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THE INFANT FEEDING STUDY

BANGKOK SITE REPORT

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TABLE OF CONTENTS

LIST OF TABLES

List of Tables (cont)

List of Tables (cont)

LIST OF FIGURES

Chapter I INTRODUCTION AND RESEARCH METHODS

This report is part of a larger study that began in 1979 to explore the determinants of infant feeding practices in four developing countries. The larger study was conducted by a research consortium of The Population Council, Columbia University, and Cornell University in collaboration with investigators in each field site. The Bangkok study was implemented by the Faculty of Public Health, Mahidol University, Bangkok. In addition to Bangkok, data were collected in Bogota, Colombia; Nairobi, Kenya; and Semarang, Indonesia. The institutions representing the other 3 sites are the Faculty of Interdisciplinary Studies, Javeriana University, Bogota; Central Bureau of Statistics (CBS) and African Medical and Research Foundation (AMREF), Nairobi; and Diponegoro University, Semarang. The central objective of the study is to investigate the significance of a broad range of biological, social, cultural and economic factors on infant feeding practices in order to determine the nature and magnitude of their contribution to problems of infant nutrition. The variables included the role of the health professions, infant food marketing and distribution strategies, and women's labor force participation. An interdisciplinary research approach has been utilized in order to identify a variety of potential influences on infant feeding decisions and choices.

This approach includes 3 study components: 1) ethnographic field work, consisting of Phase I: participant observation of infant feeding practices in the home and Phase II: similar observation in health services settings; 2) a cross-sectional household survey of mothers of infants under one year of age which includes infant feeding practices and consumer behavior relating to infant foods, 3) a market study on a national basis of the infant feeding market, including the analysis of the development and state of the industry and the structure of the market. The research has been guided by the conceptual framework developed by staff and consultants in early 1981.*

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* The conceptual framework was endorsed by AID's Project Review Panel in April 1981 and has been distributed as a Population Council International Programs Working Paper: Laukaran, V.H., E.K. Kellner, B. Winikoff, G. Solimano, M. Latham, P. Van Esterik, and J. Post, "Research on Determinants of Infant Feeding Practices: A Conceptual Framework," November 1981, Working Paper No. 1.

Ethnography: Site Description and Methods

"Bangkok, Bangkok cries out at the noontide hour. Bangkok holds up the palms of its hands to receive the rain in the wet season, and Bangkok - dreaming beneath the mist, dust and the soot. There - that is Bangkok. My mother city. Bangkok, for some, means only the cement pavements in front of two or three cinemas, the restaurants and the "shabby" cushions of the first-class seats in the trams. And the tenements and the people of Bangkok whose parched souls and eyes lack the poetry and the strength of the great rice-plain....And, as for me, Bangkok is a house, a huge house which is disorderly, noisy in confusion but full of life. Maybe it is lacking in the poetry and the strength of the rice fields but it is ful_ of the music of a great city...music from the sound of the engines and the sirens 'woot, woot' of ships and the sound of the factory bells and the power of the life and imagination and the dreams of eight hundred thousand people of human kind.

I love Bangkok - I love all about it that is ordinary and solid and all that is magnificent and grand...I love even the crowded confusion of the streets at noon when full of people, noisy with tram bells, with all the dance songs that play, and the cries of boys selling for the lottery...and I love the streets when free of people, covered by the shady tunnels of the rain trees through which we may stare up to see the silver stars uncountable, while the last rays of the day are plucked away from the horizon."

Sirichai Nau 'mitrekakan
Mahawitharalai 23, 1950
(tr. S. Simmonds)

The Bangkok Sirichai wrote of in 1950 is now a gigantic city of over five million spread over 1537 square kilometers on both sides of the Chao Phya River.

Bangkok, a primate city over forty times larger than the next largest Thai city, Chiang Mai, displays all the problems shared by other large Asian cities -- pollution, over-crowding, traffic congestion, crime, prostitution, and unemployment. As a result of rapid population growth of the capital, and rising gas and food prices throughout the seventies, subsistence problems for both urban elite and urban poor increased dramatically. In the early seventies, for example, the inner core area of Bangkok covering 21 square kilometers had a population density of 39,000 inhabitants per square kilometer. Within this city core, heavily

composed of Chinese businesses, 820,000 individuals held 296,000 jobs. This concentration of people and activities in the central cores of the city has not diminished in the past decade. However, population has spread out to the suburban fringes as well.

As the center of the political, economic, religious, and cultural life of Thailand, Bangkok attracts temporary and permanent migrants from all parts of the country, Bangkok sets the values and standards for the country, and migrants are prepared to endure difficult conditions in order to have access to the opportunities available or presumed to be available for work, education, health, and recreation. Once in the city, links with rural villages are maintained by visits from rural relatives seeking opportunities in the city and occasional visits up country for festivals and emergencies.

The migrants survive and occasionally flourish because of the urban dualism of Bangkok's economy. Although most major domestic and foreign companies are located in Bangkok, they provide only limited formal employment in industry and commerce. More significant for recent migrants is the large informal sector providing a vast range of goods and service. The informal sector employs individuals or households who work irregular hours, negotiate prices, and produce goods for a small scale "bazaar-type" economy.

About 10% of the Thai population can be identified as Chinese or Sino-Thai. Of these, over 50% live in urban centers. Thailand is often cited as a model of successful Chinese assimilation. In the nineteenth century, male children of Thai-Chinese parents could be registered as Thai or Chinese, while female children were automatically Thai. Later, all children born in Thailand automatically became Thai citizens (sanchaat). Since many Sino-Thai take Thai names, Chinese formal education is no longer available, and Chinese immigration is all but ended, Sino-Thai assimilation appears inevitable. This process is made more difficult to study, since the Thai census does not include ethnic background as a variable. However, national descent (chuachat) is still very much a part of one's identity as Thai or Chinese. By public consensus, certain neighborhoods are identified as Chinese, and within these many families can trace their descent to Chinese immigrants two or three generations back.

Within the urban context, households and individuals orient themselves in specific named communities. The ethnographers for this study sought to describe four of these communities in their Phase I work in order to understand the constraints and opportunities each household faced in making infant feeding choices. The findings of this work are described in detail in a report to the Population Council.* The Phase I ethnography was

intended to provide a background to the infant feeding survey and to suggest or modify hypotheses which could be tested in the cross sectional survey. The primary objective was to identify key sociocultural factors relevant to the determinants of infant feeding practices. The ethnography was used both to construct more useful instruments for the survey work and to add depth and context to the findings of the survey team. Specifically, the objectives of the Phase I ethnography were:

1) To describe in detail infant feeding practices and infant product use patterns.
2) To describe explicit and tacit cultural catetgories pertaining to infants, infant feeding, and foods as revealed through local language of mothers.
3) To identify potential economic, social, cultural, and commercial influences on infant feeding from the mother's point of view.
4) To identify and describe difficulties in data gathering which might affect the cooperation of respondents, or the validity, reliability and interpretations of data gathered by survey methods.

The four communities described in the phase one ethnography are examples of four distinct ecological niches within the city of Bangkok. They are not representative of anything except themselves. Other choices would provide slightly different historical and geographical contexts. The communities are described briefly below to give a background for the households within which infant feeding decisions are made on a daily basis.

Phasicharoen

The oldest of the four communities, this area was occupied around 1880 when Chinese market gardeners and members of the royal court (former queen of Rama sixth) settled in Dhonburi. The community grew up along the canals linking Dhonburi to the Chao Phraya river and Bangkok on the other river bank. In addition to natural population increase, the population grew from post World War II migration from the northeast and south of Thailand.

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*Durongdej, Somchai (ed.). "Infant Feeding in Bangkok, Thailand", Vol. II, Ethnographic Study Phase One.

The community is quite self-contained. A well developed road and water transportation system bring food and household necessities to two large markets within the community. Stores and businesses in the neighborhood adequately serve the needs of the occupants: restaurants, grocery stores, coffee shops, stationary and bookstores, hair stylists, barber shops, tailors, and mobile food vendors all provide services and employment for local residents.

Community residents work within the community and in the surrounding government institutions in Bangkok. Civil servants, military personnel, laborers, drivers and shopkeepers live in the community. In addition to formal work outside the home, local housewives can earn extra cash at home by sewing brassieres, making umbrellas, selling food, and assisting with family businesses. Ethnographers estimate an average family income of 4000 Bhat per month (US $200).

In addition to a sprinkling of large, modern walled houses, the majority of Phasicharoen residents live in wooden row housing opening onto communal walkways. Houses contain kitchen and bathing facilities in the back and are connected to adequate although undependable water and sewage systems. Some houses double as coffee shops, noodle shops, or small home industries. Some row housing within the community is very poor, with even fewer amenities.

Educational and religious institutions have been long established in the Phasicharoen area, providing services for both Thai and Chinese residents.

The community is conveniently located near several major hospitals and clinics. In addition, modern pharmacies and Chinese herbalists supply a wide range of remedies and services to area residents.

Central Plaza Construction Site

Central Plaza offers the greatest contrast to the long-established and traditional neighborhood of Phasicharoen. By administrative definition, it is not really a community at all, but an enclave created by the construction company to house its workers. The temporary housing site is located near one of Bangkok's largest commercial markets. Here, the residents can purchase all kinds of household goods and services at competitive prices. The construction contractor's family owns the only shop within the community -- a small grocery store selling foods and ready cooked dishes on credit. These charges are deducted from the worker's wages since the owner of the grocery store is the contractor who controls the payroll of all workers.

The occupants of Central Plaza Construction site are all by definition employed by the construction contractor. When a person's employment is terminated, the skimpy room must be vacated immediately. The workers are usually short-term temporary migrants from all regions of Thailand. Usually, it is the male of the family who works for the construction company, earning between 60 and 100 Bhat per day. Although women are also hired by the construction contractor, most of the mothers work informally at domestic tasks which save the family cash for household necessities such as charcoal, and occasionally provide extra income.

The residents share the burdens of an exploitative work environment. Low wages combined with no sick benefits, withholding pay as deposits to keep workers on the job, and overcharging at the company store make the financial situation of the residents precarious at best.

The housing facilities themselves are flimsy rows of single rooms separated by walkways. The multipurpose rooms are small and badly ventilated. A family of four may reside in a single room 4 x 2.5 meters. There are communal washing and toilet facilities in a separate building. Residents dispose of their garbage in front of their rooms or under the raised housing.

Residents of Central Plaza can use the education, religious, and health facilities available outside their work place. Generally these services are underutilized since the residents are temporary migrants whose only purpose in coming to Bangkok is to work at the construction site. Many young families may be totally unaware of the health and welfare services available to them in the Bangkok area. For many, their only view of Bangkok is from within the confines of the Central Plaza Construction Site.

Senanikhom

Not far from the Central Plaza Construction Site is another residential community which grew up around a place of work. But the conditions in this suburban community differ significantly from those described above.

As Bangkok grew, Senanikhom became one of the many residential suburbs around the periphery of the city. Here in 1959 a huge Blanket Factory hiring thousands of workers opened in a large rice field. Soon the workers sought housing in the immediate area rather than making the long bus trip into the residential center of Bangkok. Now, the area is simply another heavily populated suburb of Bangkok. A number of other factories have opened in the area and transportation to the center of Bangkok is much faster and more convenient than in the past.

In the past, this suburban community attracted and absorbed a large number of migrant workers from the northeast and central regions of the country. The area provided steady work for both men and women. This is a community of semi-skilled workers with women employed by factories like the Blanket Factory, and men working there or in heavy industrial factories nearby. Both men and women adjust to shift work, as the factories operate 24 hours a day. Wages vary from 50 to 120 Baht per day, within the range of the salaries paid to the Central Plaza Construction workers. However, in Senanikhom, there is a greater sense of permanency about the community, as occupational security is quite high. Temporary or seasonal migrants are not the backbone of the factory operations in Senanikhom.

Unlike Central Plaza, there are a number of housing types available in Senanikhom lanes. In addition to substantial rental housing of a variety of styles and prices, there are areas of overcrowded row housing in disrepair. As in the other two communities, these houses have a single room with kitchen and bathing facilities behind each unit. Water is piped in, but sewage facilities are inadequate, and waste water and garbage accumulate under the narrow walkways suspended between the houses.

As in Phasicharoen, there are temples and schools located in the community. Government offices including the public health station are located nearby. A variety of health facilities--from hospitals and polyclinics, to small clinics located within the lane--are used by area residents. The local health center provides a well-baby program concentrating on preventative health for mothers and infants.

Din Daeng

The Din Daeng community is the most heterogeneous of all the neighborhoods described thus far. Within its boundaries are contained slum-like housing areas, temporary squatter settlements, and public housing flats. Initially, this area of Bangkok sheltered the city's poor and temporary migrants. However, as the number of poor residents increased, conditions of overcrowding worsened, forcing the National Housing Authority to build large apartment buildings in an attempt to clear the slums.

The community is surrounded by markets, pharmacies, restaurants, and all manner of business enterprises providing goods and services at moderate cost. Within the slum itself, local residents operate stands out of their houses selling household necessities and prepared foods. Often the standard packages and bags are subdivided into small containers selling for 1-3 baht, a price more residents can afford.

There is a wide range of employment opportunities represented in this community. In the flats, one is more likely to meet business persons, teachers, police officers, hair stylists, dress makers, and government employers. In the slum itself, one is more likely to meet garbage collectors, sewage workers, taxi drivers, fertilizer plant employees, small vendors, and individuals working in the informal sector providing all kinds of legal and not so legal services. Women in particular find a variety of ways to make small amounts of cash for daily purchases, although few of them have the luxury of regular employment.

Housing conditions in the slum areas are by definition, poor. In the worst of the lanes, the houses are in poor physical condition, tilted over open sewage water a few feet below. The row houses overlap one another and face onto a communal walkway. Conditions in some of the flats, owned by former slum households, are not much better, although the five floor apartment structure looks much more durable. Sewage systems in the flats are better planned and constructed, although residents complain that the sewage disposal is quite unreliable. Below the flats is an open cement space where children play and vendors sell occasional treats.

There is little contact between the two parts of Din Daeng, except that many of the flats' residents used to live in the slum area. Relations between neighbors in the flats appear minimal. In the slums, necessity forces close co-operation between neighbors who share one water source, care for each other's children, and protect the meagre (and not so meagre--TV, stereo, etc.) possessions of their neighbors.

Din Daeng community is located near the full range of educational, religious, and health institutions. Government services such as vocational training and youth development centers are close by. For minor ailments, residents go to private clinics, pharmacies, or health centers in the community. Mobile health units provide additional services. The local health center provides immunizations and child care for local mothers.

Fieldwork: Samples, Personnel and Data Collection

Three months of fieldwork were carried out in the four Bangkok neighborhoods. Forty households were chosen, ten in each neighborhood. Only households with infants under twelve months were selected for intensive study. Households were not chosen randomly. From a limited number of introductions the sample households "snowballed" until ten households with an appropriate distribution with respect to the ages of the mothers, infants, and other socioeconomic variables were selected. Neighbors, shopkeepers and others were also observed and interviewed.

The ethnographic components were under the direction of Mr. Thavisak Svetsreni, of the Institute for Population and Social Research, Mahidol University, with the assistance of Dr. Subarn Panisavas, Dr. Santhat Sermsiri, Ms. Malika Mittiko, and Ms. Pasook Anekavancih. This team had responsibility for the design, supervision, and analysis of the research. They conducted the training for the ethnographers and participated in the training of the survey interviewers.

Eight junior ethnographers were recruited from the Faculty of Social Science, Mahidol University. They were all graduate students from the Department of Sociology and Anthropology, who had had interview experience. Four males and four females were chosen. It was felt that males would have easier access to certain key informants and social and community situations. The females had primary responsibility for the in-depth participant observation of mothers. Interviewers worked as 2 person male/female teams in each of the communities.

