which marriage takes place after menarche, and the first sexual intercourse occurs on the wedding night, the date of first marriage is a good measure of the start of exposure to the risk of conception. In some countries, however, consummation may not take place until some time after a formal ceremony, while in others sexual relations may occur before formal marriage or may define the existence of an informal union. In Cameroon it has been noted that it may be difficult to determine exactly when a marriage was finalized as often the bride-price payments are made over a period of time (Ware 1977). Interviewers were therefore instructed to find out when a couple began living together rather than the date of a formal ceremony.

An examination of the reported timing of the first marriage and the first sexual relations revealed that 44 per cent of never-married women had experienced sexual relations, and that 38 per cent of ever-married women reported premarital sex. (Indeed, 28 per cent of the first births to women married for at least five years were premaritally conceived.) While 43 per cent of ever-married women reported their first sexual relations at the same age as their first marriage, as many as 19 per cent apparently delayed consummation, 11 per cent for one year, 3 per cent for two years and the remainder for even longer. Two per cent (139) of ever-married women reported first sexual relations at least five years after their first marriage.

The question on the first sexual relations was posed only to women who reported that they had started to menstruate. (The denominators of some of the proportions just quoted therefore include prepubertal girls who were assumed not to be sexually active.) Among ever-married women 16 per cent reported reaching menarche at the same age as they first married, but 14 per cent had not yet reached menarche when they married and only half of these menstruated in the following year.

Figure 13 shows the distributions of women aged 20–29 and 40–49 by reported age at menarche. These distributions are remarkably similar, and show a strong peak at ages 14 and 15. Figure 14 compares the porportions who have reached menarche as calculated from the stated age at menarche of women aged 20–29 and as derived from the menarcheal status of teenagers at interview. Since no woman younger than 15 years was interviewed in the fertility survey, there is unfortunately only a short span of five years over which comparisons can be made. Some of the concentration of reported ages of menarche on 14 years is perhaps not real, as it produces a somewhat higher proportion of menstruating women at exact age 15 than we would expect on the basis of current-status reports. Nevertheless, overall agreement is quite good.

Figure 15 indicates that there is also little variation between younger and older women in the reporting of age at first intercourse, except for a slight peak on 18 years among the older women. The distributions peak strongly at 13 years. Nevertheless, a comparison of the reported age at first intercourse of women aged 25–34 with current-status proportions (figure 16) uncovers major discrepancies. The reports of women aged 25–34 imply a median age at first intercourse just before the fourteenth birthday, but assuming no sex before menarche (as was done in the questionnaire) and relating the number of sexually active

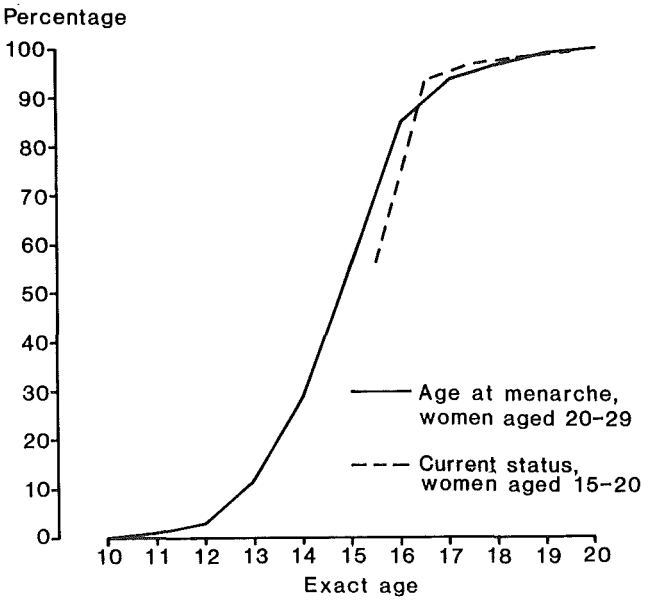

Figure 14 Percentages menstruating at exact ages estimated from retrospective reports and current status, fertility survey

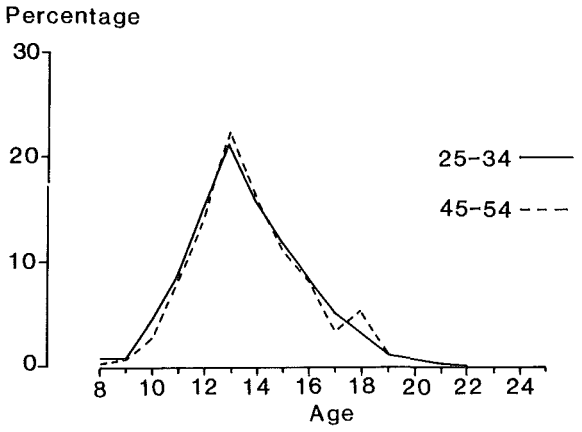

Figure 15 Distribution of reported age at first intercourse by current age, fertility survey

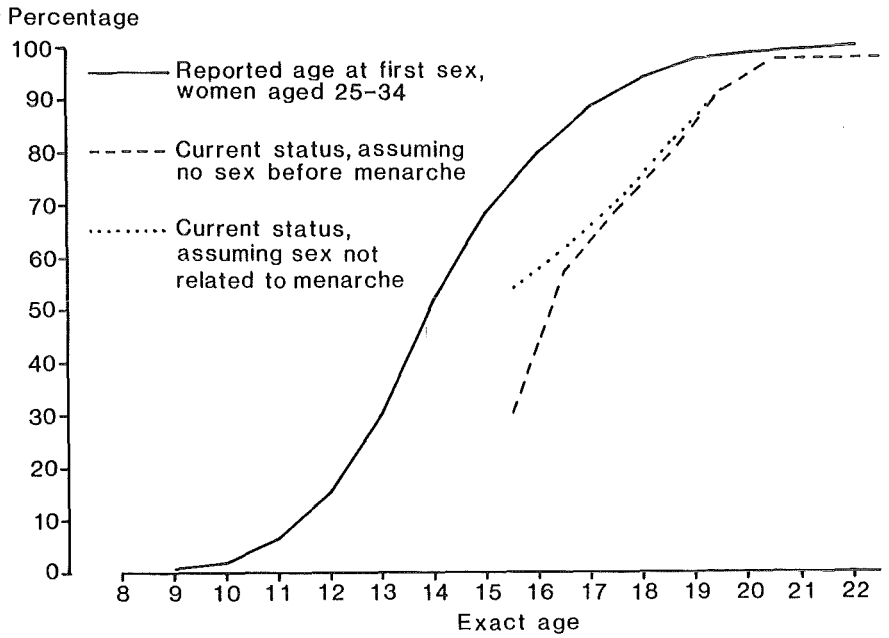

Figure 16 Percentages sexually active at exact ages estimated from retrospective reports and current status, fertility survey

women to the total number at that age gives a median several months after the sixteenth birthday. The discrepancy is only slightly lessened if we assume that sexual activity was not dependent on reaching puberty, and relate the number of sexually active women to the number who had reached menarche. It is possible that older women shifted their age at first sexual activity downwards. On the other hand, it is perhaps more likely that unmarried teenagers under-reported their sexual experience. It seems also that in some cases the first sexual activity preceded menarche, and that the question on sex should therefore not have been applied only to women who had reached menarche.

Defining the start of exposure as the later of menarche and the first sexual activity we find little variation between the cohorts 25–34, 35–44 and 45–54, with about 30 per cent first exposed at ages 10–14 and 63 per cent at ages 15–19. Table 5 compares the reported dates of first marriage and first exposure of ever-married women who have reached puberty and experienced sexual relations. Marriage is clearly not a good proxy measure for the commencement of exposure as only half the women aged at least 25 at interview were apparently first exposed in the year immediately following marriage. More than one-third of these women were exposed before marriage, and the fact that as many as 15 per cent of the oldest women reported a gap of at least 10 years between exposure and marriage strengthens our earlier suspicision that some of these women either omitted a first marriage entirely, or under-reported its duration.

At the other end of the range we find that 7 or 8 per cent of women aged 25 or older were apparently not exposed until they had been married for two years. It was anticipated that the timing of first marriage would be a difficult question, but despite the intentions underlying the marriage questions it appears that a small proportion of

Table 5 Relation between reported timing of first exposure to the risk of conception and first marriage, ever-married ever-exposed women, fertility survey

Years between exposure and marriage	Age at interview					
	15–19	20–24	25–29	30–34	35–44	45–54
Exposure before marriage (years)						
10+	0	0	2	3	8	15
5–9	0	4	7	9	9	11
2–4	7	14	15	13	12	12
1	11	14	12	11	9	6
Exposure in year following marriage	70	58	51	50	48	47
Exposure after marriage (years)						
1	7	5	6	6	6	2
2	3	2	3	3	3	2
3+	2	3	4	5	5	5

Table 6 Percentage of first births conceived before the start of exposure, fertile women, fertility survey

Age at interview	Age at start of exposure			
	10–14	15–19	20+	Total
15–24	16	22	(25)[a]	20
25–34	17	18	16	17
35–44	17	20	25	20
45–54	10	16	16	14
15–54	16	19	20	18

[a]Figures in parentheses are based on fewer than 30 cases.

Table 7 Format of reporting the timing of the first birth, fertile women, fertility survey

Age at interview	Month and year	Year only	Age of mother at birth	Total
15–19	60	36	4	100 (463)
20–24	59	33	8	100 (1196)
25–29	45	44	11	100 (1148)
30–34	31	54	15	100 (1018)
35–39	26	57	17	100 (848)
40–44	19	63	18	100 (780)
45–49	17	68	15	100 (570)
50–54	13	70	17	100 (273)
15–54	37	50	13	100 (6237)

responses referred to betrothal, rather than commencement of cohabitation.

Table 6 presents the percentage of first births occurring before nine months of exposure by age at interview and age at the start of exposure. The timing of nearly one in five first births was clearly inconsistent with that of first exposure. Many of these discrepant births were reported quite close to the start of exposure, but some go back a number of years beforehand. The later the reported entry into risk the greater is the chance of reporting a previous birth.

To look at the timing of the first birth subsequent to the start of exposure we next constructed life tables ignoring all births conceived before the reported start of exposure. (This implicitly assumes that there were no reporting problems if the first birth followed the start of exposure.) These are best examined by looking at figure 17 which shows for women first exposed at ages 10–14 and 15–19 the proportion in each cohort who had conceived their first child at fixed durations since the start of exposure. Women first exposed at ages 10–14 were slower to bear their first child than woman first exposed at ages 15–19. For example, among women aged 25–34 at interview the median time to the first birth was about three and a half years for women first exposed at ages 10–14, but about two and a half years for women first exposed at ages 15–19. This finding is consistent with the known rise in fecundity from the early teens to the twenties (Sheps and Lapierre-Adamcyk 1972), but the length of conceptive delays suggests that women were not continuously exposed, perhaps because sexual relations were infrequent or irregular, or because many women were infecund or subfecund or, as suggested earlier, because the reporting of the entry into exposure was downwardly biased, or that of the first birth was upwardly biased.