Before fieldwork began, a Thai field manual was developed from the general guidelines provided by the Consortium. Training of the ethnographers was based on this document. Information gathering was based on structured household interviews, open ethnographic interviews and participant observation to capture a comprehensive picture of infant feeding practices in Bangkok.

The male ethnographers focused on the broader macro-level community features including interviewing key informants in the area. The female ethnographers stayed with the index mothers and infants in the household or accompanied them around the community. The two person team recorded the following kinds of information obtained through participant observation and informal interviewing.

I. Infant Feeding Practices:
   -detailed description of what infants are fed by whom, at what time of day, in what settings.
   -where food is obtained, by whom and how frequently
   -how food is prepared and stored
   -care and feeding of children in mother's absence

-description of cues mothers use to determine when infants are satiated or hungry for milk or other foods.

2. Household and Community Context
   -household size and characteristics (kinship)
   -household income and expenditure
   -description of dwelling including occupants per room, water supply, toilets, etc.
   -community facilities - shops, transportation, health and social services
   -mother's relations with neighbors and friends.

3. Mothers' Activities
   -patterns of formal and informal employment and job seeking patterns of all household members
   -mothers' activities outside the home with and without the infant.
   -sequence of activities of mothers during the day.
   -compatibility of activities with infant feeding.

4. Mothers' Attitudes, Values and Knowledge of Infant Feeding
   -terms used for infant feeding
   -community norms regarding infant feeding behavior and weaning
   -attitudes toward breastfeeding with reference to values such as modernity, status, aspirations, modesty and other cultural values
   -perceptions of effects of breastfeeding on mothers health and attractiveness
   -perception of effects of breastfeeding on infant health and growth.

Analysis was principally qualitative, including the identification and description of social networks. Ethnographic findings were then integrated with the rest of the data. Interpretation of Phase I data was directed at guiding the design of other survey instruments and suggesting further hypotheses for exploration in Phase II.

The primary objective of the Phase II study was to expand on work done in the Phase I ethnography. The Phase II ethnography was conducted to overlap with the administration of the survey and to focus on information not easily obtainable by the questionnaire. The first round of ethnographic field work revealed certain clues about how pregnant and postpartum women in Bangkok absorb ideas from health and medical personnel working in hospitals, public health centers and drugstores. Although the duration of these contacts is relatively brief, compared to those with family or neighbors, such contacts were suspected to be very influential. Phase II fieldwork was designed to study these contacts. The objectives of the Phase II ethnographic research were to study:

1. the patterns of communication in the hospital and the public health centers.
2. the content of information, advice, and suggestions provided by hospital staff and public health workers.
3. the psycho-social constraints faced by mothers and their receptivity to the suggestions of professionals about infant feeding practices.
4. the mother-druggist interaction with an emphasis on infant illness as perceived by parents and remedies prescribed by drug sellers.

Observation and unstructured interviews took place in eight government and private Bangkok hospitals, five health centers, several stores and five homes. In total, 119 informants were interviewed in and around these health care institutions (Table 2-1). The research was carried out by two graduate students from the Institute for Population and Social Research, Mr. Yothin and Miss Sujinda.

Fieldwork in Phase II took two months. Each junior ethnographer was assigned to a hospital site and spent the day observing and interviewing patients and staff. Within each hospital setting, the ethnographers observed in the out patient department, examination rooms, mothers' classes, inpatient wards, and if invited, the staff lounges and quarters. Mr. Yothin, a former news reporter, and Miss Sujenda, a nurse, blended into the research setting without difficulty.

Fieldwork was carried out using participant observation and informal interviewing. Initial observations were broad; later on in the study, the ethnographers focused more on specified important issues. For each informant, the ethnographer noted demographic information, family background, infant feeding knowledge and attitudes and all possible information concerning the dissemination of information of infant feeding in each setting. The ethnographers observed, in each setting, the infant feeding messages given in the form of posters, brochures, and advertisement. The detailed findings of the Phase II ethnography are the subject of a separate report to the Population Council.*

*Svetsreni, Thavisak, "Infant Feeding", Vol. 4, Anthropological Study of Infant Feeding Communication in the Bangkok Metropolitan Communities.

Survey Methods

Sampling

The survey component of the Infant Feeding Study was designed to investigate the role of a broad range of factors as determinants of infant feeding practices. These factors included, among others, demographic variables, women's employment, and health service variables. For each of these factors, it would be possible to design a special study to investigate effects on infant feeding practices. The sampling strategies would, in all probability, vary according to the purpose of the analysis.

Because of the broad scope of this study and the need to obtain descriptive information for policy purposes, it was decided, in consultation with sampling experts, to use representative cluster samples. In Bangkok, the National Institute of Development Administration (NIDA) maintains a sampling frame which had been updated in 1979. This sampling frame includes 627,848 households in Bangkok and is a representative self-weighted multistage cluster sample. In order to achieve a sample size of between 1,000 and 1,500 households, using the number of births registered in 1978, 83 blocks were selected randomly in proportion to the original size of each district. The maps for the selected blocks were obtained from NIDA and these were used to update the blocks, to locate boundaries, to identify eligible households and to conduct a census of eligible households. All members of the households were enumerated, and each household was determined to be eligible if a female resident of the household reported a live birth during the previous twelve months (March 1, 1981 - February 28, 1982). Of the 8,796 households enumerated in the 83 blocks, 1,454 eligible households were identified. The Thai survey team stated that there were no reported refusals or non-respondents. The final sample size of 1422 includes all index mothers who provided usable data, excluding the three whose most recent child was reported to have died and those whose children were not living with them. The characteristics of the households in the sample are described in Chapter II.

Instrument Development

The Research Consortium developed a model instrument for all study sites which included information on households, information on index mothers, and information on the index child. The basis for the selection of these variables was described in International Programs Working Paper No. 15. (see above, Laukaran et al., 1981), key variables to be included in each instrument. Basic household information included income, water supply, electricity, sanitation, refrigeration, number of persons in the household, and recency of urban migration.

Information on the index mothers included age, number of live births, number of years of education, and employment of a male head of household. For each child, information on sex, date of birth, age, birth order, place of birth, name of mother, hospitalization and morbidity in the last two weeks, as well as height and weight were included. Infant feeding variables included:

* ever breastfed
* currently receiving breast milk
* currently receiving non-human milk
* currently receiving infant formula
* currently receiving other foods
* duration of exclusive breastfeeding
* age at first breastfeeding
* age at cessation of human milk
* age at introduction of non-human milk
* age at introduction of infant formula
* age at introduction of other foods
* type of other foods given

Other information included in the survey covered consumer behaviors and attitude, prenatal care and health services, mother's employment, knowledge and attitudes about breast-feeding, and determinants of bottle-feeding and weaning. A draft instrument was prepared for use in Thailand based on the core instrument developed by the Consortium and on the results of the local ethnographic field work. Technical assistance was provided by the Consortium for the revision of this instrument after pretesting in a health center in Bangkok. Revisions were incorporated, and the final instrument was approved by the Consortium prior to use in the field.

Training

Interviewers were selected from the graduate students at the Faculty of Public Health at Mahidol University. The fifteen interviewers were trained in February of 1984 with lectures, discussions and field exercises. The training was conducted by the principal investigators and research associates on the staff of the project. The ethnographic fieldworkers attended the training and participated in the fieldwork exercises. Training for anthropometric measurement was conducted by the senior staff of the project who had had previous experience in anthropometric fieldwork.

Fieldwork

The survey data collection took place from March 1, 1982 to April 16, 1982. Fieldworkers were supervised by the principal investigator and research associates from Mahidol University. Completed questionnaires were audited every day, and any incom-

plete or ambiguous responses were clarified. Some households were visited the following day to re-interview as needed. A selected number of respondents were re-interviewed by field supervisors to determine accuracy. Regular meetings were held with all interviewers in order to resolve field data collection problems or problems in locating respondents or in utilization of the instruments.

Data Analysis

The data were coded, edited, and cleaned in-country using the computing facilities of Mahidol University. The clean data tapes were delivered to Consortium staff at The Population Council in New York, and final data analyses were prepared in the Council's DEC-PDP-11-73 computer. For logistic regression analysis, the Princeton University Computing Center was used to enable the application of SAS programs.

Table 1-1 Sample for Data Collection: Ethnographic Study Phase II

Health Care provider	Number of observations	Total
Government Hospitals		
Rajvithi Hospital		
OPD	19	
Maternity Ward	19	
Cafeteria	1	39
Children hospital		
OPD	7	
Pediatric Ward	6	
Hospital shop	1	
Preventive Medicine dept.	1	
Welfare dept.	4	
Milk room	1	20
Central Hospital		
Maternity ward	8	8
Ramathibodi Hospital		
Special maternity ward	1	1
Pra Mongkut Hospital		
OPD	5	5
Siriraj Hospital		
Maternity ward	1	
Special maternity ward	2	3
Vachira Hospital		
OPD (Prenatal)	1	1
Private Hospital		
Huacheay Hospital		
OPD (Prenatal)	3	
Maternity ward	5	
Special maternity ward	2	10
Bangkok Health Center		
Center # 4	3	
Center # 9	1	
Center # 20	6	
Center # 30	2	
Center # 31	3	15
General store	1	1
Home visit	5	5
Bang 00 Market	1	1
Detail representatives	2	2
Drug store	8	8
TOTAL	119	119

II CHARACTERISTICS OF THE STUDY POPULATION

A total of 1,422 mothers and their youngest child comprise the cross sectional survey sample for Bangkok. Slightly less than half (45%) of the sample members live in nuclear families. The rest live in extended families or with non-relatives. The median family size is 4.8, and two-thirds of the households have six or fewer members. Table 2-1 shows the distribution of family size among the households comprising the sample.

When the range of family incomes is divided into four income groups, 80.2% of the sample families fall in the two lower groups with monthly family incomes of 500-3,000 and 3,001-6,000 Bhat, respectively. A much smaller percentage of families, 14.3%, are in the third group with monthly incomes in the 6,001-10,000 Bhat/month range. The smallest group, comprising 5.5% of the families are those with monthly incomes in excess of 10,000 Bhat. The median family income for the entire sample is 3,998 Bhat. (The 1982 exchange rate was 22.96 Bhat = $1 US.) Figure 2-1 shows the distribution of monthly family income.

Almost every household was reported to have electricity and an indoor flush toilet, and almost all households had access to piped water as well.* The majority of respondents (92%) reported that they boil drinking water. However, 35% said that they do so only for young infants, and this practice almost certainly exposes other family members to the risk of gastrointestinal illness. Possession of refrigerators and gas or electric stoves is less common. Fewer than half of the mothers reported living in households owning either of these (Table 2-2).

Tables 2-3 and 2-4 display some descriptive characteristics of the index children. Table 2-3 shows the age distribution of the children, indicating that the sample under twelve months of age is fairly evenly distributed by month of birth. (The median age of the sample is 5.6 months.)

*It should be noted that the ethnographers found certain areas of Bangkok to be sorely lacking in such basic amenities as water quality, indoor toilets and bathing facilities, and house construction. The Central Plaza construction area, for example. is mainly populated by construction workers and their families who must depend on a central building for bathing, laundry, and toilet facilities. These facilities were found to be "wet, badly ventilated, poorly maintained, and unclean." The Dindang slum community is another area in Bangkok with equally notorious conditions.

For the purposes of this study, a child aged 0-29 days at the time of the study is 0 months of age; a child aged 30-59 days is 1 month of age and so forth. Table 2-4 shows that there is an askewed sex distribution of the index children with the percentage of males exceeding the expected.

Most of the mothers participating in the cross sectional survey are young. Almost two-thirds of them are clustered in the 20-29 year old age cohort, and the median age of the sample is 26 years (Table 2-5). The large majority of the respondents reported having had at least some formal education, with a bare 5% reporting no formal schooling. Most of the mothers have had between one and four years of education (Table 2-6). This reflects Thailand's compulsory education law which mandates at least a minimum of formal schooling for all citizens. The sample is almost evenly divided between those mothers who were born in Bangkok, and those who were born elsewhere and later migrated to the capital (Table 2-7).

At the time of the survey, 36% of the mothers were engaged in some form of wage earning activity with service occupations/daily wage labor, commerce, civil servant and merchant being the most frequently cited occupational categories (Table 2-8).

Most of the sample mothers reported having had between one and three live births, with 43% of the mothers reporting having only one child (Table 2-9). Since the study sample is a random sample of all mothers with children aged zero to twelve months, the observation that almost half are primiparous may suggest a pattern of current low fertility in Bangkok.

Finally, given low fertility and the low age of the children in this sample, it is not surprising that only 2% of the sample mothers had become pregnant again by the time of the survey (Table 2-10). This pattern may be explained partially by postpartum lactational amenorrhea (a topic to be covered in greater detail in a later section of this report). Fully one-third of the mothers reported current amenorrhea at the time of the survey (Table 2-11). Another determinant of the low pregnancy rate is the extensive use of contraception by this group of mothers with young infants. At the time of the survey, 60% of the mothers reported that they or their partners used some form of contraception (Table 2-12). Interestingly, 10% of the sample reported the use of contraceptive injection which may have increased the number of women who reported a current state of amenorrhea. On the other hand, over one-quarter of all mothers reported that they used contraceptive pills, which could artificially decrease the extent of amenorrhea reported by the sample mothers.

Table 2-1 Family Size

Size	(N)	%
2	2	0.1
3	344	25.0
4	292	21.0
5	186	13.0
6	141	10.0
7	103	7.0
8	84	6.0
9	52	4.0
10	53	4.0
11	44	3.0
≥12	12	6.0
TOTAL	1392	100%

Table 2-2 Socioeconomic Indicators: Household Amenities

Indicator	Total N	%
Electricity	1394	98
Indoor Toilet	1409	99
Refrigerator	572	40
Gas/Electric Stove	584	41

Table 2-3 Age Distribution of Index Children

Months[1]	Total N	%
0	80	6
1	111	8
2	105	7
3	121	9
4	140	10
5	133	9
6	121	9
7	137	10
8	123	9
9	96	7
10	91	6
11	108	8
12	49	3
TOTAL	1415	101%

[1]0-29 days = 0, 30-59 days =1, etc.

Table 2-4 Sex Distribution of Index Children

	Total N	%
Male	754	53
Female	668	47
TOTAL	1422	100%

Table 2-5 Age Distribution of Mothers

Age of Mother	Total N	%
14-17 years	26	2
18-19	78	6
20-24	417	30
25-29	467	34
30-34	263	19
35-39	108	8
≥ 40	32	2
TOTAL	1391	101%

Table 2-6 Years of Education of Mothers

	Total N	%
None	68	5
1-4 years	835	60
5-7	190	14
8-10	139	10
> 10	157	11
TOTAL	1389	100%

Table 2-7 Birthplace of Mothers

	Total N	%
Bangkok	593	43
Other	788	57
TOTAL	1381	100%

Table 2-8 Occupation of Mother

Occupation	Total (N)	% of total	% of employed women
Not currently working for pay	902	64.2	
Currently working for pay	502	35.6	100
service/daily wage labor	206	15	41
civil service	182	13	36
merchant	86	6	17
professsional	8	1	2
agriculture	4	--	--
other	16	1	4

Table 2-9 Parity of Mothers

	Total N	%
1	603	43
2-3	629	45
4-5	124	9
6-7	24	2
8-9	11	1
TOTAL	1391	100%

Table 2-10 Pregnant at Time of Survey

	Total N	%
No	1337	98
Yes	30	2
TOTAL	1367	100%

Table 2-11 Amenorrhea at Time of Survey

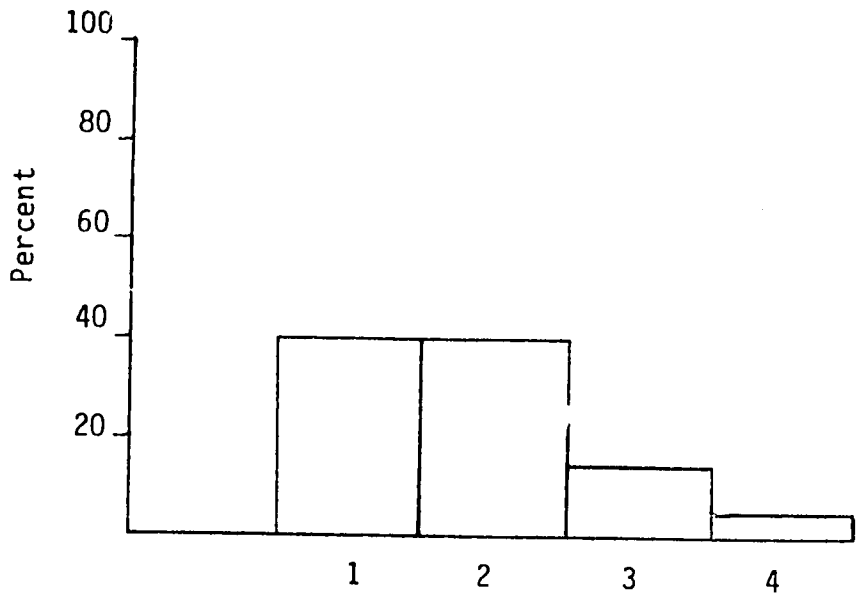
	Total N	%
No	913	67
Yes	454	33
TOTAL	1367	100%

Table 2-12 Types of Contraception Being Used by Index Mothers at Time of Survey

	Total N	%
None	562	40
Pill	381	27
Female Sterilization	206	15
Injection	137	10
IUD	53	4
Male Sterilization	20	1
Condom	19	1
Rhythm	5	-
Other	9	1
TOTAL	1392	99%

Figure 2-1

Monthly Family Income



Key:

1 = 500-3000 Bhat (n = 558)

2 = 3001-6000 Bhat (n = 551)

3 = 6001-10,000 Bhat (n = 197)

4 = >10,000 Bhat (n = 76)

III INFANT FEEDING PRACTICES: OVERALL PATTERN

The vast majority of children in the study sample are breastfed at least some time during the first year of life. Ninety percent of the sample reports initiation of breastfeeding (Figure 3-1).

Figure 3-2 is based on current status data and presents the percentages of children who are currently breastfeeding, those who are exclusively breastfeeding with no supplements, those who breastfed but stopped, and those who never breastfed, according to the age of the child at the time of the survey. This figure confirms what was illustrated earlier, that most children initiate breastfeeding. As a result, the percentage of children who have never breastfed is in the 5-10% range for all ages. The number who report current breastfeeding is almost 80% in the first month and steadily declines to nearly 40% among children over four months. Exclusive breastfeeding involves an appreciable percentage of children only during the first month. The prevalence declines sharply among older children, until, at the end of five months, there are virtually no exclusively breastfed children.

Figure 3-2 and Table 3-1 indicate that most of the change in the prevalence of these various indicators of breastfeeding status occurs during the first four months. The most precipitous early decline apparently occurs almost immediately after birth: while 90% of the sample reports having breastfed at some time, only 77.5% of all children aged 0-29 days were being breastfed at the time of the survey! Among children four months and older, the levels remain fairly stable until children reach the twelfth month when there appears to be another large decline in the numbers who continue to breastfeed (Table 3-1).

Figure 3-3 presents a view of milk consumption by type of milk and the age of the child. The data reveal that the majority of children receive no breastmilk substitutes during the first three months. By the fourth month, most children are receiving breastmilk substitutes, and the relative percentages of children consuming the various milks fluctuates very little among children aged three months and older.

The least common pattern is mixed feeding involving both breast and bottle. The suggestion here and elsewhere in this report is that the introduction of breastmilk substitutes is associated with relatively rapid cessation of breastfeeding in Bangkok. Thus, for most children, milk feeding involves either breastmilk or breastmilk substitutes, but rarely breastmilk and breastmilk substitutes together. When this pattern is seen, it is likely part of a transitional phase leading to the cessation of breastfeeding.

Although most Bangkok mothers in the sample did breastfeed for at least some time, ten percent never initiated breastfeeding. The cross-sectional survey suggests that the women who have never breastfed do differ from other women with respect to a number of socioeconomic and health services variables (Table 3-2). In comparison to the majority of the sample mothers, those who were aged 40 or more, parity of 4 or above, born in Bangkok and had deliveries at public hospitals were much more likely (approximately two-fold) never to initiate breastfeeding. In addition, a more discrete group with specific health difficulties can be defined as particularly at risk of never breastfeeding. These include women who had caesarean deliveries and those whose babies had health problems at birth or had to stay extra days in the hospital. These babies constitute only a small percent of the entire sample (<10%) and a minority of those who never breastfeed. Nonetheless, they are an easily identified group at special risk for subsequent health problems, where early intervention and encouragement of breastfeeding might be both feasible and effective.

The ethnographic case studies provide some possible insights as to why certain Bangkok mothers never initiate breastfeeding. One of the ethnographers describes the experience of a woman who, after becoming pregnant, separated from the child's father:

> "Vasna was born in Bangkok... (before marriage) she lived at home with her parents in a construction site where her father was a carpenter. Vasna ran away from him and got a Japanese husband (not a legal marriage). When she became pregnant, the husband left her. She returned to stay with her parents again. The infant was born at Rajvithi Hospital. Initially, breast feeding was intended, but Vasna's nipples were too short and (were) refused by the baby. The hospital staff suggested formula milk to her. S-26 brand was started according to her mother's advice. After 20 days Meiji Brand (was substituted) for S-26 because during the previous three weeks there was no sign of the baby's growth... Since there are seven persons in the family, there are more than enough people who eagerly take responsibility for the baby. Her (Vasna's) mother plays a leading role in making decisions for everything related to the baby. Vasna became uninterested in taking care of the baby because there are already too many persons doing that."

Here we have a situation where difficult social circumstances, physical problems with breastfeeding and inappropriate medical advice, all combine to result in a lack of breastfeeding in circumstances where there were no true contra-indications or absolute barriers to maternal nursing. It is probable that complete failure to breastfeed is often due to an

unfortunate coincidence of discouraging events each of which make breastfeeding marginally more difficult. Combined with poor advice from professionals and/or family and friends and a readily available alternative, a certain small percentage of women, in effect, abandon breastfeeding even before they start.

Figure 3-4 shows the percentages of children in different age groups who consume any breastmilk, any breastmilk substitute, and any other food. In the first three months, when the percentage of children receiving breastmilk is highest, approximately half the children report consumption of breastmilk substitutes and other foods as well. In the three to five months age group, about half are receiving breastmilk, two-thirds are receiving substitutes, and almost all are receiving other foods.

Feeding patterns can be broken down into several discrete categories in order to give additional detail about the pattern of supplements consumed by the sample children at different ages. Table 3-3 presents this information for various combinations of breastmilk, other milk and other foods. It is clear from the table that certain patterns are rare among Thai children. The use of foods alone with no milk, for example, almost never occurs, regardless of the age of the child. Likewise, the use of bottlefeeding as the sole source of nutrition is uncommon, and with the exception of the 0-2 month cohort where about 8% use bottle milk alone, only a very small minority of children depend on this pattern. Even less common is a milk diet consisting of a combination of breast and bottle milk. In the 0-2 month group, again, about 8% of children are fed this way, but the numbers drop to 2% in the 3-5 month group and less than 1% of the other children. The most frequent pattern at all ages is for milk (either breastmilk or from a bottle) to be consumed along with other foods. Even in the earliest period of infancy (0-2 months), 57% of the children were receiving non-milk foods.

Since almost 90% of the 3-5 month group report consumption of "other" foods, the dominant feeding patterns are either breastmilk with other foods or breastmilk substitute with other foods for all but the very youngest infants. In Bangkok, then, introduction of other foods is early and widespread, regardless of whether breastmilk or substitutes are the source of milk in the diet. This point will be demonstrated in more detail in a following section.

Another point suggested by this pattern is that supplementation of breastfeeding may have a very different outcome depending on whether supplementation takes the form of breastmilk substitutes or other foods. Unlike breastmilk substitutes, supplementation with other foods seems quite compatible with continued breastfeeding. Indeed, a combination of breastmilk and other foods may well represent the most common traditional diet

during the first year. Early, widespread use of other foods is to be expected in Thailand where, as in many Southeast Asian cultures, food has crucial religious, social, and medicinal properties in addition to the nutrients that it contains. Introduction to a variety of foods is often viewed as essential to proper integration of the young child into society.

The survey findings are supported by the ethnography on this point. The ethnographers observed that the great majority of mothers introduce early supplementation with non-milk products in Bangkok. Most mothers they observed gave either mashed banana or banana and rice within the first month of the infant's life. In northeast Thailand--from where many index mothers in this sample migrated--mothers typically pre-chew food such as rice before giving it to the infant. Reasons for introducing such supplements at an early age range from doing so on the advice of neighbors or relatives to the belief that these foods will "fill up" the baby, increase strength and decrease fussiness.

> "Now I am feeding (the baby) by...chewing white rice mashed with banana to add sweet flavor...I began this (when) the baby was seven days old. The people next door told me to do so, and I followed (their advice)..." (Nangsorawang, age 24).

Table 3-1 Current Breastfeeding By Age of Child

Age (Months)	N	% Current Breastfeeding
0	80	77.5
1	109	75.2
2	103	69.9
3	114	57.0
4	136	44.9
5	131	42.7
6	117	49.6
7	134	44.8
8	121	46.3
9	94	42.6
10	86	40.7
11	107	46.7
12	49	24.5

Table 3-2 Association of Socioeconomic and Health Factors with Failure to Initiate Breastfeeding

	N	% Never Breastfed
Age Mother $>$ 30 years	402	15
Age Mother $\leq$ 30 years	986	8
Parity $>$ 4	158	18
Parity $\leq$ 4	1,225	9
Mother Bangkok Born	590	14
Mother Born Outside Bangkok	787	6
Private Hospital Birth	245	16
Birth Elsewhere	1,139	9
Caesarean Section	118	19
Vaginal Delivery	1,270	9
Birth Defect in Baby (Neonatal Health Problem)	120	17
Normal Newborn	1,276	9
Baby Had to Remain in Hospital	94	15
Baby Discharged with Mother	1,307	9

Table 3-3 Infant Feeding Pattern by Age of Child

Row	Breast Only	Breast & Bottle[1]	Bottle Only	Breast & Other	Bottle & Other	Breast, Bottle & Other	Other Only	Total
Age in months								
0-2	79(27%)	24(8.2%)	23(7.9%)	77(26.4%)	53(18.1%)	36(12.3%)	0(0)	292
3-5	17(4.5%)	6(2%)	18(4.7%)	109(28.7%)	181(47.6%)	49(12.9%)	0(0)	380
6-8	13(3.5%)	2(0.5%)	13(3.5%)	115(30.9%)	184(49.5%)	44(11.8%)	1(0.28%)	372
9-12	3(0.9%)	2(0.6%)	4(1%)	101(30%)	190(56.6%)	31(9.2%)	5(1.5%)	336