It is notable also that the time to the first birth is sharply differentiated by age at interview, with older women reporting longer delays than younger women. Given the invariance of the timing of entry into risk across the cohorts this might suggest that the age at first birth has been declining. Nevertheless, this trend is also consistent with age-related misreporting of the timing of the first

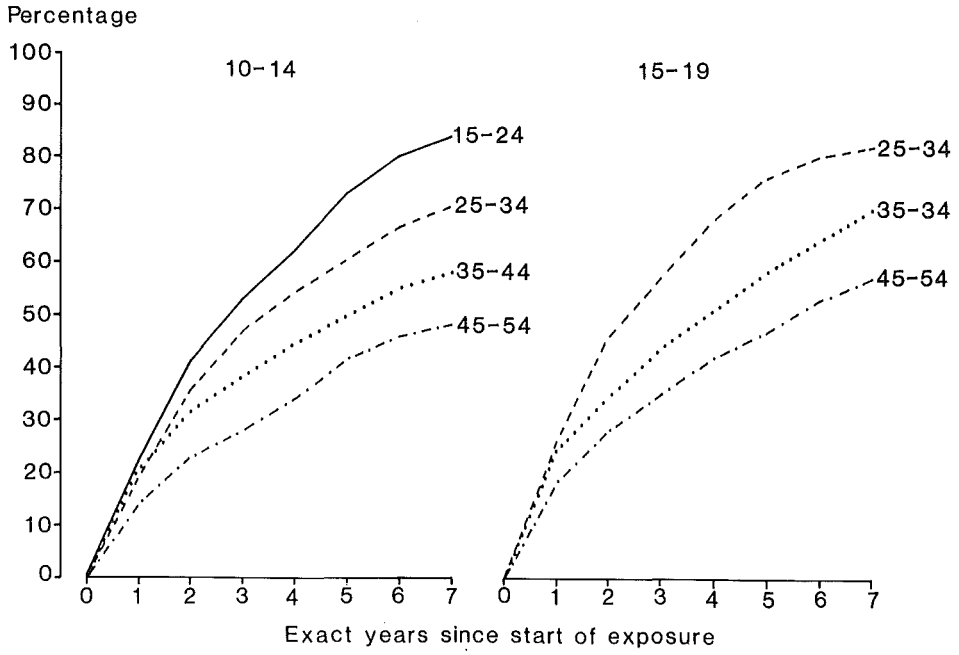

Figure 17 Percentage of women in each ten-year age group who have conceived their first child at fixed durations since the start of exposure, by age at start of exposure, fertility survey

birth. Older women, after all, had a longer period from first exposure to the time of interview in which to locate events, and there may have been a progressive displacement of the first birth towards the interview and away from the start of exposure.

The precision with which the first birth was reported can be gauged by an examination of table 7. A date of first birth was reported by three in five women under the age of 25, but by fewer than one in five women aged 40 and above. The proportion reporting only the year of the first birth rose from one-third among the youngest women to little over two-thirds among the oldest, while between 15 and 18 per cent of women aged 30 and above dated their first birth by reference to their age at confinement. Thus the analysis of time to the first birth is complicated both by misreporting of the timing of the first exposure, and by misreporting of the timing of the first live birth.

Useful information about regional patterns and even trends in nuptiality can be gained from the data, particularly from women younger than 40. Nevertheless, age at first marriage seems to be of greater social or cultural than immediate demographic significance, at least as regards its being interpreted as signalling the commencement of exposure to the risk of conception. A great many women were first exposed to the risk of conception well before they married, while a small number appear not to have been exposed until some years afterwards.

Examination of the period from first exposure to the first live birth suggested that conceptive delays might be becoming shorter, and the age at first birth falling. The findings discussed in chapter 4 should help us to assess whether this has indeed been the case.

4 Fertility and Sterility

Tabulations presented in the First Country Report indicated a rise in Cameroonian fertility over about the last 15 years, and also documented fairly high levels of childlessness among older women. In this chapter we will see how far we can use the data to attempt to discover whether there has been a decline in sterility and, if so, whether this was the sole cause of the increase in fertility.

Figure 18 depicts the proportions of childless women at consecutive ages as obtained in the household survey and the individual survey. Most of the childlessness at the younger ages is caused by non-exposure to risk, but from about age 30 onward can be attributed to impaired fecundity.

The proportions childless from the household survey peak on ages 25, 30, 35 and 40. For example, 11 per cent of women aged 39 and 12 per cent of women aged 41, but 18 per cent of women aged 40, were reported as childless. Some simple calculations reminiscent of the earlier examination of irregularities in the proportions ever married point to the explanation, namely, that the North, which was the area of the worst age reporting, also had high levels of sterility. At ages 39 and 41 the North comprised 22 and 13 per cent respectively of the female population of Cameroon, but it comprised 52 per cent of the population aged 40. The excess weight of the North at this age, in combination with a level of sterility twice as high as the

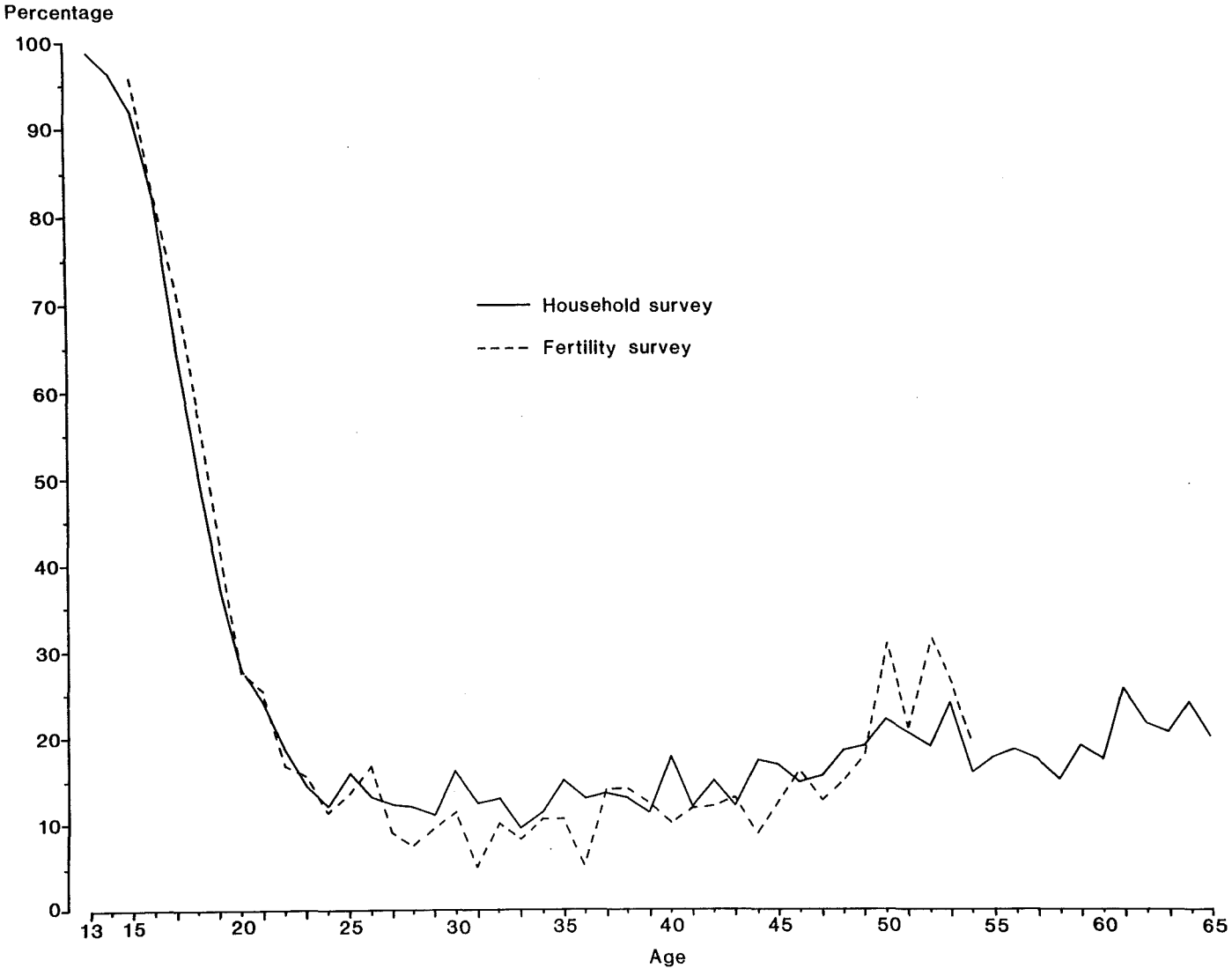

Figure 18 Percentage of childless women by single years of age

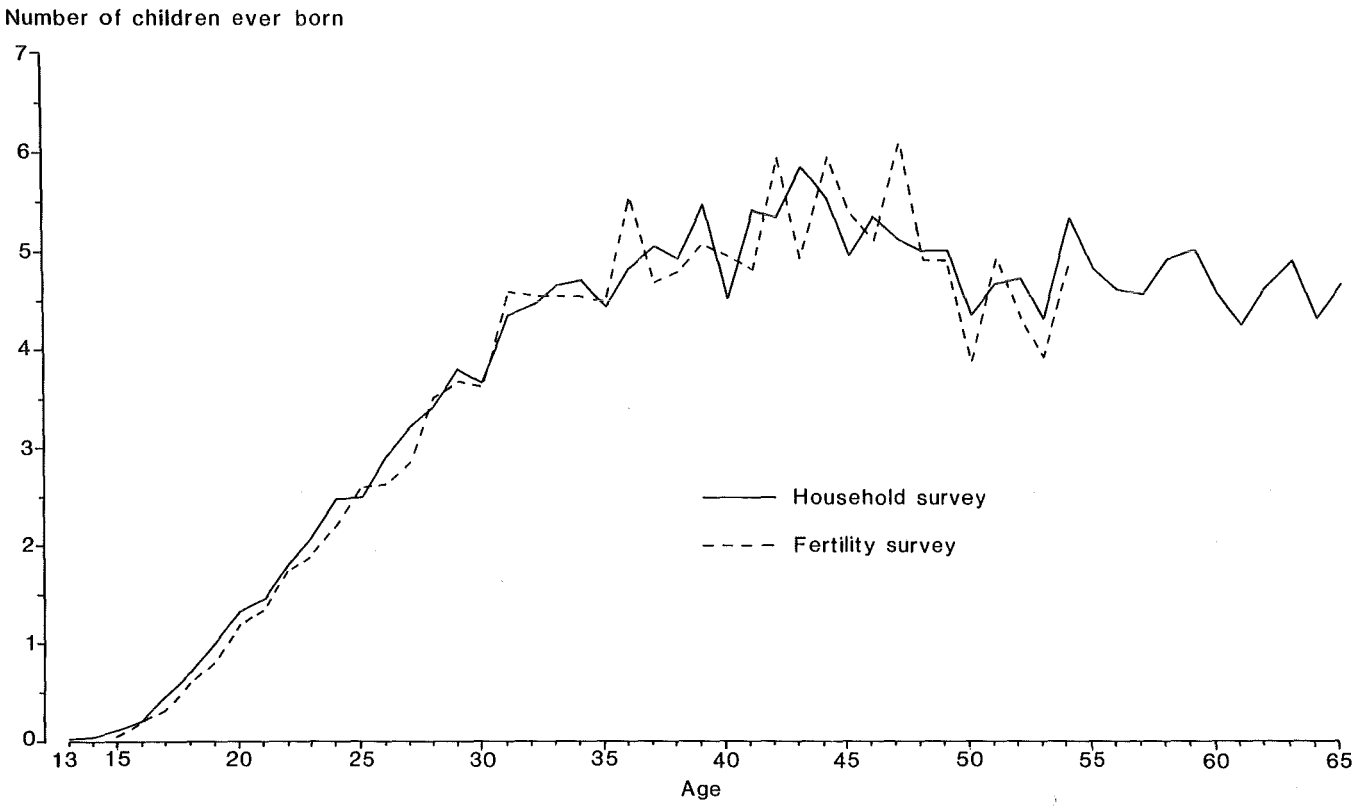

Figure 19 Average number of children ever born by single years of age

average for the remainder of the country, was enough to produce a peak in the national distribution. It is important to remember that inadequacies in one form of data will be carried over to other forms, and that care must be taken in interpreting Cameroonian data at the national level because of regional variation in both demographic characteristics and the quality of reporting.