[1]Bottle = Breastmilk Substitute

Figure 3-1

Percentage of Children Initiating Breastfeeding

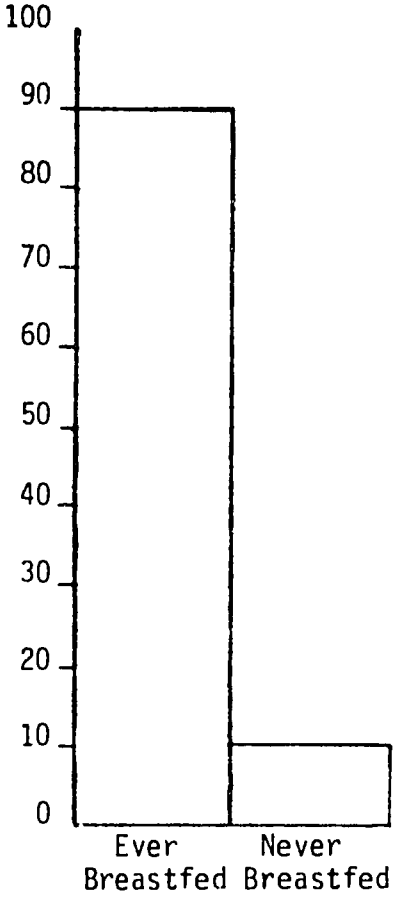


Figure 3-2

Breastfeeding Patterns

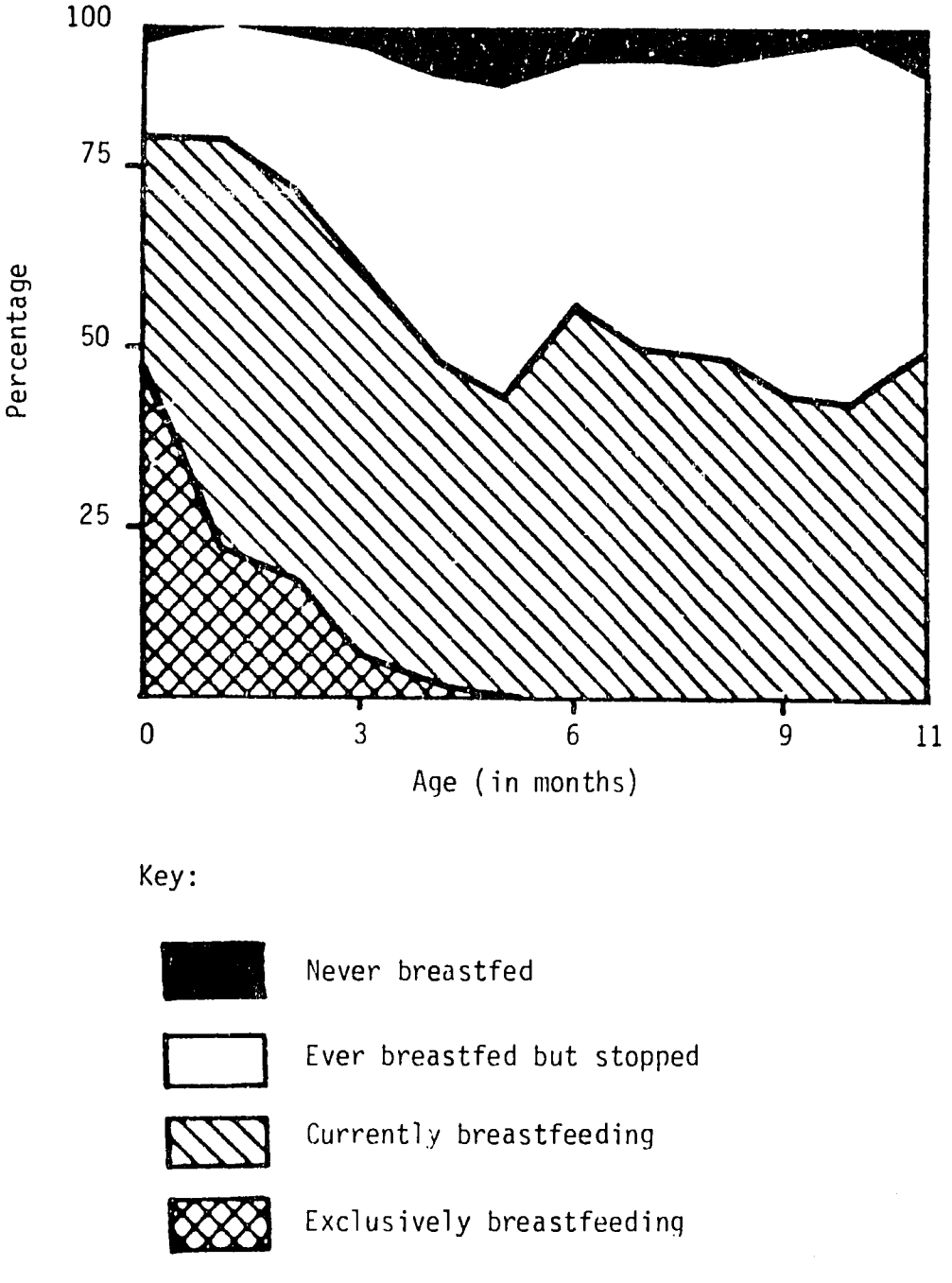
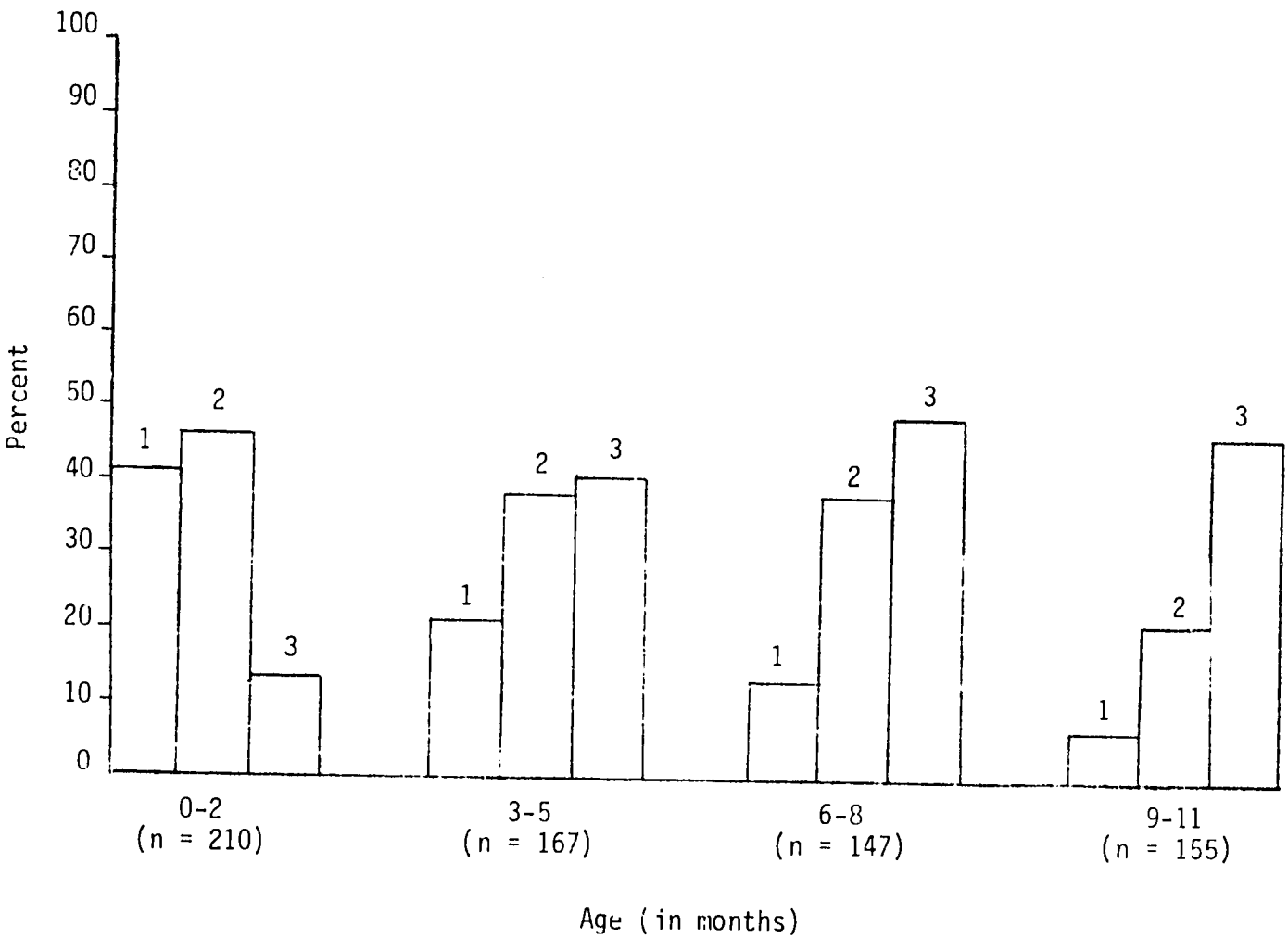


Figure 3-3

Percentage of Children Consuming Different Milks by Age of Child



Key:

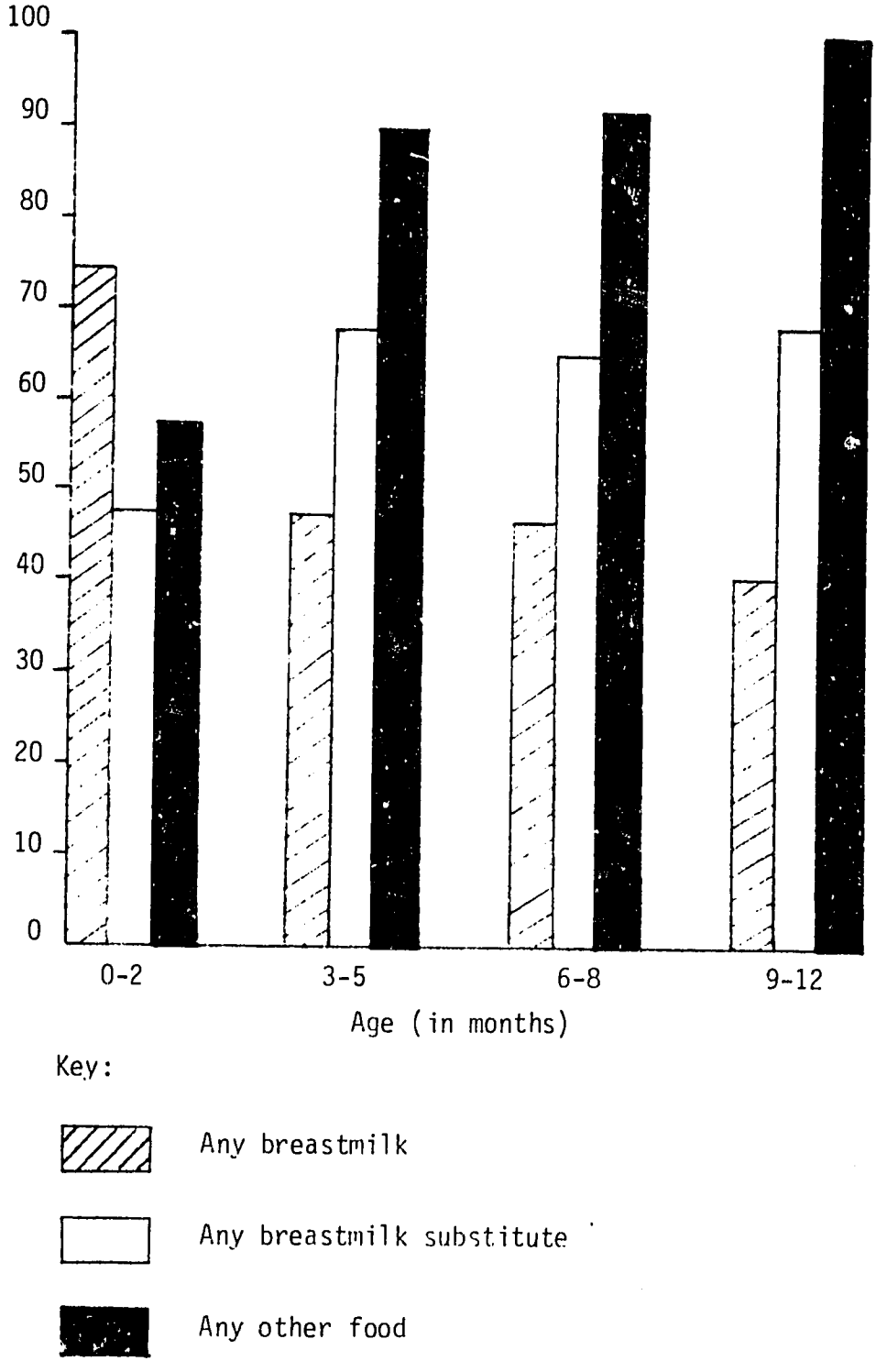
1 = Breastmilk exclusively

2 = Breast, and breastmilk substitute mixed only

3 = Substitute exclusively, no breastmilk

Figure 3-4

Percentage of Children Consuming Different Infant Foods by Type of Food and Age of Child



IV INFANT FEEDING PRACTICES: DETAILS OF BREASTFEEDING

Patterns of Breastfeeding

While initiation of breastfeeding is high (90%), the proportion that continues to breastfeed for given intervals through the first year is much lower. Figure 4-1 shows the percentages of children who have breastfed to certain ages among children older than that cutoff. Figure 4-2 is a lifetable that shows what proportions of a group of children that commence breastfeeding at birth continue to breastfeed at monthly intervals. Only about one-half of children aged 6 months or greater have breastfed for at least 6 months. These two figures suggest that in Bangkok the problem is not one of initiation of breastfeeding, but the numbers of children who stop early in the first year of life.

The data indicate that a majority of the women in the sample report a pre-natal desire to breastfeed (Table 4-3). However, less mothers report a prenatal intention to breastfeed (82%) than the number who actually breastfed (90%). This may account for some of the early discontinuation of breastfeeding: the initial reported episodes may have been token and not part of the mother's plan for feeding her infant on a continual basis. Early breastfeeding appears to follow the advice offered for successful lactation, however, with 82% of mothers reporting use of colostrum (Table 4-2) and 93% reporting feeding on demand (Table 4-3).

The most striking finding regarding frequency is that the average number of feedings reported per day does not appear to differ by age of the child. The mean frequency of breastfeeding is 8.3 times per day for children age 0-2 months (Table 4-4) and only slightly lower for the other children. In fact, there are no differences at all in mean frequency reported for the children 3-5, 6-8 and 9-12 months old, although a smaller percent of children is still breastfeeding at later ages. The groups may differ, of course, in duration of breastfeeding per episode, but this is a separate issue which cannot be examined using these data.

Figure 4-3 is a graph of median breastfeeding episodes per day by age of child, and it displays a pattern consistent with the data in Table 3-1. Another point of interest concerns the prevalence of nightfeeding. It can be seen (Figure 4-5) that over 95% of all breastfed infants are offered the breast during the night. The practice does not appear to decline when older infants are breastfed, consistent with the stability in reported breastfeeding episodes per day. Higher income appears to be associated with a slightly lower probability of breastfeeding at night, but, again, the overwhelming majority of breastfeeding

mothers (over 90%) of every income group practice night feeding (Table 4-5).

Figure 4-5 presents the proportion of exclusively breastfed children among currently breastfed children, in contrast to Figure 3-2 which shows the proportion of exclusively breastfed children in the entire sample. Exclusive breastfeeding (with no breastmilk substitutes or other foods) is widespread only during the first month, with 60% of breastfed children reporting this pattern. In the second month, this proportion is halved, to 30%, and is halved again among children aged 3 months. Among children over 5 months, exclusive breastfeeding reaches a very low level and essentially disappears by the first birthday.

Breastfeeding Patterns and Postpartum Amenorrhea

Many studies have demonstrated that the length of breastfeeding and presumably breastfeeding pattern are correlated with the length of postpartum amenorrhea (and hence the length of birth intervals). There are, however, not enough studies that assess how different breastfeeding patterns are related to amenorrhea lengths. This study obtained unusually detailed information on infant feeding practices for fairly large representative samples. Hence, the study provides valuable information for an examination of how infant feeding practices, particularly breastfeeding, affect the length of postpartum amenorrhea.

There are 1422 observations in the Thailand sample. Of these, 47 cases were excluded from the examination of the relationship between breastfeeding and amenorrhea because of obvious reporting errors or potentially misleading information. There were 14 cases reporting a length of amenorrhea longer than the current age of the child, an obvious case of reporting error. Six women were pregnant before their first postpartum menstruation, hence no valid length of postpartum amenorrhea could be obtained from these women. Certain kinds of hormonal contraceptives interfere with a woman's menstruation; therefore, if the use of these contraceptives was initiated before a woman's first postpartum menstruation, her reported time of first menstruation may be artificially delayed or induced by the hormone. Hence, these cases should be excluded from the analyses of the relationship between breastfeeding and amenorrhea length. Women who use hormonal injection contraceptives could delay menstruation for several months; 9 women in the Thailand sample had initiated the use of injection contraceptives before first menstruation. On the other hand, women who use contraceptive pills will experience induced menstruation within two weeks; there were 18 women in the Thailand sample who started using pills prior to the reported start of menstruation.

The estimated median length of breastfeeding is 7.00 months, while the estimated median length of amenorrhea is 2.88 months. Among those women who have weaned their child (currently not breastfeeding, and with known length of breastfeeding), there is a positive relationsip between the known length of breastfeeding and the median length of amenorrhea (Table 4-6).

The proportion still breastfeeding and the mean frequency of breastfeeding among currently breastfeeding women for each postpartum month is presented below. While the proportion breastfeeding decreases over time, the mean frequency of breastfeeding among still breastfeeding women remains fairly stable at about 7 to 8 times of breastfeeding per day throughout the first 12 months, as noted above (Table 4-7).

In order to assess the effect of frequency of breastfeeding on amenorrhea status, the proportion amenorrheic of the "high frequency" (frequency greater than six times per day) and the "low frequency" (frequency less than six times per day, currently non-breastfeeding women not included) breastfeeders are compared. The results are presented below. At each postpartum period except the first and last, the proportion amenorrheic is higher for the "high frequency" breastfeeders (Table 4-8).

Presumably, the more the infant's diet is dependent on the mother's breast milk, the more the suckling stimulus is produced for the maintenance of amenorrhea. The proportion amenorrheic is analyzed by each of five feeding patterns. In all postpartum months, the proportion amenorrheic is lowest for those women who have weaned their child (NO BF) and highest among the exclusive breastfeeders (BF only) Table 4-9.

The median length of breastfeeding and median length of amenorrhea by age of the mother are presented in Table 4-10. There seems to be no obvious trend in the median lengths of breastfeeding and amenorrhea by age of the mother. The youngest age group (less than 20 years old) and the 30-34 age group have the shortest length of breastfeeding. The oldest age group (older than 35 years old) has the longest lengths of breastfeeding and amenorrhea.

Median breastfeeding and amenorrhea lengths are assessed by parity groups. The results are presented in Table 4-11. First parity women have distinctly shorter lengths of breastfeeding and amenorrhea than women of higher parities.

Problems of Breastfeeding, Insufficient Milk and Weaning

The types and frequencies of problems associated with breastfeeding are enumerated in Table 4-12. As can be seen, insufficient milk is the most frequently cited problem. When mothers were asked how they knew they had a problem with insuf-

ficient milk, 54% cited either a complete cessation of output or a reduction in quantity, simple reiterations of the problem (Table 4-13). Most of the others (43%) cited the crying of the baby as the reason. None cited medical diagnosis or failure of baby to gain weight. When the mothers were asked what course of action they took in response to the problem of insufficient milk (Table 4-14), most responded that they changed the child's diet (70%). Sixty-two percent of the mothers reported giving formula to the child, by far the most common "treatment" for the problem. Twenty-six percent of the mothers applied some treatment to themselves ranging from dietary change (15%) to local treatment of the breast (8%) or use of drugs (3%). No mother mentioned increasing the frequency of breastfeeding, the recommended response to the complaint of insufficient milk. A majority of the mothers (66%) did not discuss this problem with anyone else; only 16% sought advice from a physician or other health personnel (Table 4-15).