There are some discrepancies between the proportions childless derived from the household survey and those from the fertility survey. In the household survey the proportions increase slowly from age 30, peak over ages 50–53, drop down in the late fifties and increase again in the sixties. In the fertility survey the proportions also increase with age, but from a lower level, and do not exceed the household proportions until ages 50–54.

The earlier examination of the household age data indicated that interviewers tended to shift women from the 50–54 age group into the 55–59 age group, knowing that no women older than 54 would be interviewed in the fertility survey. It now appears that this age shift was parity dependent in that fertile women (from whom detailed pregnancy histories would later have to be taken) were more likely to be moved up one age group than childless women. This leaves a disproportionately large number of childless women in the 50–54 age group.

It is somewhat harder to explain why the individual survey's proportions childless at ages 50 and above were even higher again. This cannot represent a breakdown in the field procedures with oversampling of households containing older childless women since households were randomly selected as eligible to supply respondents to the fertility survey before the household schedule was applied, and therefore before the fertility of female residents had been recorded. It may simply have been that interviewers were less diligent in collecting detailed pregnancy histories from women whose reproductive spans were thought to have ended.

Figure 19 compares the average numbers of children ever born to women at consecutive ages in the household survey and the fertility survey. The peaks in the proportions childless are here translated into troughs in average parity, which dips down particularly low at ages 50–54. The overall correspondence, however, is quite good. These comparisons are summarized in table 8. Although the average parity of fertile women is as high in the fertility survey as the household survey some care should be taken when interpreting the fertility data from the oldest women.

A useful guide to the sex-specific omission of births is given by the sex ratio of the reported children ever born to mothers of different ages, the sex ratio at birth being about 105 males to 100 females. Indeed, the sex ratio of births varied in a narrow and acceptable range between 103 and 106 among women in five-year age groups between the ages of 15 and 49 years. Some slight omission of females may have occurred thereafter with sex ratios of 107 at 55–59 and 110 at 60–64, but will not affect conventional measures of fertility which are restricted to women younger than 50. Any omission of female

Table 8 Comparison of fertility data from household survey (HHS) and fertility survey (FS)

Age	Percentage age distribution		Percentage childless		Average parity		Average parity of fertile women	
	HHS	FS	HHS	FS	HHS	FS	HHS	FS
15–19	19	18	65	69	0.5	0.4	1.4	1.3
20–24	17	18	21	20	1.8	1.6	2.2	2.0
25–29	16	16	13	12	3.1	3.0	3.5	3.4
30–34	13	14	14	10	4.1	4.2	4.8	4.6
35–39	11	12	13	11	4.9	4.9	5.6	5.5
40–44	10	11	16	11	5.0	5.2	6.0	5.9
45–49	8	7	17	15	5.0	5.2	6.1	6.1
50–54	6	5	20	27	4.6	4.2	5.8	5.8
Total	100	100	25	24	3.1	3.2	3.9	3.8

births was strongest in the North which contained the highest proportion of Muslims and exhibited the worst reporting of all the provinces. Nevertheless, even here omission was not particularly marked, with a sex ratio of 108 among the children ever born to women aged 15–49.

In the household interview information was sought not only on the parity of each woman, but also on the timing of the most recent births. This question, in theory, permits the estimation of current age-specific fertility rates by equating a tabulation of women whose last child was born during the 12 months preceding interview with that of all births over the period (Brass and Coale 1968). The data used in the estimation procedure are presented in table 9, and warrant several comments. Only a little over half the dates of the last birth were given exactly, the rest were reported as year of birth only or as the number of years since the birth took place (table 10). Older women were less well able to give a date than young women, most probably because the birth was less recent. Nevertheless, 91 per cent of last births to women aged 15–49 which were reported in duration form were said to have taken place two or more years ago, while 84 per cent which were reported as year of birth only were said to have occurred no later than 1976.

In an initial estimation we calculated the number of births which occurred in the previous year as the sum of the number of women whose last birth was reported in date form to have occurred during the 12 months before interview, the number who reported that a last birth occurred 0 years ago, the number whose last birth reportedly occurred in 1978 and a fraction of those whose last birth occurred in 1977, this fraction being derived from the average month of interview. It was assumed that when the timing of the last birth was not stated, the birth had occurred more than a year before. Of the births thus estimated to have occurred in the last year an almost constant 88 per cent were given in date form by women in each age group.

Before moving on to estimate age-specific fertility we might note that table 9 itself shows some evidence of misreporting in that some women aged 50 and older reported a birth in the year preceding interview. The majority of these births were reported in date form, which perhaps gives them greater credibility than if they had been reported

Table 9 Distribution of women according to timing of the last birth, household survey

Age	Number of women	Month and year			Years ago			Year only			NS
		Last 12 months	Previous 12 months	Before	0	1	2+	1978	1977	1976	
15–19	7932	1101	478	227	25	80	304	48	148	265	100
20–24	7064	1708	1065	879	42	110	790	33	222	614	117
25–29	6612	1368	864	850	55	122	1279	39	197	772	179
30–34	5258	904	509	700	30	91	1176	15	134	816	155
35–39	4737	577	383	775	14	50	1080	14	66	957	179
40–44	4186	252	246	778	10	29	1089	4	40	902	172
45–49	3166	102	69	595	3	10	826	6	17	834	165
50–54	2304	29	17	354	3	6	660	2	4	618	138
55–59	4744	34	17	351	1	4	1835	–	7	1280	391
60+	5396	5	8	193	1	1	2127	1	4	1417	609

Table 10 Form in which the last birth was reported, household survey

Age	Percentage of last births reported as			NS	Percentage of duration-format last births occurring 2+ years ago	Percentage of year-only format occurring no later than 1976
	Month and Year	Years ago	Year only			
15–19	65	15	16	4	74	57
20–24	65	17	16	2	84	71
25–29	54	25	18	3	88	77
30–34	47	29	21	3	91	85
35–39	43	28	25	4	94	92
40–44	36	32	27	5	97	95
45–49	29	32	33	6	98	97
Total	55	28	22	5	91	84

less precisely. If we accept the dating of these births we are then led to conclude that their mothers' ages were exaggerated.

The assumptions of the estimation procedure are that the pattern of recent fertility is correctly reported by all women while the level is correctly reported by young women. One therefore compares a parity-equivalent measure derived from the age-specific fertility rates F_i with average parity P_i. A difference between P_i and F_i among young women, aged 20–24 say, is ascribed to an error in the reference period and this error is assumed to be the same over all age groups.

The first panel of table 11 shows that age-specific fertility rates calculated directly from the estimated number of births in the last year imply a total fertility rate of 5.55. However, P_2/F_2 takes the value of 1.11 which implies that, despite the fact that most of these births were given in date form, the reference period was too short. If 1.11 is used as a correction factor the total fertility rate increases to 6.14.

In order to test the effect of the method of calculating the number of births in the last year the calculations were varied slightly, as shown in the second and third panels. In the first variation, births which were reported as occurring one year ago were included in the total. This increases the observed TFR to 5.95 but the P/F ratios are correspondingly reduced so that the adjusted TFR is 6.24, which is only 0.10 higher than the previous estimation. The second variation relaxed the assumption related to missing data, and pro-rated the last births of which the timing was unstated. In this case the adjusted TFR rises to only 6.18. Whatever the exact calculation procedure chosen, then, the adjusted TFR lies between 6.1 and 6.2.

The final column of the table shows age-specific fertility rates over the five years preceding the survey which were directly calculated from the pregnancy histories in the fertility survey. At 6.38 the TFR is slightly higher than that obtained from the household data, primarily because of higher reported age-specific fertility at ages 40–44. Overall agreement, however, is very good.

Whichever sequence we examine in table 11, the P/F ratios decrease with age which means that progressively higher parity is implied by current fertility rates, than was reported directly. This suggests either that fertility has been increasing, or that there was omission of children ever born and the severity of this omission increased with age. Since the ratios decline from a young age, however, it is unlikely that omission is the sole or even major explanation.

Age-specific fertility rates were also calculated for different subregions of Cameroon, and some of the results

Table 11 Indirect estimation of age-specific fertility rates from the household survey

Age	i	Births in the last year derived									Direct estimates from fertility survey
		As described in the text			Includes births reported 1 year ago			Not-stated responses pro-rated			
		f_i	P_i/F_i	f_i'	f_i	P_i/F_i	f_i'	f_i	P_i/F_i	f_i'	
15–19	1	159	1.22	176	169	1.14	177	165	1.16	178	186
20–24	2	272	1.11	301	286	1.05	300	277	1.08	298	295
25–29	3	239	1.06	265	257	1.00	270	247	1.03	266	277
30–34	4	196	1.04	217	213	0.98	224	203	1.01	219	220
35–39	5	136	1.02	151	147	0.95	154	142	0.99	153	155
40–44	6	70	0.96	77	76	0.89	80	73	0.93	79	106
45–49	7	38	0.91	42	41	0.85	43	41	0.88	44	36
TFR		5.55		6.14	5.95		6.24	5.74		6.18	6.38

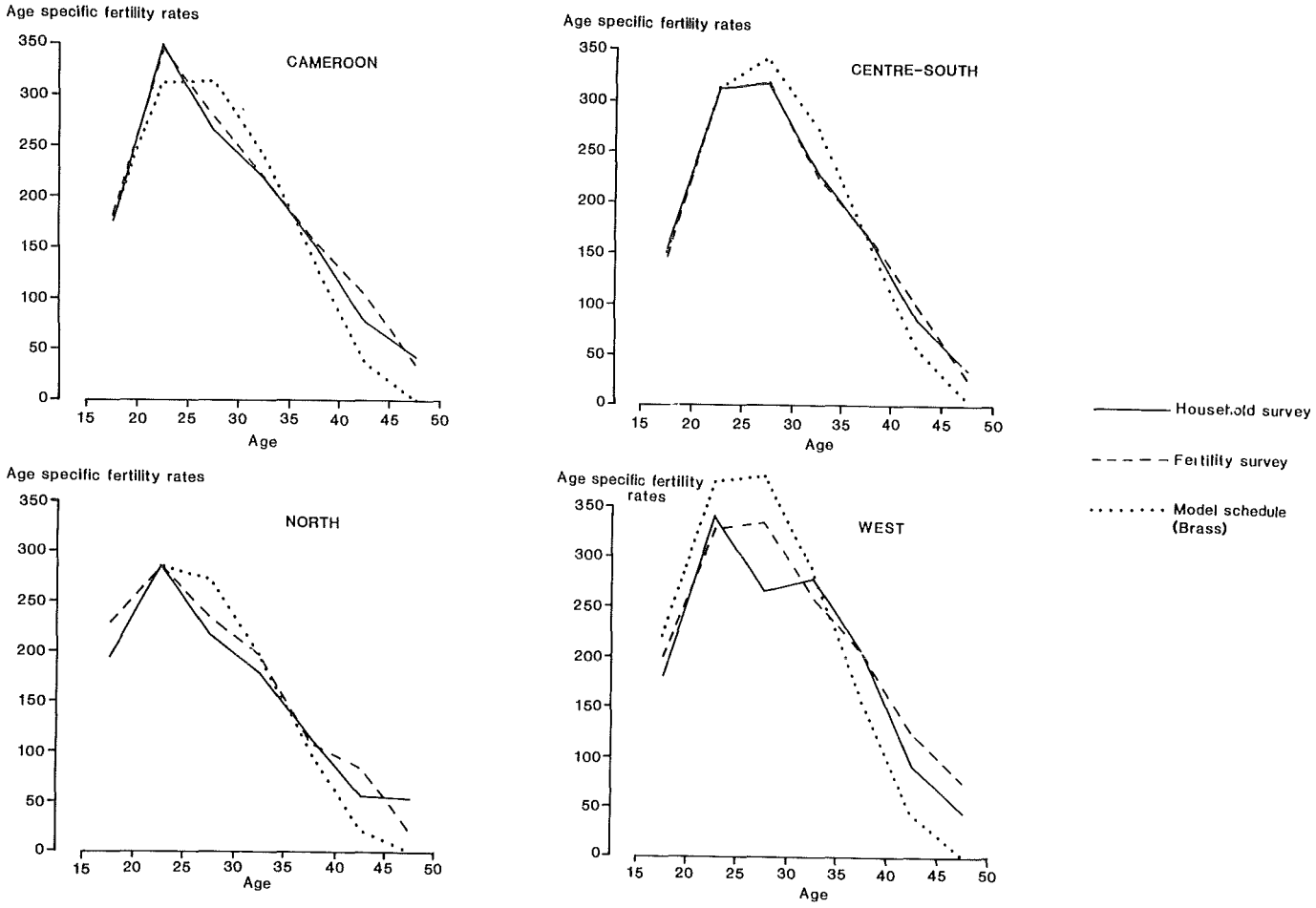

Figure 20 Age-specific fertility rates per 1000 women

are shown in figure 20. They illustrate variations in both fertility and data quality. The North was the area of the worst age reporting and the lowest fertility, with an adjusted current TFR of 5.5 from the household data and a reported TFR of 5.8 over the five years preceding the fertility survey. The Centre-South, with the best age reporting and moderate fertility of 6.5, exhibited almost the same fertility curve from the pregnancy histories as from the household survey. The West, with moderately bad age reporting and high fertility, exhibited a household TFR of 7.4 and a TFR from the fertility survey of 7.6. Nevertheless the agreement between the fertility curves was not particularly good, with an obviously erroneous dip in the household curve at ages 25–29. A complete set of comparisons appears in table 12. Agreement between the indirect and direct estimates of recent fertility is quite good except in Yaounde and Douala where direct estimates are lower than indirect estimates, and the South-West, where direct estimates are based on relatively few cases, and greatly exceed the indirect estimates.

We now draw on the pregnancy histories of the fertility survey to examine past trends in childbearing and primary sterility. Table 13 presents the average number of children ever born at certain exact ages by different birth cohorts of women. Even ignoring the oldest cohort (which has already been shown to contain an over-representation of childless women), there is a steady increase in cumulative fertility at exact ages as we move from the oldest to the youngest birth cohorts. For example, by exact age 25 women aged 45–49 at interview had borne on average 1.7 children, while women aged 35–39 had borne 2.1 and women aged 25–29 had borne 2.4. The trend is evident at each exact age. Were it caused merely by displacement of births towards the date of interview there would be a 'catching-up' process whereby the trend was cancelled or even reversed at a higher age, but this does not occur. Moreover, since the trend is evident even among women younger than 40 it cannot be ascribed in large part to entire omission of births.

Table 14 presents a comparable tabulation based on marriage cohorts. Cohorts are defined by duration since the first marriage and prenuptial births are excluded. A trend of increasing marital fertility also appears, and is apparent at each exact marital duration. The strength of this trend means that the increase in cumulative fertility cannot be ascribed to changes in marriage patterns.

Table 15 tabulates the percentages of each birth cohort which were still childless at exact ages. There has been a clear decrease in the incidence of primary sterility. By age 25, for example, 25 per cent of women aged 40–44, but 16 per cent of women aged 30–34, were still childless. By age 30 the proportions childless in the same cohorts were 15 and 10 per cent.

Some of the apparent strength of the trend is due, among the older women at least, to displacement of the date of the first birth towards the interview date, or out-

Table 12 Comparison of indirect estimates of age-specific fertility rates from births in the last year (household survey) and direct estimates of age-specific fertility rates over the five years preceding the survey (fertility survey)

	HHS	FS	HHS	FS	HHS	FS
	North		Centre-South		Yaounde	
15–19	195	229	155	150	130	121
20–24	284	283	312	312	258	272
25–29	216	232	318	319	321	262
30–34	177	198	229	226	219	160
35–39	113	109	167	169	161	(141)
40–44	56	86	85	98	69	(76)
45–49	53	19	35	24	25	–
TFR	5.5	5.8	6.5	6.5	5.9	5.2
TFR (15–35)	4.4	4.7	5.1	5.0	4.6	4.1
	East		Littoral		Douala	
15–19	178	186	172	133	109	119
20–24	297	298	273	268	282	256
25–29	278	250	226	280	327	268
30–34	196	228	283	256	228	202
35–39	152	159	120	147	146	148
40–44	109	143	60	(109)	57	(83)
45–49	38	53	16	(51)	17	(11)
TFR	6.3	6.6	5.8	6.2	5.8	5.4
TFR (15–35)	4.8	4.8	4.8	4.7	4.7	4.2
	North-West		West		South-West	
15–19	171	202	190	201	214	200
20–24	307	296	357	327	317	358
25–39	312	330	279	335	245	317
30–34	263	231	291	260	172	(239)
35–39	169	195	213	205	124	(207)
40–44	84	144	97	124	86	(102)
45–49	61	(59)	46	76	46	(23)
TFR	6.8	7.3	7.4	7.6	6.0	7.2
TFR (15–35)	5.3	5.3	5.6	5.6	4.7	5.6

right omission of the first birth. For example, 20 per cent of women aged 45–49 were childless at age 35, but only 15 per cent at age 40, indicating that 5 per cent reported that they bore their first child when aged 35–39. This is an extremely late age at first childbearing, particularly in an African country, and is rendered even more implausible by the observation that only one per cent of women in the 40–44 age group reportedly bore their first child when aged 35–39. It seems most probable, then, that primary sterility is on the decline, but that the trend in table 14 is exaggerated by misreporting by the oldest women.

Table 16 presents the average parity of fertile women grouped according to the time since the first birth (within 'motherhood cohorts') at exact durations since the first birth. Once childbearing commenced there was virtually no difference between the rates of subsequent childbearing in different motherhood cohorts. By five years after the first birth each cohort had borne on average 2.4 children, and by 15 years 5.1 children. There is some evidence of mis-statement in the two 'oldest' cohorts, with achieved average parities 20 years after the first birth of 6.0 in the 20–24 and 25–29 cohorts, 5.8 in the 30–34 and 5.3 in the 35+ cohort. This decline may represent both omission and displacement since average parity continued to increase after 25 years of childbearing, with values at 30 years of 6.5 and 6.2 for the 30–34 and 35+ cohort, and at 35 years of 6.3 for the 35+ cohort.

Since the fertility of fertile women has been virtually constant it follows that rises in average parity have come about through declines in childlessness. While this is a fair statement at the national level it is essential to look also at regional differences since it is inevitable that not just the levels but also the determinants and trends in fertility have not been uniform across the country.

Table 17 is a good illustration of the regional variation in the number of children ever born. Average parity at ages 40–44 varies from 4.1 in the North to 6.6 in the North-West. Only in the North-West, West and South-West provinces does the average parity of women aged 50–54 exceed that of women aged 45–49, while in the North, Centre-South and Yaounde the maximum average parity was reported by women aged 40–44. If there were no reason for believing that fertility had been increasing, such declines in average parity might be ascribed to under-reporting of children ever-born by older women. In the case of Cameroon we must be a little circumspect.

Table 13 Average parity at exact ages within birth cohorts, all women

Exact age	Age at interview						
	20–24	25–29	30–34	35–39	40–44	45–49	50–54
15	0.1	0.1	0.1	0.1	0.1	0.0	0.1
18	0.5	0.5	0.5	0.5	0.5	0.3	0.3
20	1.0	0.9	1.0	0.8	0.8	0.6	0.6
23		1.8	1.8	1.5	1.5	1.3	1.0
25		2.4	2.4	2.1	2.0	1.7	1.4
28			3.2	2.8	2.8	2.3	1.9
30			3.8	3.4	3.2	2.7	2.2
35				4.5	4.3	3.7	3.0
40					5.0	4.5	3.6

Table 14 Average (legitimate) parity at exact marriage durations within marriage cohorts, ever-married women

Time since first marriage	Marriage duration at interview						
	5–9	10–14	15–19	20–24	25–29	30–34	35+
3	0.8	0.7	0.7	0.7	0.6	0.5	0.4
5	1.4	1.3	1.2	1.2	1.0	1.0	0.7
8		2.1	2.1	2.0	1.7	1.6	1.2
10		2.6	2.6	2.5	2.2	2.1	1.5
13			3.4	3.3	2.8	2.7	2.0
15			3.9	3.7	3.2	3.1	2.3
18				4.3	3.8	3.6	2.8
20				4.7	4.2	3.9	3.0
25					4.8	4.5	3.5

Table 15 Percentage of childless women at exact ages within birth cohorts

Exact age	Age at interview						
	20–24	25–29	30–34	35–39	40–44	45–49	50–54
15	94	94	90	93	93	96	95
18	61	64	62	66	66	77	77
20	34	42	42	50	53	60	67
23		20	23	33	34	42	52
25		15	16	24	25	35	47
28			12	17	19	28	39
30			10	15	15	25	35
35				12	12	20	31
40					11	15	29

Table 16 Average parity at exact durations since the first birth within motherhood cohorts, fertile women

Exact time since the first birth	Duration at interview since the first live birth						
	5–9	10–14	15–19	20–24	25–29	30–34	35+
3	1.7	1.7	1.7	1.7	1.7	1.7	1.7
5	2.4	2.3	2.4	2.4	2.4	2.4	2.3
8		3.3	3.3	3.2	3.3	3.3	3.1
10		3.9	3.9	3.8	3.8	3.8	3.6
13			4.7	4.6	4.6	4.6	4.2
15			5.1	5.1	5.1	5.0	4.6
18				5.7	5.7	5.5	5.1
20				6.0	6.0	5.8	5.3
25					6.7	6.3	5.8

Table 18 presents the average parity achieved at various exact ages by different birth cohorts within different regions of Cameroon. The grouping of provinces was necessary to create sufficiently large cohorts, except in the North, and was based on both geographical and demographic considerations. (The areas thus defined are not, however, homogeneous and a case for other groupings could be defended.)