Because associations have been reported between use of estrogen containing oral contraception and complaints of breastmilk insufficiency, the Bangkok data were examined for evidence of any such effect. Table 4-16 displays the frequencies and percentages of women who reported a problem of insufficient breastmilk by contraceptive use since the birth of the index child. Among pill users, more women report insufficient milk than users of no contraception. However, users of all other forms of contraception also report a problem at a level comparable to the pill users. There is no evidence here of a specific relationship between pill use and insufficient milk. It may be that users of contraception share some attribute directly related to more frequent complaint of insufficient milk. Nevertheless, pill users appear to have particular concern about the effect of their chosen contraceptive on breastmilk. The ethnographers report a twenty-one year old woman who switched her infant to Bear brand milk and then to Meiji after he was two months of age because she felt that use of the pill affected the taste of her breastmilk, and this was the reason he refused the breast. Other ethnographic reports confirm this pattern.

Table 4-17 shows problems during breastfeeding which the mother attributed to the infant. The most common problem cited is the infant refusing breastmilk. When mothers were asked what they did when children refused to breastfeed (Table 3-18), the most common response, once again, was to give formula (88%). A majority of mothers (66%), again, did not consult anyone for advice on this perceived problem (Table 4-19).

The ethnographic data reveal that the decision to stop breastfeeding may involve a series of interacting factors and events. For example, one twenty year old mother gave the following description of what led her to stop breastfeeding her infant:

"When I was in the hospital after child delivery I had no milk so the nurse used bottle milk...When I came back home, (my) husband bought Nan Brand (formula)...I used that to alternate with breastmilk for three days when the baby developed diarrhea. The excreta became 'foamy.' I didn't know whether it was because of the formula or my milk. (I) decided to stop breastfeeding and continue Nan."

It is noteworthy that among mothers of infants who refused to breastfeed, 66% had given supplements to their children before the problem arose, the majority (58%) using formula (Table 4-20). In fact, provision of formula is itself viewed as a method of weaning, by far the most common one among the mothers (88%) (Table 4-21).

Table 4-22 shows the distribution of answers given by mothers when asked why they weaned their children. Return to work (35%) was the single most frequently cited reason with insufficient milk almost as common (29%). Insufficient milk combined with child refusing breast (Total, 42%), suggests that involuntary weaning was extremely common and probably associated with lack of good advice on how to avoid and/or solve common problems of breastfeeding. Bangkok women seem to take pride in the fact that weaning decisions rest almost exclusively with the mother. Less than 10% of the mothers reported that they received this suggestion from anyone else (Table 4-23).

The concept of "weaning interval" was developed for the analysis of these data to help describe the dynamics of breast/bottle interrelationships. "Weaning interval" is defined here as the difference between age at first supplementation and age at last breastfeeding. Table 4-24 shows that weaning interval varies with age at first bottle. For example, the table shows that among those who receive a bottle in the first two months, more than half are totally weaned from the breast in less than one month. Of those children receiving the bottle later, progressively greater percentages report longer weaning intervals. This is particularly evident among those receiving their first bottle at age 4 months or older. Here, the majority experience weaning intervals of two months or longer.

There are several possible interpretations of this pattern: introduction of bottle feeding to young infants may represent a conscious intention of the mother to wean her child, or it may be introduced as a breastmilk supplement. In the case where early weaning is not the specific intention, these data may underscore the unintended but nonetheless disruptive consequences of introducing early bottle-feeding into the diet of a young child. This will be examined in more detail in the forthcoming sections on determinants of infant feeding patterns.

The study explored knowledge and attitudes about breastfeeding as possible clues to behavioral choices of mothers. Women were asked whether they agreed or disagreed with a series of statements about breastfeeding. Responses are shown in Table 4-25 for women who have and have not breastfed their children. For most of the statements, there is little variation between the two groups in the percentages that agree with the statements. A clear exception to this concerns the statement about the inconvenience of breastfeeding; a majority of women in the never breastfed group agree with this, while less than half of the other group does. Similarly, about 10% more of the never breastfed group agree that a breastfeeding mother must restrict her intake of prohibited foods. Thus, not breastfeeding a child seems correlated with the perception of breastfeeding as more burdensome and inconvenient for the mother. On the other hand, certain biological advantages of breastfeeding (nutrition, immunity, pregnancy prevention) seem slightly more often appreciated by mothers who have breastfed.

There are a number of statements for which there is near unanimous agreement among the mothers, regardless of breastfeeding history. Almost all agree that breastfeeding allows more intimacy, that it provides an adequate and valuable food for the child, that it is of higher nutritional value than formula, and that it gives more immunity. Exposure to information about the beneficial aspects of breastfeeding, therefore, appears to be widespread.

Relatively small percentages of the women in both groups agree with some of the statements concerning negative attitudes about breastfeeding. For example, only about a third or less of the women agree that breastfeeding causes weight gain or physical weakness in the mother, or that formula milk is less trouble than breastfeeding. On the other hand, close to half of the women agree that breastfeeding causes changes in appearance of the breasts, and more than two-thirds agree that using formula milk is modern. Although half or more of women agree with these last two statements which suggest negative attitudes about breastfeeding, it is interesting to note the absence of clear differences between the ever and never breastfed groups.

Table 4-1 Mother's Prenatal Choice of Milk

	N	%
Breast	950	68
Formula	177	13
Both	183	13
No Decision	79	6
If Male Breast, If Female Formula	1	0
TOTAL	1390	100%

Table 4-2 Fed Colostrum

	Total	N%
No	210	17
Yes	1031	82
TOTAL	1241	100%

Table 4-3 Scheduled Breastfeeding

	Total N	%
No	885	93
Yes	63	7
TOTAL	948	100%

Table 4-4 Mean (S.D.) Daily Frequency of Breastfeeding Episodes by Age Group

Age (Months)	Breastfeeding Frequency Mean	S.D.	Total N
0-2	8.3	4.2	216
3-5	7.5	3.2	183
6-8	7.5	3.0	173
9-12	7.9	3.3	137
			709

Table 4-5 Prevalence of Breastfeeding at Night by Family Income Group

	Total N	%
500 - 3,000 Bhat	343	97.4
3,001 - 6,000	265	97.4
6,001 - 10,000	65	95.4
10,000 +	25	92.0

Table 4-6 Length of Breastfeeding and Length of Amenorrhea

Known Length of breastfeeding	Median Length of Amenorrhea
0 < Length < 3	2.05 (n=442)
4 < Length < 7	3.25 (n=63)
8 < Length < 12	7.50 (n=9)

Table 4-7 Mean Frequency of Breastfeeding and Proportion Amenorrheic

Months	Mean Frequency of BF	Proportion BF
0	8.3	.80
1	8.6	.78
2	7.8	.73
3	6.9	.61
4	8.1	.48
5	7.8	.43
6	8.7	.54
7	7.4	.49
8	7.1	.48
9	7.1	.45
10	7.4	.41
11	8.6	.50
12	8.2	.27

Table 4-8 Proportion Amenorrheic by Frequency of Breastfeeding

Postpartum Months	Freq < 6 times		Freq ≥ 6 times	
	Prop (AM)	n	Prop (AM)	n
0,1	100.0	25	88.2	110
2,3	53.3	30	59.0	100
4,5	45.5	22	57.5	87
6,7	34.6	2	42.5	87
8,9	33.3	27	45.0	60
10,11,12	41.2	17	27.4	73

Table 4-9 Proportion Amenorrheic by Patterns of Feeding

Feeding Patterns	MONTHS 0,1	2,3	4,5	6,7	8,9	10,11	(n)
BF ONLY	93.1	64.0	75.0	85.7	57.1	50.0	107
BF +FOOD	82.9	63.5	53.5	38.8	47.4	29.0	381
BF + MILK	(100.0)	(60.0)	(50.0)	(100.0)	-	-	34
BF+FD+MK	88.2	43.2	51.9	30.8	22.7	30.0	149
NO BF	76.7	13.2	11.2	4.5	8.0	4.3	646

Table 4-10 Median Length of Breastfeeding and Amenorrhea by Age of the Mother

AGE OF MOTHER	MEDIAN BF LENGTH	(n)	MEDIAN AM LENGTH	(n)
<20	4.27	96	2.45	100
20-24	8.64	369	2.76	387
25-29	7.52	411	2.83	443
30-35	4.90	216	2.92	251
35+	12.00	119	3.66	130

Table 4-11 Median Length of Breastfeeding and Amenorrhea by Age of the Mother

PARITY OF MOTHER	MEDIAN BF LENGTH	(n)	MEDIAN AM LENGTH	(n)
ONE	4.34	514	2.38	561
TWO/THREE	11.73	563	3.41	594
FOUR/FIVE	>12.00	105	3.82	117
SIX/SEVEN	>11.00	16	3.50	23
EIGHT	>11.00	9	3.60	11

Table 4-12 Mothers' Problems During Breastfeeding

	N responses	% of responses (n = 555)	% of respondents (n = 463)
Insufficient milk	287	51.7	62.0
Obstructed nipple	111	20.0	24.0
Sore, inflamed, cracked nipples	89	16.0	19.2
Illness	36	6.5	7.8
Stress, fatigue	20	3.6	4.3
Took drug during pregnancy	9	1.6	1.9
Pregnant	1	0.2	0.2
Other	2	0.4	0.4
TOTAL	555	100%	*

* Sums to more than 100% because some mothers cited more than one problem.

Table 4-13 Why Mother Decided Her Milk Was Insufficient

	Total N	%
Baby cried	119	43
Less milk	89	33
No milk	63	23
Twin	5	2
Baby didn't suck	3	1
TOTAL	279	100%

Table 4-14 Responses to Perception of Insufficient Milk

	Total N	%
Give formula	189	62
Eat fish, gang liang	26	8
Eat a lot	23	7
Give supplement food	20	7
Use hot water	14	5
Pump	10	3
Take drug	10	3
Discuss with others	8	3
Give condensed milk	3	1
TOTAL	303	100%

Table 4-15 Source of Advice About Breastfeeding Problem

	Total N	%
No one	188	66
Doctor or other health personnel	47	16
Parent/relative	27	9
Husband	10	4
Friend	11	4
Other in house	1	0
Can't remember with whom	1	0
TOTAL	285	100%

Table 4-16 Insufficient Breastmilk by Contraceptive Use Since Birth of Index Child

Insufficient Milk	None	Pill	Other
No	79(49.1%)	52(35.1%)	46(30.7%)
Yes	82(50.9%)	96(64.9%)	104(69.3%)
TOTAL	161	148	150

Table 4-17 Infants' Problems During Breastfeeding

	Total N	% of Respondents	% of Responses
Refuses breastmilk	105	52.8	4.1
Diarrhea	56	28.1	23.5
Fever or sickness	48	24.1	20.2
Familiar with formula milk	27	13.6	11.3
Baby can't suck	2	1.0	0.8
TOTAL	238		100%

Table 4-18 Mother's Response When Child Refused to Breastfeed

	Total N	%
Give formula	93	88
Ask advice	5	5
Use artificial nipple	3	3
Pull nipple	2	2
Give hot water	2	2
Give supplement foods	1	1
TOTAL	106	100%

Table 4-19 Source of Advice about Child's Refusal to Breastfeed

	Total N	%
None	70	66
With MD or other health personnel	17	16
Parent/relative	11	10
Husband	5	5
Friend	3	3
TOTAL	106	100%

Table 4-20 Food Given to Child Before Refusal to Continue Breastfeeding

	Total N	%
Formula	48	45
Nothing	36	34
Formula and food	14	13
Supplement food	8	8
TOTAL	106	100%

Table 4-21 Method of Weaning

	Total N	%
Gave formula	471	88
Didn't do anything	32	6
Gave condensed milk	22	4
Gave weaning food	7	1
Separated child from mother	1	-
TOTAL	533	100%

Table 4-22 Mother's Statement of Reason Child was Weaned

	Total N	%
Return to work	197	35
Insufficient milk	160	29
Baby refused breast	71	13
Mother's health/physical problem	59	11
Breastfeeding inconvenient	35	6
Child health problem	26	5
Age of child	13	2
TOTAL	561	100

Table 4-23 Source of Suggestion to Wean

	Total N	%
Own decision	479	90
MD/other health personnel	22	4
Husband	12	2
Parent	8	1
Friend	5	1
Relative	4	1
Baby didn't suck	3	1
Roommate	1	-
TOTAL	534	100%

Table 4-24 Weaning Interval by Age at First Bottle

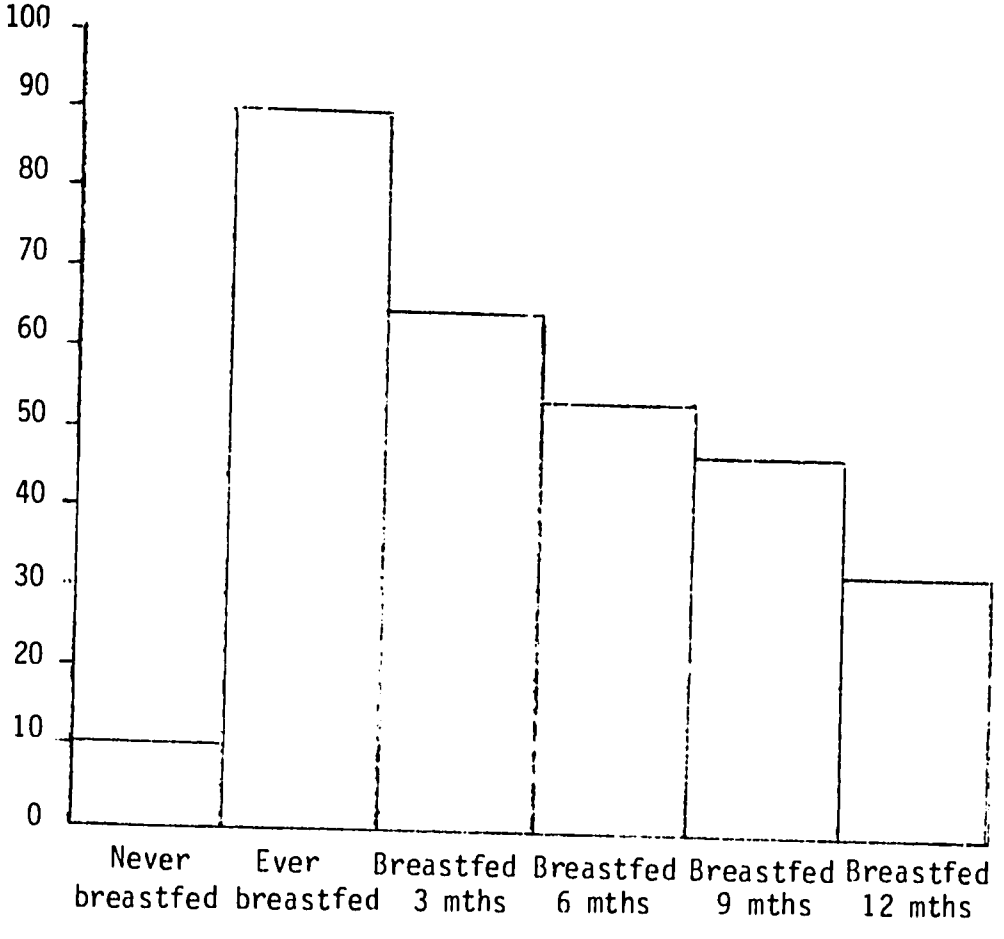
Age First Bottle	Weaning Interval (Months) 0	1	2-3	≥4	(N)
0	62.5%	21.0%	10.7%	6.0%	272
1	74.2%	19.4%	4.3%	2.2%	93
2	52.8%	18.9%	26.4%	1.9%	53
3	50.0%	16.7%	31.3%	2.1%	48
4-5	17.9%	17.9%	46.4%	17.9%	28
6-12	10.0%	3.0%	36.7%	53.3%	30
TOTAL					523