Even ignoring the reported fertility of women aged 45–49 it appears that the North has experienced a recent rise in fertility. By age 25 women aged 40–44 had borne on average 1.9 children, while women aged 30–34 had borne 2.1 and women aged 25–29 had borne 2.4. A similar increase was reported in the region containing Centre-South and East provinces. In both these regions women aged 30–34 at interview had borne about half a child more by aged 30 than had women aged 40–44. Within the second region the overall increase is primarily due to the Centre-South, where average parity at exact age 30 rose from 3.3 to 4.0 compared with 3.0 to 3.3 in the East and 3.5 to 3.6 in the city of Yaounde.

No such fertility increase was reported from the two remaining regions. An apparent rise in the fertility of women aged 30–34 and 35–39 in Littoral province is

Table 17 Average parity by age at interview and region, all women

Region	Age at interview							
	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54
North	0.6	1.7	2.9	3.5	4.1	4.1	4.2	3.2
Centre-South	0.2	1.8	3.3	4.6	4.9	5.4	4.8	3.5
Yaounde	0.2	1.2	2.9	4.0	4.5	(5.9)[a]	(3.7)[a]	—[b]
East	0.4	1.6	2.9	3.8	4.7	5.1	5.2	(4.5)[a]
Littoral	0.3	1.5	2.6	4.5	5.5	5.7	5.8	(5.3)[a]
Douala	0.2	1.2	2.8	4.1	5.4	4.5	(5.4)[a]	(7.0)[a]
North-West	0.5	1.8	2.9	4.8	5.4	6.6	6.0	(2.0)[a]
West	0.4	1.8	3.3	4.8	5.2	5.9	6.5	6.6
South-West	0.5	1.7	3.3	4.8	6.4	6.0	6.7	—[b]
Cameroon	0.41	1.62	3.00	4.16	4.87	5.21	5.18	4.21

[a]Figures in parentheses are based on fewer than 30 women.
[b]Indicates fewer than 10 women.

Table 18 Average parity at exact ages within birth cohorts and by region, all women

Region	Exact age	Age at interview					
		20–24	25–29	30–34	35–39	40–44	45–49
North	15	0.1	0.1	0.2	0.1	0.1	0.1
	18	0.6	0.6	0.6	0.5	0.5	0.2
	20	1.1	1.0	1.1	0.8	0.8	0.6
	23		1.8	1.7	1.3	1.4	1.2
	25		2.4	2.1	1.7	1.9	1.5
	28			2.8	2.4	2.4	2.0
	30			3.2	2.9	2.8	2.3
	35				3.8	3.6	3.0
	40					4.1	3.6
Centre-South,	15	0.1	0.0	0.1	0.1	0.1	0.1
Yaounde, East	18	0.4	0.4	0.4	0.5	0.4	0.3
	20	0.9	0.9	0.9	0.9	0.8	0.6
	23		1.8	1.8	1.6	1.5	1.2
	25		2.5	2.4	2.1	2.1	1.6
	28			3.3	2.8	2.8	2.2
	30			3.8	3.3	3.3	2.5
	35				4.4	4.4	3.4
	40					5.1	4.2
Littoral, Douala	15	0.0	0.0	0.0	0.1	0.1	0.1
	18	0.3	0.3	0.5	0.5	0.4	0.5
	20	0.7	0.8	1.0	0.8	0.8	0.9
	23		1.6	1.9	1.7	1.5	1.6
	25		2.1	2.5	2.4	2.0	2.1
	28			3.3	3.2	2.7	2.9
	30			3.8	3.8	3.2	3.4
	35				5.0	4.3	4.3
	40					5.0	5.1
North-West, West,	15	0.1	0.0	0.1	0.1	0.0	0.0
South-West	18	0.5	0.4	0.5	0.5	0.5	0.3
	20	1.1	0.9	1.0	0.9	0.9	0.6
	23		1.8	2.0	1.7	1.6	1.4
	25		2.4	2.7	2.3	2.2	1.9
	28		3.3	3.7	3.2	3.0	2.7
	30			4.3	3.9	3.6	3.1
	35				5.0	4.9	4.4
	40					5.9	5.5

Table 19 Percentage of childless women by age at interview and region, all women

Region	Age at interview							
	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54
North	57	19	18	15	18	16	20	40
Centre-South	79	13	11	10	14	17	24	37
Yaounde	81	35	14	13	17	(10)[a]	(19)[a]	–[b]
East	73	19	7	14	6	16	14	(24)[a]
Littoral	75	26	12	7	6	6	14	(7)[a]
Douala	83	33	8	5	7	8	(7)[a]	(13)[a]
North-West	62	18	5	2	4	3	7	(3)[a]
West	68	13	4	1	8	5	3	6
South-West	66	17	5	7	2	2	(0)[a]	–[b]
Cameroon	68.8	20.2	11.6	9.8	11.5	10.9	14.7	27.5

[a]Figures in parentheses are based on fewer than 30 cases.
[b]Indicates fewer than 10 cases.

Table 20 Percentage of childless women at exact ages within birth cohorts and by region, all women

Region	Exact age	Age at interview					
		20–24	25–29	30–34	35–39	40–44	45–49
North	15	92	91	88	93	91	99
	18	53	60	59	67	67	80
	20	32	44	45	57	57	55
	23		27	30	45	38	48
	25		21	24	36	30	44
	28			20	27	25	40
	30			16	23	22	36
	35				19	18	32
	40					16	20
Centre-South, Yaounde, East	15	94	96	91	91	90	95
	18	65	67	64	64	69	77
	20	35	41	38	44	54	62
	23		16	22	29	32	43
	25		12	16	23	26	36
	28			13	18	21	32
	30			12	16	19	29
	35				13	17	23
	40					16	21
Littoral, Douala	15	97	99	96	94	94	90
	18	74	67	64	63	66	65
	20	48	44	33	47	47	53
	23		14	16	29	27	34
	25		13	8	13	16	30
	28			7	8	12	21
	30			6	8	10	18
	35				6	7	13
	40					7	12
North-West, West, South-West	15	93	96	89	93	96	96
	18	58	68	65	68	65	77
	20	28	40	43	50	52	64
	23		17	17	26	33	38
	25		9	9	15	24	30
	28			5	9	13	17
	30			3	7	9	13
	35				6	5	7
	40					4	5

offset by lower fertility of younger women and is almost certainly spurious, as is the apparent excess fertility of women aged 30–34 in the North-West, West and South-West.

Table 19 illustrates the geographic distribution of primary sterility. The areas most affected are the North, Centre-South and East, and the least affected are the North-West, West and South-West. Regional variation is extremely marked, with proportions childless at ages 40–44 ranging from 17 per cent in the Centre-South to 2 per cent in the South-West. Table 20 suggests, in addition, that the decline in childlessness has not been uniform across the country. The Centre-South and East have probably undergone the greatest decline, with proportions childless at age 35 of 23 per cent among women aged 45–49, 17 per cent among women aged 40–44 and 13 per cent among women aged 35–39. It seems also that the North has experienced a decline in primary sterility, but that this decline began more recently than in the Centre-South. At age 30, 23 per cent of 35–39 year old women, but 16 per cent of 30–34 year old women, were childless. It seems unlikely, for several reasons, that the differences between the older Northern cohorts are real: first, by ages 30 and 35 the 35–39 and 40–44 cohorts had the same levels of childlessness which suggests that differences in the early twenties were caused by misreporting of the age at first birth; secondly, 12 per cent of the women aged 45–49 reported that they bore their first child when aged 35–39, which is clear evidence of a shift in the timing of the first birth towards the date of interview.

By age 35 between 5 and 7 per cent of women aged 35–44 in the two remaining areas were still childless. Differences between levels of childlessness in adjacent cohorts in Littoral province from the late twenties up to age 35 probably stem primarily from displacement of dates. In contrast, there may have been a slight reduction in primary sterility in the North-West, West and South-West provinces. Since primary sterility was the lowest in this region such a reduction could have little effect on fertility.

The average parity of fertile women (table 21) does not exhibit as much regional variation as the average parity of all women (table 17). Nevertheless the fertility of fertile women in the North was still somewhat lower than that of fertile women elsewhere. For example, women who had borne their first child 20–24 years earlier had an average of 5.7 children in the North, but between 6.2 and 6.8 in the other regions (excluding the cities of Yaounde and Douala).

Table 22 permits an examination of trends in the pace of childbearing after the first birth, although less weight should be placed on the cumulative fertility of women who first gave birth more than 30 years before the survey. There may have been a slight fairly recent increase in the fertility of fertile women in the North, with average parities five years after the first birth of 2.4 among the 5–9 motherhood cohort and 2.2 among the 15–19 cohort, and average parities ten years after the first birth of 3.8 among the 10–14 cohort and 3.5 among the 15–19 cohort. Any increase in the Centre-South and East did not appear until at least ten years after the first birth, if at all. No increase appeared in the Western provinces, while a very slight decrease may have occurred recently in the Littoral province. None of these variations, however, is so large as to be indisputably real. What does emerge clearly from the table is that the pace of childbearing varies from region to region. Taking women whose first baby was born between 10 and 24 years before the survey we find average parities ten years after the first birth of 3.5 to 3.8 in the North, 3.8 to 3.9 in the Centre-South and East, 3.6 to 3.8 in the Littoral, but 4.0 to 4.3 in the Western area; at 15 years since the first birth these averages have risen to 4.6, 5.2, 5.0 and 5.6 respectively. It appears both that those areas with the highest levels of infertility (North, Centre-South and East) have experienced declines in childlessness and consequent increases in family size; and that fertile women in the high-sterility areas (such as the North) have a lower rate of childbearing than fertile women in the low-sterility areas (such as the Western region).

A link between a high level of primary sterility on the one hand, and lower rates of childbearing among fertile women on the other, might lie with secondary sterility. One way of looking at regional variations in secondary sterility is to calculate the ages by which certain proportions of older fertile women have borne their last child, and the results of such a tabulation appear in table 23 for women aged 45–49. By their early twenties 10 per cent of fertile women everywhere except the Western provinces have borne their last child, but this proportion is not

Table 21 Average parity by duration since the first birth and region, fertile women

Region	Duration since the first birth						
	0–4	5–9	10–14	15–19	20–24	25–29	30–34
North	1.6	3.1	4.3	5.0	5.7	6.4	6.0
Centre-South	1.4	3.2	4.6	5.8	6.4	6.9	5.9
Yaounde	1.5	3.0	4.6	5.6	(5.6)[a]	(6.8)[a]	—[b]
East	1.6	3.0	4.3	5.2	6.8	6.3	(5.5)[a]
Littoral	1.4	2.9	4.3	5.5	6.2	7.8	(6.0)[a]
Douala	1.5	3.1	4.0	5.3	(5.9)[a]	(5.7)[a]	—[b]
North-West	1.5	3.1	4.8	5.8	6.9	7.5	(7.7)[a]
West	1.4	3.1	4.8	6.1	6.5	6.9	(8.4)[a]
South-West	1.5	3.2	5.1	6.8	6.8	6.5	—[b]
Cameroon	1.51	2.08	3.53	4.56	5.25	5.77	5.51

[a]Figures in parentheses are based on fewer than 30 cases.
[b]Indicates fewer than 10 cases.