Table 4-25 Knowledge and Attitudes About Breastfeeding Among Mothers Who Have Ever Breastfed and Never Breastfed Their Infants (Percentage Agreeing with Statements)

Statement	Ever Breastfed (n = 1251)	Never Breastfed (n = 137)
Breastfeeding causes breasts to sag and/or lose shape	49.7%	42.3%
Breastfeeding causes weight gain in mother	24.8%	20.4%
Breastfeeding delays pregnancy	56.6%	51.1%
Breastfeeding is inconvenient	45.3%	62.0%
Breastfeeding gives more immunity to child	94.9%	88.3%
Breastmilk is an adequate and valuable food for the child	95.0%	93.4%
Breastfeeding allows more intimacy with child	98.5%	94.9%
Breastfeeding causes physical weakness	33.3%	37.2%
Cannot breastfeed if taking birth control pills	43.3%	37.2%
When breastfeeding, must stop eating restricted foods	72.7%	82.5%
Formula milk less trouble than breastfeeding	32.4%	37.2%
Using formula milk is modern	68.7%	69.3%
Breastfeeding has higher nutritional value than formula milk	98.1%	93.4%

Figure 4-1

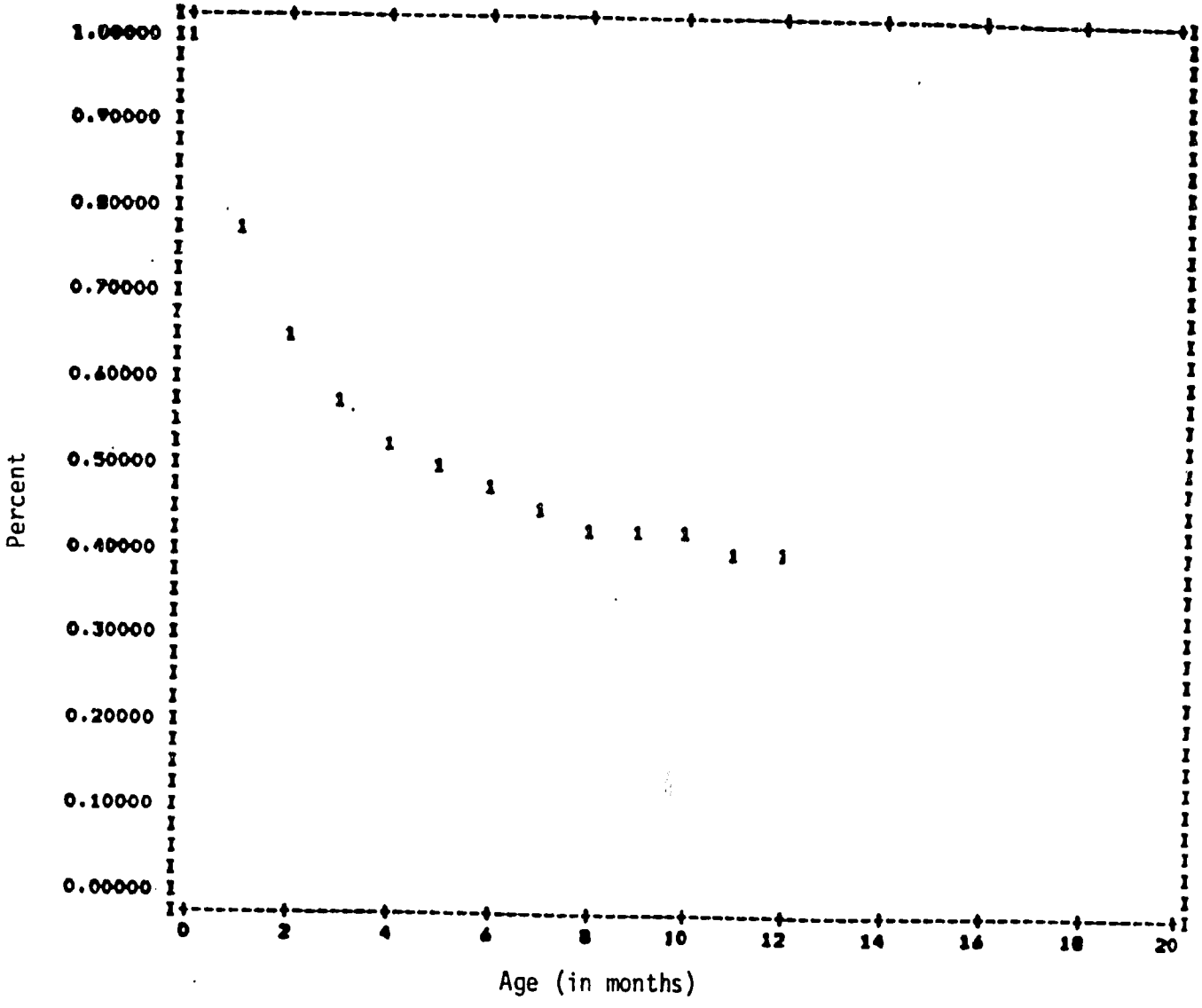
Percent of Sample Breastfeeding for Various Durations[1]



[1]Based on both current and retrospective data

Figure 4-2

Duration of Breastfeeding by Last Breastfeeding



Key:	N	Median Survival
Breastfeeding	1244	6.01

Figure 4-3

Median 24-Hour Breastfeeding Frequency for Currently Breastfeeding Infants By Age

Figure 4-4

Prevalence of Breastfeeding at Night (Breastfed Infants)

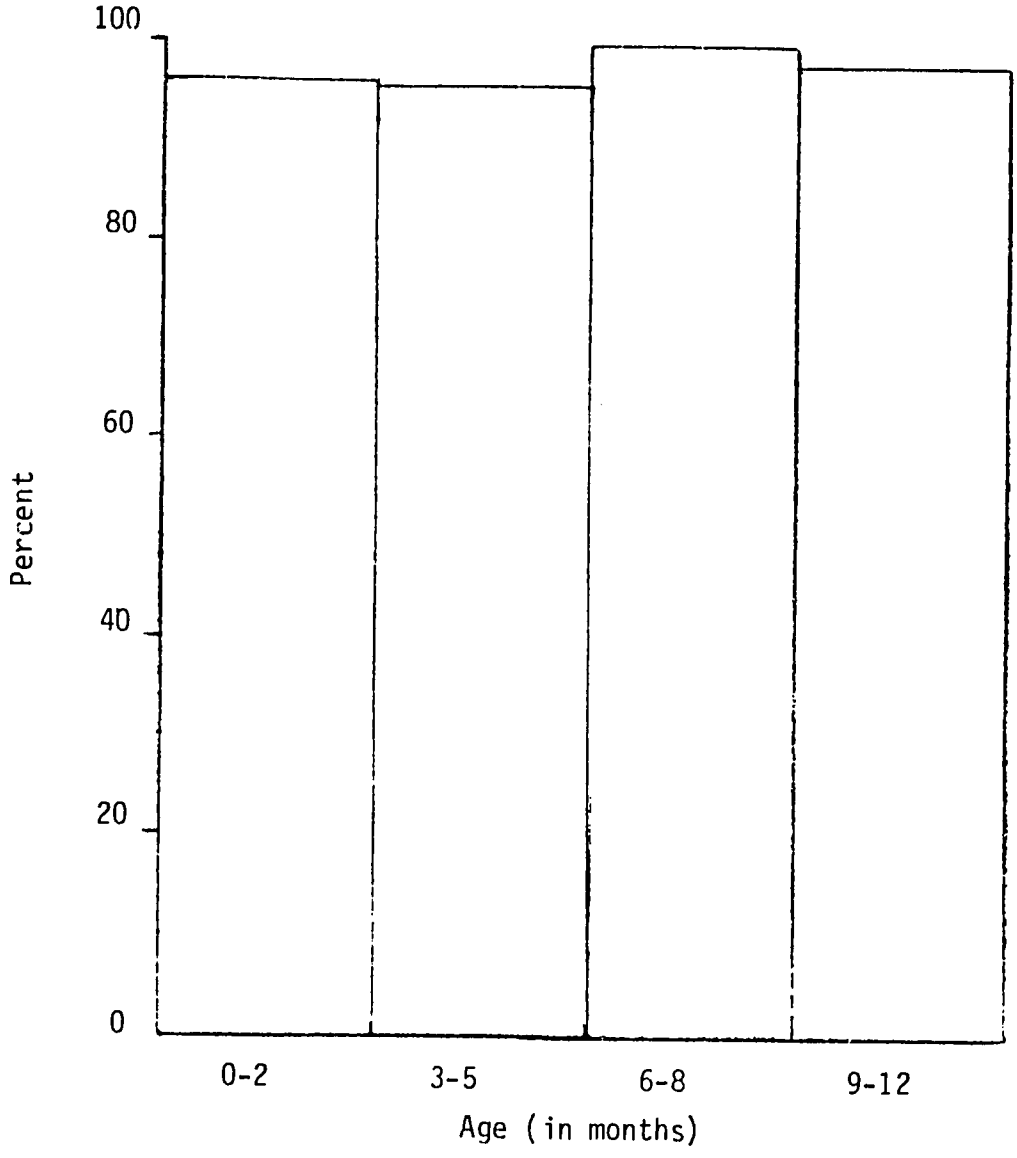
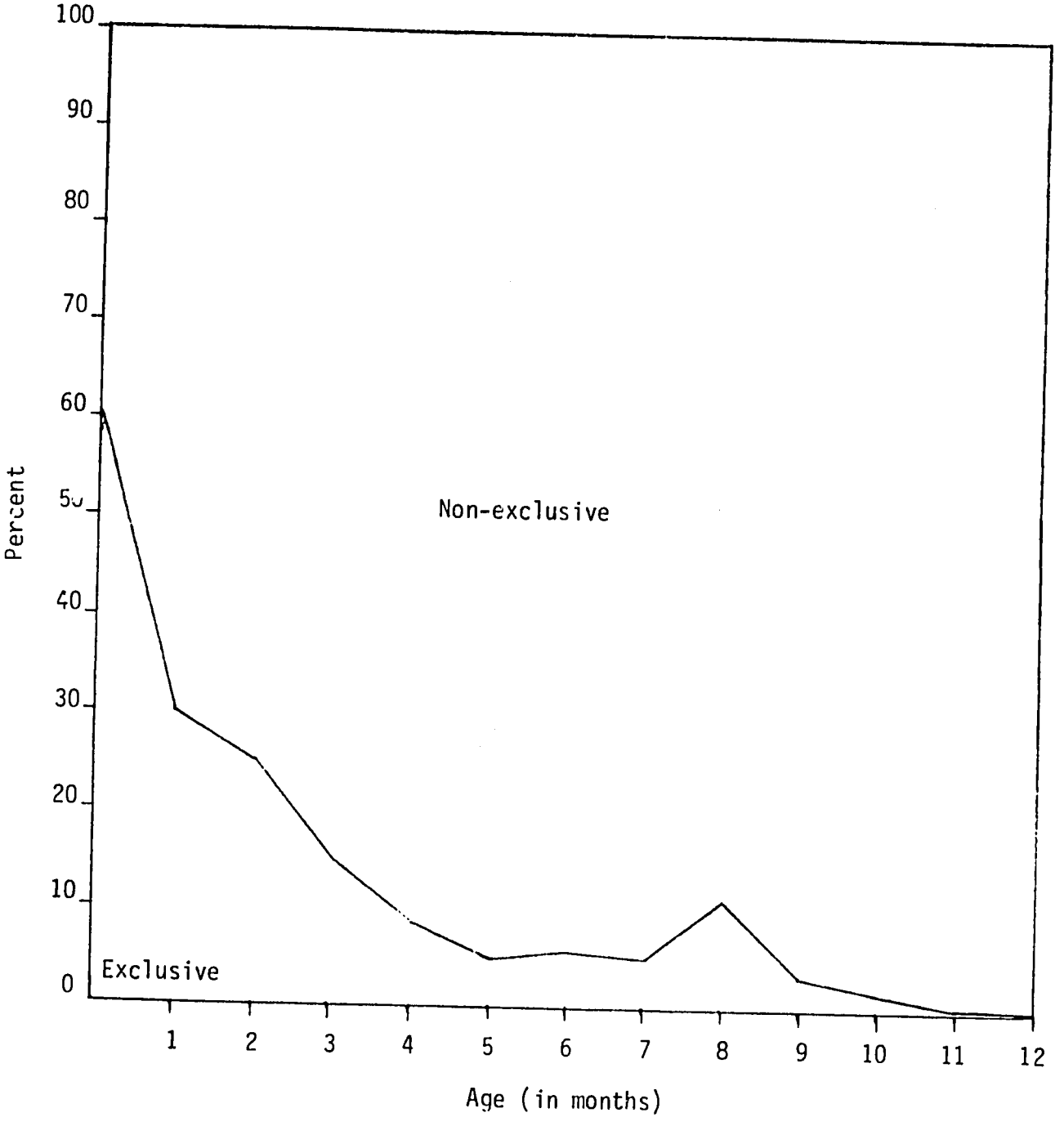


Figure 4-5

Exclusive and Non-exclusive Breastfeeding by Age of Child



V INFANT FEEDING PRACTICES: DETAILS OF SUPPLEMENTATION

Initiation of Supplementation

The percentages of the sample currently bottlefed or consuming other foods by age of the child (Figure 5-1) verify the impression gained from the description of feeding patterns, above, that most supplementation occurs early. Two-thirds of one month-old children are receiving food and 45% receive bottle milk. Among children aged five months and older, the percentages of children that are bottlefed or consuming other foods remain fairly stable at about 60% and 95%, respectively.

Current use of bottle substitutes and other foods among children who had breastfed in the past but are currently weaned is shown in Figure 5-2. Regardless of the current age of the child, the use of bottle feeding is close to or equals 100% throughout the first year among those children no longer breastfeeding. Small numbers of children age 10-11 months are consuming other foods and no bottles. Reasons given by mothers for introducing formula milk (Table 5-1) are essentially the same as reasons given for weaning. A majority of the women gave one of two responses: that they had to return to work (37%) or they had a problem with insufficient milk (31%). An additional 8% of the women also reported that they began to give formula milk because the child refused to breastfeed.

The ethnographers found numerous cases which support the above survey findings, namely, that weaning of children occurs when mothers return to outside employment. This is the case even among women who have clear, positive attitudes about the benefits of breastfeeding as opposed to formula use. The issue of maternal employment will be examined in more detail in a later section of this report.

Details of Food Supplementation

Figure 5-3 shows patterns of non-milk food intake among the sample children receiving any food at the time of the survey broken down by age groups. The histograms indicate the percentages of children currently consuming any of six listed food types: grains (principally rice), vegetables, fruit, juice, animal protein, and sugar. As can be seen, the pattern of consumption differs markedly between the older and younger children. For example, in the 0-2 month cohort almost none of the children are receiving vegetables or animal protein supplements. The most widely consumed food is fruit, followed by grains, fruit juice and sugar among children in this age cohort.

Among children aged 3-5 months, the pattern of intake still resembles that of younger children in that consumption of

vegetables is extremely rare, with only about 5% of the children reporting any intake. In other respects, these children begin to conform to what is seen among the older groups. Consumption of grains becomes much more common, with over 70% of the 3-5 month olds reporting intake, while over 20% of that cohort reports consumption of animal protein. At the same time, fruit consumption has become less frequent, while juice and sugar intake have changed little from what was seen in the younger children.

The patterns seen in children aged 6-8 months and 9-12 are very similar to one another with respect to the relative percentages of children consuming the different foods. Almost all children are reported to eat grains, a majority reporting intake of animal protein, and between 30 and 40% reporting sugar intake. For these foods, the percentages of children reporting intake contrast with those seen among children aged less than 6 months. The main difference between the two cohorts is that in the oldest group, the absolute percentage of children reporting intake of each food is generally higher with the exceptions of fruit and juice.