Table 22 Average parity at exact durations since the first birth within motherhood cohorts and by region, fertile women

Region	Exact duration	Duration since the first birth					
		5–9	10–14	15–19	20–24	25–29	30–34
North	3	1.7	1.6	1.6	1.7	1.6	1.6
	5	2.4	2.3	2.2	2.3	2.2	2.3
	8		3.3	3.0	3.1	3.0	3.3
	10		3.8	3.5	3.6	3.5	3.7
	13			4.2	4.3	4.3	4.7
	15			4.6	4.7	4.8	5.0
	18				5.2	5.3	5.3
	20				5.5	5.6	5.5
	25					6.3	5.8
Centre-South,	3	1.7	1.7	1.7	1.7	1.8	1.6
Yaounde, East	5	2.4	2.3	2.3	2.4	2.4	2.1
	8		3.3	3.3	3.3	3.3	2.9
	10		3.9	3.9	3.8	3.7	3.3
	13			4.7	4.6	4.5	3.8
	15			5.2	5.1	4.9	4.2
	18				5.7	5.6	4.6
	20				6.1	6.0	4.8
	25					6.6	5.4
Littoral, Douala	3	1.6	1.6	1.7	1.8	1.8	1.7
	5	2.2	2.3	2.4	2.4	2.3	2.4
	8		3.1	3.2	3.2	3.4	3.1
	10		3.6	3.8	3.8	4.0	3.8
	13			4.5	4.5	4.8	4.5
	15			5.0	5.0	5.3	4.9
	18				5.6	5.9	5.3
	20				5.9	6.3	5.4
	25					6.9	5.8
North-West, West,	1.7	1.7	1.8	1.6	1.7	1.7	
South-West	5	2.3	2.4	2.5	2.4	2.5	2.6
	8		3.4	3.6	3.4	3.5	3.7
	10		4.1	4.3	4.0	4.1	4.3
	13			5.1	4.8	4.9	5.3
	15			5.6	5.4	5.3	5.9
	18				6.1	6.0	6.7
	20				6.4	6.3	7.1
	25					6.9	7.8

Table 23 Ages at which selected percentages of fertile women aged 45–49 have borne their last child

Region	Percentage			
	10	25	50 (median)	75
North	23	28	34	42
Centre-South, Yaounde, East	20	28	38	43
Littoral, Douala	21	28	37	42
North-West, West, South-West	28	34	39	44
Cameroon	23	30	38	43

reached in the Western regions until the age of 28. Half the Northern women are secondarily sterile by the age of 34, a proportion not reached elsewhere for four more years.

Since the table is based only on women who have more or less completed their families we are restricted to looking at events which occurred in the past. Moreover, the reporting of the oldest women was the least accurate and there is considerable heaping on ages at the last birth: 11 per cent of the last births were reported at age 30 by women in the North, and 10 per cent at age 38 by women in the Western regions. While table 22 is therefore indicative of regional variations in secondary sterility, a closer examination requires that other information also be taken into account.

There are a number of diseases, venereal and otherwise, which predispose to primary or secondary sterility and pregnancy loss. Even without previous disease a miscarriage

Table 24 Percentage of pregnancies terminating in foetal wastage

Region	Age at interview							
	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54
North	4	8	5	5	4	4	6	6
Centre-South	15	11	10	9	11	13	14	17
Yaounde	(19)[a]	13	11	9	15	12	13	(17)[a]
East	20	13	11	13	9	8	11	11
Littoral	(11)[a]	12	11	7	7	9	10	12
Douala	(25)[a]	15	14	14	9	20	13	18
North-West	10	7	6	4	7	3	5	6
West	7	6	10	8	9	11	11	9
South-West	16	9	11	6	10	9	9	8
Cameroon	11	10	8	7	8	9	10	11

[a]Figures in parentheses are based on fewer than 30 pregnancies.

or other complication of pregnancy may cause pelvic infection leading to permanent sterility. The situation is more dangerous when disease is present. For example, syphilis increases the likelihood of pregnancy wastage and subsequent infertility, while gonorrhoea reduces fecundability itself. Other diseases such as bilharzia cause multiple miscarriage and sterility (Retel-Laurentin 1971, 1978).

A belt of involuntarily low fertility is known to stretch across sub-Saharan Africa, to include northern and southern Cameroon, and to be related very largely to venereal and other disease (Caldwell and Caldwell 1983; David and Voas 1981; Frank 1983). The WFS, of course, has no information on disease, but did collect information on pregnancy wastage. We therefore now attempt to uncover consistent regional patterns of the reported levels of miscarriage and stillbirth, childlessness and fertility. While it would be desirable to try to chart any trend over time in the propensity to abort it should be noted at the outset that data on foetal wastage are notoriously hard to collect, and that such an attempt may be over-ambitious.

Table 24 shows the proportions of all pregnancies which reportedly terminated in foetal wastage. With an expected proportion of between 10 and 15 per cent (Léridon 1973) it is immediately clear that pregnancy wastage was greatly under-reported in the North. Given the quality of other reporting in the North this is not particularly surprising; henceforward, pregnancy wastage data from the North are quoted only for the sake of completeness, but should be given no weight. Nevertheless, data from the other regions appear to be of higher quality. A higher incidence of foetal wastage among teenagers than women in their twenties is consistent with data from other sources (Nortman 1974). Moreover, foetal wastage is high in the Centre-South and East, which recorded high levels of childlessness, and lower in the Western provinces where childlessness was much less common.

Table 25 Percentage of first pregnancies reportedly terminating in foetal wastage

Region	Age at interview			
	15–24	25–34	35–44	45–54
North	5	5	5	7
Centre-South, Yaounde, East	12	10	9	17
Littoral, Douala	13	9	9	8
North-West, West, South-West	6	4	8	6
Cameroon	8	6	7	10

Table 25 contains the proportions of first pregnancies reportedly terminating in foetal wastage. Since the proportions are tabulated by age at interview, rather than confinement, we would expect a fairly constant proportion in each region if the incidence of foetal loss had not changed in the past. Any deviations from constancy would be caused by the relation between age at confinement and pregnancy outcome. Indeed, the higher proportions reported by women aged 15–24 than by women aged 25–34 may reflect the fact that the first pregnancies of the younger women of necessity are clustered more on the younger ages.

Looking at the levels of foetal wastage of the older women it appears that, at least in the Centre-South and East, there has been a decline in the incidence of foetal wastage, with wastage accounting for significantly more of the first pregnancies of women aged 45–54 (17 per cent) than of women aged 35–44 (9 per cent). Since virtually all first births had taken place by the age of 35 this difference cannot be ascribed to variation in the distribution of age at the first pregnancy and higher rates of foetal loss among first pregnancies occurring after age 35. On the contrary, since foetal wastage is typically under-reported and the quality of reporting worsens with age or the time since the event,[7] the real decline in the incidence of foetal wastage may have been even greater. This is illustrated by the fact that, in the Centre-South and East, women all of whose pregnancies ended in foetal wastage comprised 4 per cent of gravid women aged 25–44, but as many as 8 per cent of women aged 45–54.

There is a clear link between the outcome of the first pregnancy and subsequent fertility. While the proportions

[7] For example, higher levels of foetal wastage were reported over a short period preceding the survey, and over the previous year than the previous five years.

Table 26 Percentage of women whose first pregnancy ended in foetal wastage who have borne no live children

Region	Age at interview		
	15–34	35–54	15–54
North	32	34	32
Centre-South, Yaounde, East	52	45	49
Littoral, Douala	38	(31)[a]	35
North-West, West, South-West	34	11	22
Cameroon	41	31	37

[a]Based on fewer than 30 cases.

Table 27 Percentage foetal wastage among last pregnancies

Region	Age at interview			
	15–24	25–34	35–44	45–54
North	5	5	8	6
Centre-South, Yaounde, East	14	14	22	32
Littoral, Douala	12	13	16	19
North-West, West, South-West	5	8	14	16
Cameroon	8	9	15	19

in table 26 are based on small numbers they give useful information, as they are independent of the reported level of foetal loss. Two points are of interest. First, the proportions could be expected to drop off sharply with age at interview as the older women have had a longer period after the first pregnancy in which to bear a live child, but this happens only in the Western provinces. Elsewhere, there is little change with age. Secondly, the proportions vary greatly between regions with about one-half the women in the Centre-South and East who lost their first pregnancy remaining childless, but less than one quarter in the Western provinces. That loss of the first pregnancy is such a strong predictor of ultimate childlessness everywhere except in the Western region suggests that pregnancy complications frequently led to sterilizing disease in those areas. We can conclude that only in the North-West, West and South-West are women relatively unaffected by such disease, and that an intermediate level of disease exists in the Littoral province. These findings accord well with earlier findings on the incidence of both foetal wastage and childlessness.

A comparison of foetal wastage among first and last pregnancies (table 25 and table 27) reveals that a higher proportion of last pregnancies than first pregnancies are reported as foetal losses. For example, such losses accounted for 7 per cent of the first pregnancies of women aged 35–44, but 15 per cent of their last pregnancies. This might be explained as better (more complete) reporting of more recent events, or as an age effect whereby women over the age of about 35 are less likely to carry a pregnancy to term. This latter trend has been measured elsewhere (Nortman 1974) and might be exacerbated in areas of Cameroon by a history of previous pregnancy-related or venereal disease.

Table 28 suggests yet another explanation. Controlling for the duration since the termination, the last pregnancy of older women was a little more likely to end in foetal loss than that of younger women, but the table also shows that the longer ago the last termination the greater the probability that it was a stillbirth or abortion. Since the last pregnancies of the older women occurred longer ago than those of the younger women, their overall levels of foetal loss are weighted by such last wasted pregnancies.

The identification of a group of women in each cohort who had not been pregnant for many years, and whose last pregnancy ended more commonly in foetal loss than the last pregnancy of more recently pregnant women, suggests a link between wasted pregnancies and primary or secondary sterility. We have already seen that a sizeable proportion of women never bear a live child, either because they never become pregnant or because ultimate sterility sets in after the experience of foetal wastage. The latter tables show, in addition, that the onset of secondary sterility is also linked with foetal wastage.

It is extremely unfortunate that data were so badly reported in the North since foetal wastage, linked with venereal disease, undoubtedly plays a major role there in contributing to high levels of primary (and probably secondary) sterility (David and Voas 1981). Data from other parts of the country, however, proved more useful than one would have anticipated, and offer valuable insights into the determination of current fertility patterns. The

Table 28 Percentage foetal wastage among last pregnancies by time since their occurrence

Years since the last termination	Age at interview							
	15–24		25–34		35–44		45–54	
	%	(N)	%	(N)	%	(N)	%	(N)
0–4	8	(1671)	9	(1851)	12	(947)	19	(216)
5–9	13	(65)	10	(239)	17	(304)	16	(176)
10–14			15	(93)	15	(184)	18	(115)
15–19					18	(145)	14	(115)
20–24					20	(70)	22	(85)
25+							28	(107)

Western provinces are the only ones to exhibit consistently high fertility and low primary and secondary sterility. The Centre-South and East exhibit lower but rising fertility, higher but falling primary sterility, and also a high level of foetal wastage and associated secondary sterility. A slight decline in the incidence of wasted pregnancies may have contributed both to the decline in childlessness and, perhaps, to a slight increase in the fertility of fertile women. Finally, there is a high level of foetal wastage and secondary sterility in the Littoral province, but absolute childlessness has always been less prevalent there than in the North, East and Centre-South.

5 Infant and Child Mortality

Figure 21 presents the average number of dead children to women by single years of age as obtained from the household survey and the fertility survey. They are shown superimposed on figure 19 which presented average parities by single years of age of mother. Fluctuations in the average number of dead children recorded by the household survey are only minor for women younger than 50, while over 50 the fluctuations resemble those observed in average parities. The average numbers of dead children obtained from the fertility survey are very similar to, if slightly less than, those from the household survey.