Table 5-1 Reason for Beginning Formula Milk

	Total N	%
Mother goes to work, inconvenient	336	37
Mother has no milk	283	31
Child refused breast	73	8
Child likes formula/stay at hospital	43	5
Abnormal nipple	44	5
Mother unhealthy	35	4
Want healthy baby	24	3
Other	31	3
Child became large	22	2
Allergy, diarrhea	11	1
TOTAL	902	100%

Figure 5-1

Percentage of Children Currently Bottle Fed and Consuming Other Foods by Age of Child

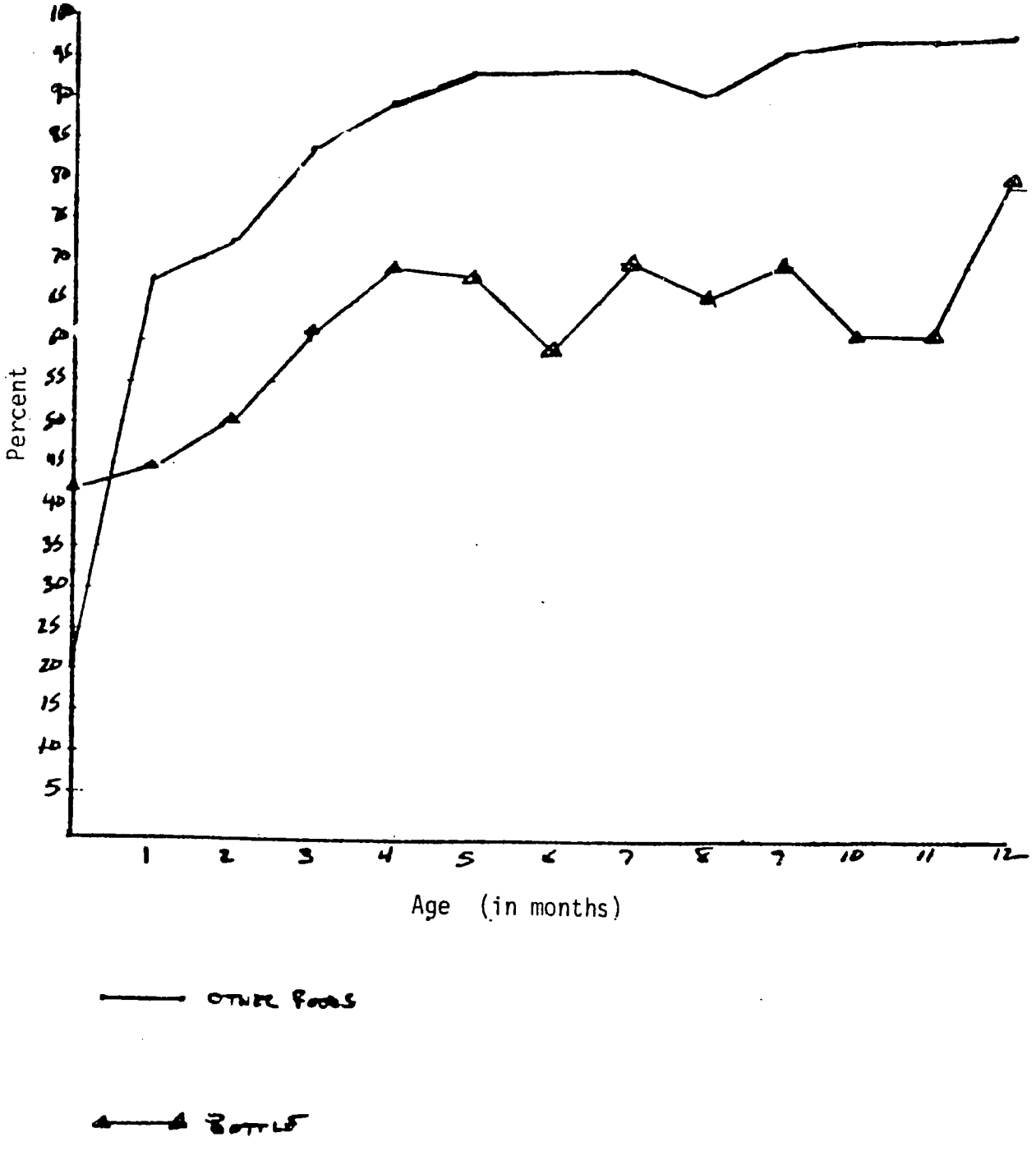


Figure 5-2

Current Use of Bottle and Other Foods Among Weaned Children by Age of Child

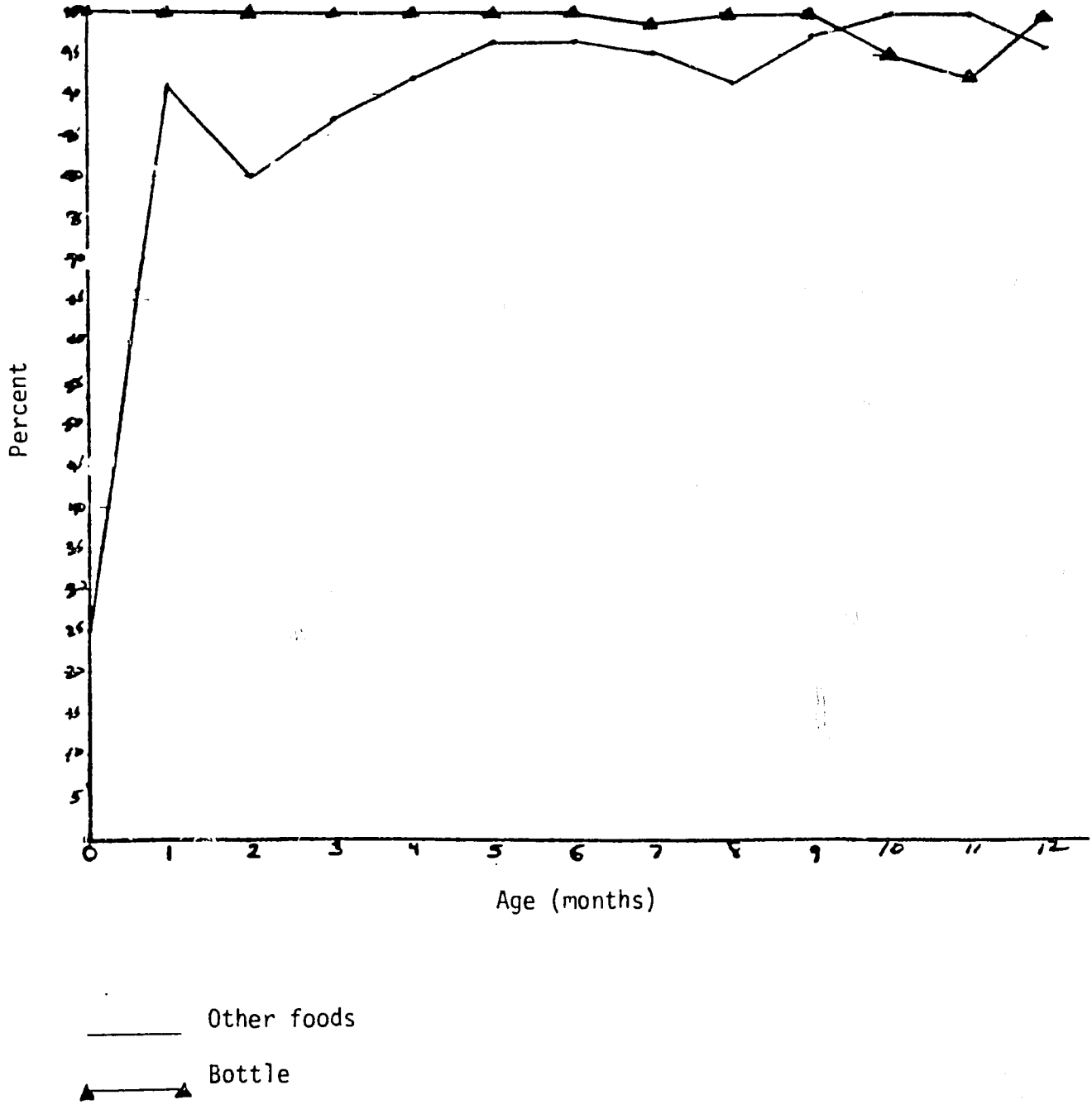
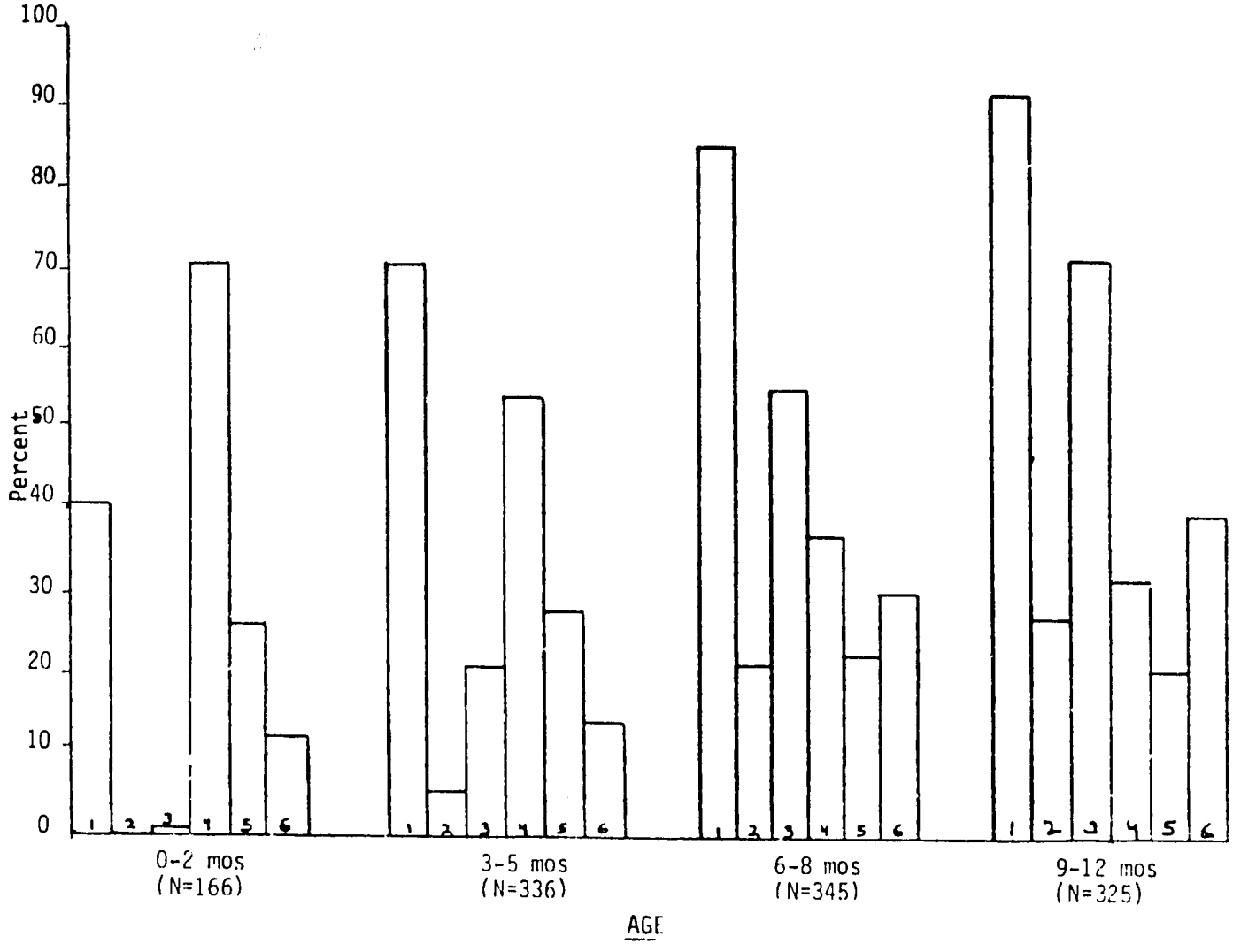


Figure 5-3

Percentage of Children Consuming Different Foods
By Age Group Among All Children Consuming Foods



1 = Grain
2 = Vegetables
3 = Meat, Fish, Egg
4 = Fruit
5 = Juice
6 = Sugar

VI DETERMINANTS OF INFANT FEEDING PRACTICES: BACKGROUND VARIABLES

Infant Feeding Outcome Variables

In this, and subsequent sections of this report, a set of dichotomous variables is used to represent different aspects of infant feeding behavior in order to evaluate the determinants of each of several feeding outcomes. The variable "Ever Breastfed" is used to distinguish between those children who have and have not initiated breastfeeding. As indicators of breastfeeding duration, a set of variables representing breastfeeding for successive three month intervals was created. "Breastfed Three Months" distinguishes among children aged three months and older who have and have not breastfed for at least three months. "Breastfed Six Months" is the corresponding variable for six months' breastfeeding. Because breastfeeding prevalence declines rapidly in Bangkok after six months, consideration of longer durations will not be included in this analysis.

As an indicator of the use of breastmilk substitutes and supplements in Bangkok, the variable "Bottle by Two Months" will be used. This variable classifies children older than two months according to whether or not they were introduced to bottle feeding at any time up to the completion of the second month. The choice of this marker is based on the observation made earlier that introduction of bottle feeding is associated with rapid weaning, many children being weaned in one month's time or less following the first introduction of bottle feeding. Since early bottle feeding poses the risks associated with contamination of bottles and their contents for very young infants, it may lead to increased morbidity and mortality. Thus, early introduction of bottle feeding can have significant public health consequences even aside from its association with curtailed breastfeeding.

Background Variables as Determinants

The first determinants of infant feeding examined are a set of background socioeconomic variables. Prior research on infant feeding shows clearly that infant feeding patterns may vary with different socioeconomic attributes. This pattern of variation can be seen in Table 6-1.

The data on mother's age suggest lower likelihood of breastfeeding initiation (Ever Breastfed) as the age of the mother increases. Yet, among mothers who do initiate breastfeeding, the percentages of children who breastfeed for at least three months (Breastfed Three Months) or at least six months (Breastfed Six Months) is variable but appears highest among the

very oldest mothers. Finally, more children are introduced to bottle feeding by two months of age among mothers older than 30 years.

When the infant feeding variables are broken down according to parity, the general trend suggests that initiation of breastfeeding is virtually universal but somewhat lower in the very highest parity group, perhaps corresponding with the older age group, above. Breastfeeding duration is shorter among women having their first birth (only 45% breastfeed for six months vs. 60% or more in the other parity groups), and early introduction of bottle feeding is more common among these women.

Infant feeding patterns vary quite consistently across outcomes according to mother's birthplace. Rural-born women seem to initiate breastfeeding slightly more often than those born in Bangkok. The differences between these groups are even more pronounced for breastfeeding duration. The length of breastfeeding is shorter among the children of Bangkok born women (only 58% breastfeed for three months vs. 71% of rural born women), and these women are more likely (53% versus 43%) to introduce early bottle feeding than their rural-born counterparts.

While initiation of breastfeeding shows no consistent trend by educational level of mother, shorter duration seems to be consistently associated with more educational attainment. In addition, there is more early introduction of bottle feeding with more education. The small group of women reporting no education appear to initiate breastfeeding less often and perhaps breastfeed for slightly shorter durations than the group of women with little formal education.

Finally, family income is associated strikingly and consistently with the infant feeding outcomes. The percentage of women reporting initiation of breastfeeding declines with increasing family income (from 92% to 86%). This same inverse relationship with income is even clearer and more pronounced for the breastfeeding duration, with likelihood of breastfeeding for six months declining from 65% to 27% from the highest to the lowest income groups. Consistent with these findings is the observation that the percentages of women reporting early introduction of bottle feeding increases directly with level of family income: the highest group is almost twice as likely as the lowest to have introduced bottle feeding by two months.