The household survey data permit a calculation of the proportions of children ever born who have died by the time of the survey by women in five-year age groups, and these proportions are approximately equal to the proportions of children dying before certain ages. The correspondence is made more exact by applying multipliers (which are very close to unity) to the former proportions, the multipliers being based on the underlying fertility pattern (Brass and Coale 1968).

Table 29 contains estimated values of q(x), the proportion of children dying before their xth birthday, for the different regions of Cameroon and by sex. (The proportions are expressed per 1000 live births.) The multiplying factors were based on the ratio of the average parity of women aged 20–24 to that of women aged 25–29, P_2/P_3.[8] There

Table 29 Indirect estimates of mortality by region and sex, household survey

	q(1)	q(2)	q(3)	q(5)	q(10)
North	169	197	227	265	279
Centre-South	103	134	150	157	182
Yaounde	99	119	139	147	151
East	170	185	219	220	279
Littoral	194	137	209	220	264
Douala	156	137	130	151	199
North-West	131	141	160	200	265
West	148	147	184	222	281
South-West	164	137	220	239	307
Male	153	163	195	230	269
Female	143	147	182	203	242
Cameroon	149	155	188	217	256

[8] The North has a pattern of very early childbearing, so that P_1/P_2 exceeded the range of multipliers given by Brass; estimates were thus based on P_2/P_3.

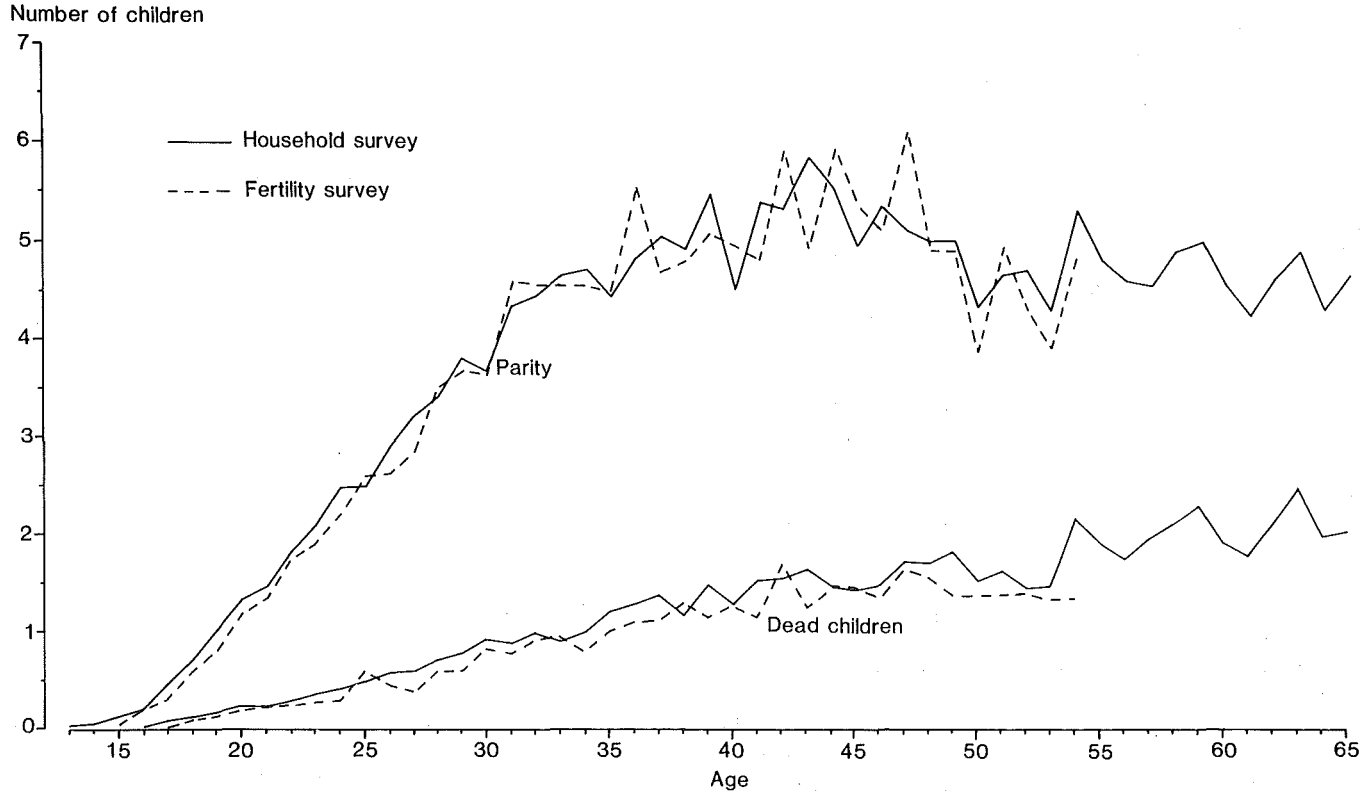

Figure 21 Average parity and average number of dead children

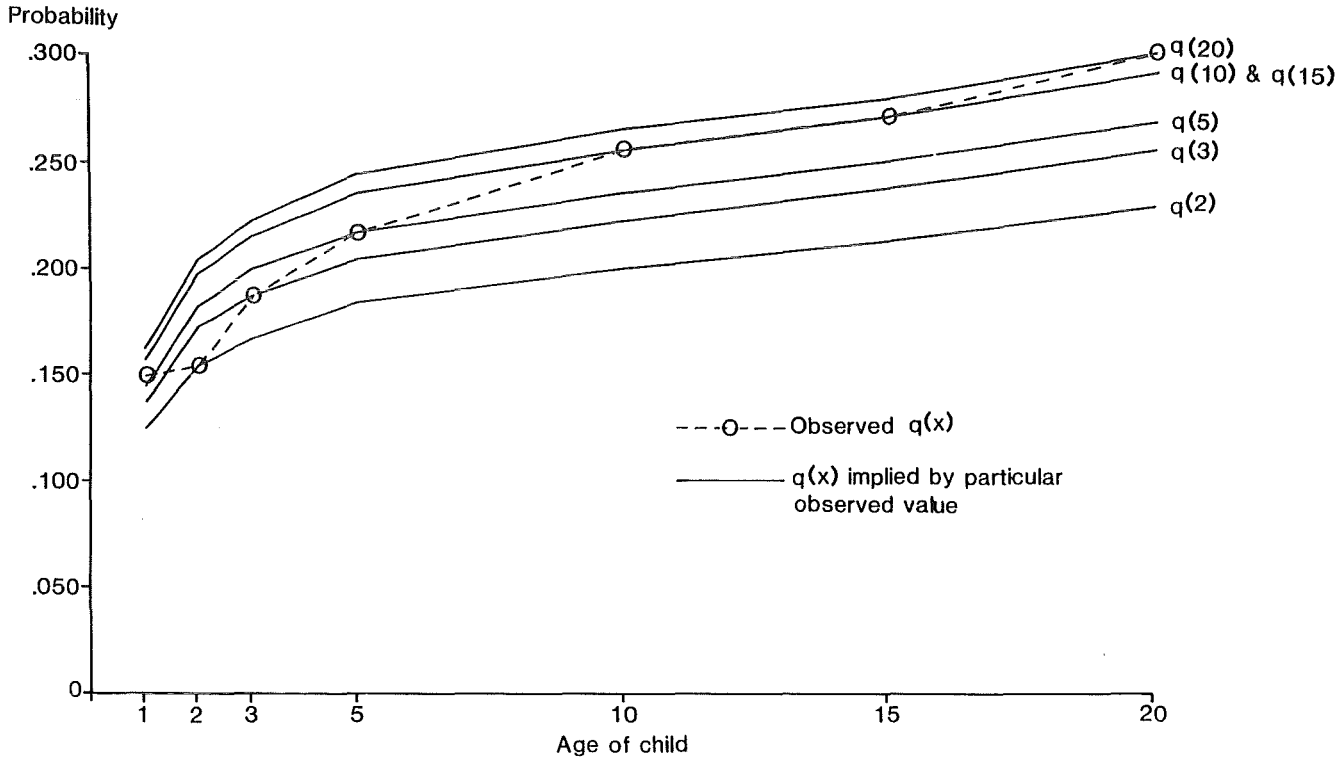

Figure 22 Probability of dying before age x, household survey

are marked variations between the regions, with the proportion dying before their second birthday ranging from nearly 0.20 in the North and East down to about 0.14 in the other provinces and a relatively low 0.12 in Yaounde. In the majority of regions the proportion dying before their first birthday was estimated to exceed the proportion dying before their second, but this anomalous finding is common in applications of the indirect technique. It stems essentially from the fact that q(1) is based on the proportion of dead children amongst children ever born to women aged 15–19. Such births are relatively few so that the proportion is thus subject to greater stochastic variation than the proportions for older women; and secondly, are at greater risk than births to older women because the risk of infant mortality is greater for teenage mothers and first births (Nortman 1974). The estimates of proportions dead rise steadily with age from q(2) onwards.

Reference to a schedule of model life tables (Coale and Demeny 1966) permits the calculation of a series of q(x) proportions consistent with each estimated proportion. For example, taking as our basis a West model life table with a q(2) value of 0.155, the same as that indirectly estimated for Cameroon as a whole, we obtain a value of q(5) of 0.184, as compared with an observed value for Cameroon of 0.217. Such comparisons can be used to assess the consistency of a series of estimates of q(x) or to detect any past mortality trends.

The results of such an exercise appear in figure 22. The dotted lines link the indirect estimates of proportions of children dying before particular birthdays, while the unbroken curves link each of these estimates with the corresponding proportions implied by a West model life table. The graph shows clearly that the older the women from whom the q(x) value was estimated, the higher the level of mortality. Thus, for example, the proportion of children dying before the age of five years indirectly estimated from women 30–34 was 0.217, but that consistent with the child mortality experienced by women aged 20–24 was 0.184 and that consistent with the experience of women aged 40–44 was 0.234. In other words, the findings are consistent with a decline in mortality, slower in the past and accelerating towards the time of the survey. The indirect estimates therefore refer not to current but to past mortality, and the degree of overestimation of the present level of mortality increases with the age of the child.[9]

Table 29 also presents sex-specific indirect estimates of mortality. It is encouraging that male mortality always exceeds female mortality, but a stronger test of the plausibility of the estimates is to determine for each age the model life table consistent with the male estimate, to derive a female estimate from the corresponding female life table, and to compare this implied estimate of female mortality with that calculated from the surviving proportion of female births. The results of this exercise appear in table 30 and demonstrate very close agreement, even for the estimates based on the reporting of women in their forties, namely q(15) and q(20).

Given the recent mortality decline, the regional estimates in table 29 will refer to increasingly earlier periods in the past. Table 31 therefore presents estimates of recent mortality under ages one and five based on a West model life table at a level determined, in each case, by the indirect estimate of q(2). A comparison between the indirect

[9] The decline in fertility would have little effect on the indirect mortality estimates because the age density of children of mothers of a particular age has probably undergone little change. If there were an effect it would be to underestimate mortality (Arthur and Stoto 1983).

Table 30 Consistency of indirect estimates of mortality by sex, household survey

Age	Male observed 1000q(x)	Female 1000q(x)	
		Implied by male mortality	Observed
1	153	130	143
2	163	143	147
3	195	174	182
5	230	208	203
10	269	247	242
15	278	258	260
20	314	295	286

estimates of child mortality, q(5), derived from women aged 30–34, and levels of child mortality implied by the experience of women aged 20–24, points to recent mortality declines in the North,[10] Littoral and Western provinces but not in the Centre-South or East.

For finer, direct estimates of current mortality levels it is necessary to turn to the fertility survey where information was sought not only on the number of children ever born and the number who had died, but also on the

[10] Independent evidence for a mortality decline in the North comes from considerably higher mortality estimates derived from a survey carried out in 1960 (Brass 1968).

Table 31 Levels of q(1) and q(5) implied by the indirect estimate of q(2), West model life table, household survey

	Implied q(1)	Indirect q(2)	Implied q(5)	Indirect q(5)
North	157	197	235	265
Centre-South	109	134	158	157
Yaounde	98	119	140	147
East	148	185	220	220
Littoral	111	137	162	220
Douala	111	137	162	151
North-West	114	141	167	200
West	119	147	174	222
South-West	111	137	162	239
Male	131	163	194	230
Female	119	147	174	203
Cameroon	125	155	184	217

timing of all births and deaths. Figure 23 indicates that two-fifths of all ages at death were reported in terms of completed years only. Slightly over one-quarter reported an exact number of completed years (0 completed months), and while some of this is undoubtedly real and refers to neonatal mortality, a portion is in all probability due to rounding. Morever, we might have expected a higher frequency on one completed month than two or three. The peak on six months confirms that many ages at death were

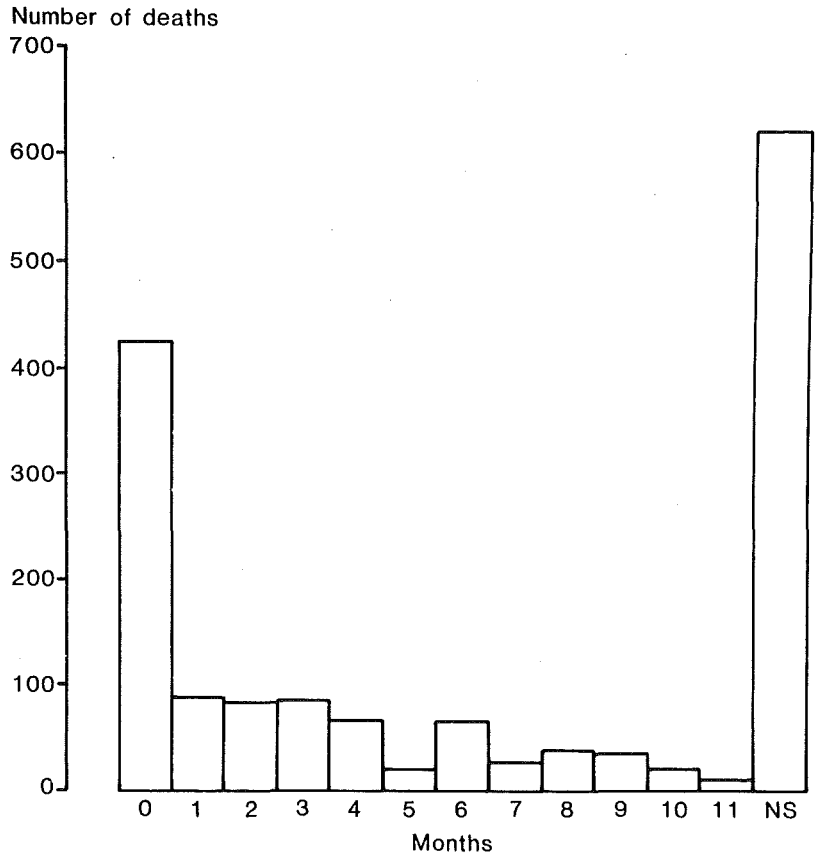

Figure 23 Distribution of age at death in completed months, fertility survey

Table 32 Trends in child mortality from the individual survey

	q(1)	q(2)	q(5)
Direct estimates of mortality by period before the survey (years)[a]			
0–4	106	143	195
5–9	103	140	194
10–14	135	174	243
15–19	134	170	241
20–24	186	225	291
Mortality implied by direct estimates[a] *of q(2) and West model mortality, by period*			
0–4	116	–	169
5–9	113	–	165
10–14	139	–	207
15–19	136	–	202
20–24	179	–	268
Mortality implied by indirect estimate of q(2) and West model			
Individual survey	118	146	173
Household survey	125	155	184

[a]Direct estimates are from table 6.3, First Country Report.

only approximations, as does the unpopularity of eleven months. Nevertheless, flaws in the reported age at death in terms of completed months will affect direct estimates of mortality only if children were shifted into an adjacent age group, for example if a child who died at the age of ten months were reported to have died at the age of one year.

The first panel of table 32 presents direct estimates of the proportions dying before their first, second and fifth birthdays in different periods before the survey, expressed per 1000 live births. A recent decline in child mortality is confirmed with, for example, a probability of death before the second birthday of 0.14 over the last decade, but of 0.17 over the previous decade. It is heartening to note the close agreement of the indirect estimate of q(2) from the individual survey (146) with the direct estimate over the recent past (143), while the indirect estimate from the household survey (155) is only a little higher.

The second panel of the table presents values of q(1) and q(5) implied by the direct estimates of q(2) assuming a West pattern of mortality. The implied values of q(5) are smaller in each case than the direct estimates, while the implied values of q(1) are close to the direct estimates. The greatest discrepancy in infant mortality occurs over the two most recent periods with an implied estimate of 116 over the period 0–4 years before the survey, but a direct estimate of 106, and comparable estimates for the period 5–9 years before the survey of 113 and 103.[11] Closer agreement is found between the direct and implied estimates of infant mortality during the more distant five-year periods.

The principal aim of table 33 is to assess the consistency of reported levels of male and female mortality. The central column of the table therefore presents the proportions of surviving females (per 1000) implied by the reported levels of male mortality on the assumption of a West pattern of mortality. The implied and observed levels of female mortality are very similar for the most recent period. Subsequent discrepancies are, however, quite large. For example, female mortality was reportedly higher over the period 10–14 years before the survey than over the period 15–19 years before. Moreover, female mortality was reported to be as high as male mortality over the ten-year period 5–14 years before the survey while, over the period 15–19 years before, its reported level fell considerably below male mortality.

There are some obvious deficiencies in the mortality data. For example, it is difficult to accept the existence of plateaux, with direct estimates suggesting fairly constant mortality over the decade preceding the survey, and fairly constant mortality, but at a higher level, over the ten years before that (table 32). In addition, while female mortality implied by indirectly estimated male mortality from the household survey is close to indirectly estimated female mortality (table 30), the directly estimated levels of female mortality from the individual survey are not close to the levels implied by male mortality when we go back more than five years before the survey (table 33). Nevertheless, although it may be difficult to seize on firm estimates of past mortality, it is indisputable, whether we base our argument on the household survey or the individual survey, that mortality has declined. At the time of the survey the infant mortality rate was probably a little higher than 106, while the probability of death before the age of two was about 0.14, and that before the age of five was about 0.18. The excess in the directly reported child mortality over the implied level may have come about either because of problems in reporting an exact age at death, or because the mortality schedule differs substantially from a Princeton model, with exceptionally high child mortality relative to q(1) and q(2).

Table 33 Levels of female mortality implied by direct estimates of male mortality, fertility survey

Period before the survey		Observed male	Implied female	Observed female
0–4	q(1)	115	97	96
	q(2)	150	130	135
	q(5)	200	181	190
5–9	q(1)	102	85	104
	q(2)	138	120	141
	q(5)	195	176	193
10–14	q(1)	129	109	141
	q(2)	176	155	174
	q(5)	245	222	240
15–19	q(1)	149	127	119
	q(2)	190	168	151
	q(5)	261	236	222

[11] The assumption of a South pattern of mortality lowers the implied infant mortality rates from 116 to 112, and from 113 to 110, but leaves the implied estimates of q(5) virtually unchanged, that is, considerably less than the direct estimates.

6 Summary of Findings

The Cameroon Fertility Survey is a particularly rich source of information on recent trends and current levels of fertility and child mortality. Both the household and the individual data have made valuable contributions to the present report. This is not to deny, however, that the data suffer from various reporting problems. The prime example is found in information from the North which is flawed by poor age reporting and by under-reporting of first marriages and foetal wastage. In almost every region, but especially in the North, childless women were over-represented in the 50–54 age group, while women in the 45–49 age group tended to displace the timing of their first birth toward the date of interview. The data must therefore be approached with some caution, but a reasonable measure of confidence can be placed in the information derived from women younger than 45, particularly if they are from areas other than the North.

Cameroon is experiencing an overall rise in fertility, and by 1978 the total fertility rate had climbed to between 6.2 and 6.4. The fertility increase is a direct response to a decline in primary sterility. Simultaneously, infant and child mortality have been falling, with respective levels at the time of the survey of about 110 and 180 per 1000 live births. While those women who bear children are not achieving higher parities than did earlier fertile generations, average family size has increased overall as more women than formerly are now physically capable of childbearing. An additional contributory factor to the increase in family size is the decline in mortality. These factors point to an increase in the annual rate of population growth.

The main picture to emerge from the analysis is one of clear regional diversity with respect not only to measures of fertility and mortality, but also to trends. Despite recent increases, the North still exhibits among the lowest fertility, and still has the highest level of primary sterility. Mortality is also highest in the North but shows some evidence of decline. Declines in primary and secondary sterility have been greater in the Centre-South and East and fertility has risen as a result. Mortality may not have declined in these provinces at all although the Centre-South has had the lowest child mortality of any province for some time. The fertility of women in the Littoral province is less affected by primary sterility, but a certain degree of secondary sterility appears to act as a fertility depressant. This province has experienced a recent mortality decline, and perhaps also a decline in fertility which may be related to a rise in the age at first marriage. Very high fertility was recorded in the North-West, West and South-West provinces. Primary sterility is not at the pathological levels measured elsewhere, nor does secondary sterility appear to be of importance. These provinces have also experienced a substantial mortality decline.

The great variation in levels of primary and secondary sterility between different regions of Cameroon is undoubtedly related to patterns of disease, but why these patterns should themselves vary so greatly across the country is the subject of further investigation. Some researchers have suggested a link between long periods of post-partum female sexual abstinence and high levels of genital disease, since husbands may seek out a large number of alternative partners while their wives are sexually unavailable (Caldwell and Caldwell 1983). On first examination such an explanation is untenable in Cameroon since the longest durations of abstinence, of between 15 and 19 months in the last closed birth interval, were recorded in the low-sterility areas of the North-West, West and South-West; shorter durations of between 8 and 13 months were reported in the high-sterility areas of the North, Centre-South and East. Nevertheless, the knowledge that conception may be difficult in these latter areas may serve to shorten periods of abstinence and hence to complicate the picture. Whether customary durations of post-partum abstinence are related to levels of sterility or not, the importance of a multiplicity of sexual partners, linked with long absences of males from home and high levels of marital instability have undoubtedly been of importance in depressing Fulani fertility in the North (David and Voas 1981).

Gonorrhoeal sequelae are linked with a very early age at first intercourse (Caldwell and Caldwell 1983). This is consistent with the Northern pattern of high levels of impaired fecundity and very early marriage. Moreover, the decline in primary and secondary sterility in the Centre-South may thus have come about as much through the recent increase in school attendance and rise in the age at first marriage as through the improvement of public health services and the administration of antibiotics.

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