The results presented in Table 6-1 suggest that the prevalence of different infant feeding behaviors in Bangkok does fluctuate with some socioeconomic indicators. In the case of breastfeeding initiation, the variability in prevalence is not great. This, however, might be expected given the fact that almost all (90%) Bangkok mothers breastfeed for at least some

duration (Table 2-1). Prevalence of breastfeeding duration and early bottle feeding co-varies with socioeconomic indices to a much greater extent. This observation suggests that socioeconomic variables may be among the important predictors of infant feeding behavior in Bangkok, but they may be confounded by other factors, such as health care or work status, which differently affect women of disparate socioeconomic strata. These possibilities will be examined later.

Although the indicators "Breastfed Three Months" and "Breastfed Six Months" can be used to assess the numbers of children who have breastfed for two specific durations, additional information about breastfeeding duration can be gleaned through life table analysis. Figures 6-1 through 6-5 contain the results of such analyses, displayed separately for each of the preceding socioeconomic indicators. Within each figure, separate curves are presented for each category of each variable, indicating the proportion of children in that sub-group still breastfeeding at each month. The median duration of breastfeeding, expressed in months, is also shown for each sub-group.

In the analysis of mothers' ages (Fig. 6-1), the data indicate that duration is consistently longest among children whose mothers are in the 20-29 year old cohort and shorter for those less than age 20 and older than age 29. The different trends among categories of mother's education, mother's birthplace, parity, and family income (Figures 6-2 through 6-5) are consistent with what was suggested for the corresponding Breastfed Three Months and Breastfed Six Months data in Table 6-1. The parity variable shows the least clear and consistent association with duration of breastfeeding.

Logistic Regression Analysis

The preceding cross-tabulations and life table analyses demonstrate associations between infant feeding behavior and certain socioeconomic variables. In order to evaluate the effect of each of these on specific aspects of infant feeding while controlling for the effects of the other predictors, it is necessary to use a form of multivariate analysis. In this case, logistic regression was chosen. Multiple logistic regression is the most appropriate linear model, multivariate technique for use with dichotomous dependent variables. It permits both the evaluation of the predictive power of entire models and allows the assessment of the effects of individual predictor variables while simultaneously controlling for the effects of other independent variables.

Table 6-2 shows four separate models in which the four dichotomous infant feeding outcomes are the dependent variables

and the background variables are the predictors. The beta coefficients and associated chi-square tests provide an indication of which of the predictors exert a significant effect on the probability of the infant feeding outcome under consideration. As one example, both mother's age and urban birthplace have a significant effect on the value of the dependent variable "Ever Breastfed." The fact that the coefficients in this case are negative suggest that both increasing age and urban birthplace increase the probability that a mother will not initiate breastfeeding. We know however, that for age, this relationship is not linear, and, from the life table can see that much of the effect may be due to the fact that younger mothers are least likely to initiate breastfeeding--and not that oldest mothers are most likely to do so. In this model, none of the other predictors has a significant influence on the dependent variable.

For the models in which "Breastfed Three Months" and "Breastfed Six Months" are the dependent variables, a different set of predictors exerts significant influence on the probability of the infant feeding outcomes. For these two models, it is parity, mother's birthplace, and family income[1] which are significant. The direction of each predictor variable's effect is again instructive. High parity is associated with the probability that a child will be breastfed for at least three months, or at least six months, respectively. This may reflect the lower likelihood of first time mothers to initiate and continue breastfeeding rather than a strong tendency for very high parity women to breastfeed for long durations (see Figure 6-2). Contrasted with this are the effects of mother's birthplace and family income, both of which have negative betas, suggesting that among Bangkok-born mothers and high income families, the probability is reduced that the index child will be breastfed for longer durations. The effects of mother's age and mother's education are not significant in these models.

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[1]In this and subsequent logistic regression analyses, the family income variable was divided into eight income ranges. This was done in order to detect the effect, if any, of more subtle changes in level of family income. The eight income ranges used in these analyses are:

500-2000 BHAT
2001-3000
3001-4000
4001-6000
6001-8000
8001-10000
10001-15000
$\geq$ 15000

The model of the determinants of bottle feeding by two months shows that each of the predictor variables exerts a significant effect on the outcome. Again, the signs of the betas are of interest, and they are consistent with the patterns suggested in the earlier tables. The coefficient for parity suggests that among low parity women, the probability is increased that the child will experience early bottle feeding. For each of the remaining predictors in this model, there is a significant positive influence on the dependent variable. An urban-born mother, high family income, and older mother, an educated mother, each increase the probability that the child will be introduced to bottle feeding by two months.

For each of the models displayed in Table 6-2, the chi-square for the entire model is also shown. The interpretation of these chi-squares and the associated P values is that the joint association of all the predictors in each model exerts a significant effect on the probability of the outcome stipulated by the dependent variable.

Since interpretation of the magnitude of effect represented by the beta coefficients is not readily apparent, the preferred method of quantifying and comparing the effects of the predictor variables is to calculate the adjusted risk odds ratio (RÔR) for each. For each variable, this ratio represents the probability of a given outcome divided by the probability of the alternative. Table 6-3 shows the RÔRs and 95% confidence intervals for each of the predictor variables that were significant in the preceding table. Although some predictor variables are coded as simple dichotomies (e.g., Urban Mother) others are coded on an ordinal scale. For this latter type of variable, a series of representative odds ratios is presented in which comparisons are made between a reference category and other categories of interest. For each of the ordinal variables, the modal score was chosen as the reference category. Examples of odds ratios for both dichotomous and ordinal variables are given in Table 6-3.

In the "Breastfed Three Months" model, the odds ratio for the dichotomous variable Urban Mother suggests that a Bangkok-born mother is only about half as likely to breastfeed for three or more months, in comparison to a rural-born mother. Middle income group mothers are about half as likely to breastfeed for 3 or 6 months as lower income group mothers, while upper income group mothers are only about one fourth as likely to do so. In the "Bottle By Two Months" Variable, the set of odds ratios for the ordinal variable income group suggest that in comparison to the reference category (2000-3000 bhat/month), higher income groups are more likely (by 1.29 greater than two and more than three times, respectively) to introduce early bottle feeding. The remaining RÔRs for the other predictor variables and models are interpreted in a similar way. Overall, high income and very high parity seem to exert some of the strongest effects in the

model. The influence of urban vs. rural birth is also substantial and very pervasive.

In the preceding multivariate analysis, introduction of bottle feeding by two months was one of the four infant feeding outcomes under consideration. In the earlier descriptive section on the dynamics of weaning, an examination of "weaning intervals" indicated that cessation of breastfeeding follows rapidly after first initiation of bottle feeding. For this reason, an additional logistic model was created, using "Bottle by Two Months" as one of the variables predicting the probability of breastfeeding duration.

The results of this further analysis (Table 6-4) show that early bottle feeding appears to have a dramatic negative effect on the duration of breastfeeding. The overall model chi-square has also increased dramatically from the corresponding model without "Bottle by Two Months" in Table 6-2. When the model in Table 6-2 is compared to that in Table 6-4, distinct differences can be seen in the magnitude and significance of the coefficients for mother's birthplace, mother's age, and family income. These effects have been reduced by the addition of "Bottle by Two Months" as a predictor variable. This suggests that a good part of the effect seen for the above background variables is actually due to the latent influence of Bottle by Two Months. Table 6-4 therefore presents a partitioning of relative effects on the dependent variable, separating those attributable to the background variables alone and those attributable to use of bottles by two months.

As can be seen by the odds ratios in Table 6-5, introduction of early bottle feeding appears to reduce greatly the odds that a child will breastfeed for at least three months. Early bottle feeding also has an extremely pronounced if not quite as strong, association with duration for one month. In these models, early bottles reduce by 25-fold the odds that a child will breastfeed for as long as three months, and by eleven-fold the odds of breastfeeding for six months.

The question remains whether early introduction of the bottle does or does not represent a deliberate intention to wean on the part of the mother, in which case it would be, by definition, associated with shorter breastfeeding. If bottles are introduced by 2 months as part of a weaning strategy, there would obviously be a very high probability of weaning by 3 months. The fact that the effect is very strong for 3 months of breastfeeding and weakened for 6 months duration suggests that this may be part of the explanation for the very strong association. One way to test this is to create a second model, with which one can evaluate whether the statistical association of early bottle with lack of breastfeeding for <u>six</u> months is

really a result of its association with weaning before 3 months.

The analysis was thus repeated using a subset of the sample, consisting only of those children who did breastfeed for as long as three months. When this analysis was performed, no significant effects were realized for any of the predictor variables on breastfeeding for six months including "Bottle by Two Months." This suggests that it is impossible to say with confidence how much of the apparent impact of early bottle feeding on shortened duration of breastfeeding is due to the mother's intention to wean her child rapidly and how much is due to unintentional weaning caused by disruption of lactation when bottles are added. It should be noted, however, that in the companion studies for Nairobi and Semarang, introduction of early bottle feeding by two months did have a significant, independent effect on the probability of breastfeeding for six months and longer. Therefore, under some circumstances, the negative influence of early bottle feeding on breastfeeding duration may be demonstrable statistically. Although in Bangkok the result is not straightforward (apparently because many women wean early for a whole complex of reasons), use of "early bottles" as an independent variable remains interesting, if problematic.

Support for the existence of a sequence of events beginning with early bottles and ending with unintentional weaning from the breast was provided by the ethnographers who noted cases where introduction of bottle feeding was associated with subsequent undesired termination of breastfeeding:

> "Samlee was married at the age of 20 and continued rice farming for two more years before she and her husband moved to work in Bangkok. Her husband is a construction sub-contractor while she works as a laborer. After the first baby was born (index) at Rajvithi Hospital, she stopped working and has been staying at home with the baby. She believes that mother's milk is good and it helps the baby to grow fat, to be strong and to love its' parents. The baby was breastfed from the second day until the twentieth day when the husband said that the baby is not fleshy (mai rud nua). Her mother-in-law suggested that powder milk should be additionally given. Her husband bought a tin of Meiji (brand formula). The baby would be breastfed before he was bottle fed. Once the baby reached one month old he gave up mother's breast and only continued taking powder milk..."

The above findings illustrate the need to consider the possibility that "Bottle by Two Months" functions both as an outcome variable and as a possible determinant of feeding practices. In this way, it may be possible to partition the effect of background variables on duration of breastfeeding into

that part which operates directly and that portion which operates through the decision to introduce bottle milks early in infancy. This type of two-stage analysis involving "Bottle by Two Months" will be employed again in a later section when development of an overall predictive model is considered.

Table 6-1 Initiation of Breastfeeding, Breastfeeding Duration, and Introduction of Bottle Feeding Broken Down by Socioeconomic Factors

	EVER BREASTFED Total		BREASTFED 3 MONTHS Total		BREASTFED 6 MONTHS Total		BOTTLE BY 2 MONTHS Total	
	N	%Yes	N	%Yes	N	%Yes	N	%Yes
Mother's Age								
<20 years	104	94.2	69	60.9	34	44.1	77	44.2
20-29	882	92.0	628	65.9	408	55.9	751	43.5
30-39	370	85.9	257	63.0	178	50.6	331	55.9
≥40	32	75.0	20	75.0	16	88.7	29	51.7
Parity								
1	801	89.4	419	58.2	262	44.7	515	52.6
2-3	624	92.9	450	70.0	301	59.8	533	42.2
4-5	124	85.5	84	71.4	57	63.2	111	47.7
6-7	34	70.6	18	66.7	13	69.2	29	44.8
Mother's Birthplace								
Bangkok	590	86.1	414	57.7	267	44.6	560	52.5
Other (rural)	787	93.5	552	70.5	364	61.3	657	42.5
Mother's Education								
None	68	82.4	46	67.4	33	60.6	59	42.4
1-4 years	834	92.1	593	70.2	379	61.7	712	41.0
5-7 years	190	90.0	134	62.7	94	50.0	167	46.7
8-10 years	139	83.5	94	55.3	60	36.7	120	65.8
>10 years	155	89.0	107	46.7	70	30.0	129	67.4
Family Income								
500-3000 BHAT	550	92.2	387	74.9	245	64.5	473	36.6
3001-6000	537	89.8	383	63.7	263	54.4	484	50.2
6001-10000	190	86.3	137	47.4	86	36.0	171	67.8
>10000	72	86.1	42	45.2	30	26.7	59	67.8

Table 6-2 Logistic Regression Models for Different Infant Feeding Outcomes:
Beta Coefficients for Background Socioeconomic Variables

Model	EVER BREASTFED	BREASTFED 3 MONTHS	BREASTFED 6 MONTHS	BOTTLE BY 2 MONTHS
Intercept	3.959 (99.94)[1]***	1.238 (17.84)***	1.051 (8.36)**	-1.647 (39.42)***
Parity	0.052 (0.15)	0.392 (9.96)*	0.548 (13.67)***	-0.339 (11.98)***
Urban Mother	-0.774 (16.10)***	-0.584 (15.75)***	-0.682 (14.64)***	0.375 (8.58)**
Income Group	-0.092 (2.40)	-0.258 (29.61)***	-0.270 (20.18)***	0.252 (36.60)***
Mother's Age	-0.283 (9.46)**	-0.012 (0.03)	-0.115 (1.68)	0.226 (13.16)***
Mother's Education	0.006 (0.01)	-0.070 (1.44)	-0.113 (2.27)	0.142 (7.18)**
Model X^2	(34.71)***	(77.62)***	(73.51)***	(108.17)***
R	.17	.24	.27	.25

[1]Numbers in parentheses are MLE chi squares (Wald Statistic)

*P < .05, **P < .01, ***P < .001

Table 6-3 Logistic Regression Models for Different Infant Feeding Outcomes: Adjusted Risk Odds Ratios and 95% Confidence Intervals for Socioeconomic Variables with Significant P Values

	EVER BREASTFED	BREASTFED 3 MONTHS	BREASTFED 6 MONTHS	BOTTLE BY 2 MONTHS
Parity				
2-3 vs 1	NS	1.48 (1.16,1.89)	1.73 (1.29,2.31)	.71 (.59,.86)
6-7 vs 2-3	NS	2.19 (1.72,2.79)	2.99 (2.24,4.00)	.51 (.38,.68)
Urban Mother	.46 (.32,.67)	.56 (.42,.74)	.51 (.36,.72)	1.46 (1.13,1.87)
Income Group				
2,000-3,000 vs 3,000-4,000 bhat	NS	.77 (.70,.85)	.76 (.68,.86)	1.29 (1.18,1.40)
2,000-3,000 vs 6,000-8,000	NS	.46 (.42,.51)	.44 (.40,.50)	2.13 (1.89,2.40)
2,000-3,000 vs 10,000-15,000	NS	.28 (.25,.30)	.26 (.23,.29)	3.52 (3.13,3.96)
Mother's Age				
25-29 vs 20-24 years	.75 (.63,.90)	NS	NS	1.25 (1.11,1.42)
35-39 vs 25-29	.57 (.48,.69)	NS	NS	1.57 (1.32,1.87)
40+ vs 25-29	.43 (.36,.51)	NS	NS	1.97 (1.66,2.34)
Mother's Education				
1-4 vs 0 years	NS	NS	NS	1.15 (1.04,1.28)
8-10 vs 1-4	NS	NS	NS	1.33 (1.15,1.54)

Table 6-4 Logistic Regression Models for Different Infant Feeding Outcomes: The Effect of Early Bottle Feeding

Model	BREASTFED 3 MONTHS	BREASTFED 6 MONTHS
Intercept	2.048 (29.78)[1]***	1.757 (14.01)***
Parity	0.108 (0.48)	0.322 (3.65)
Mother's Birthplace	-0.557 (8.94)**	-0.608 (8.58)***
Family Income	-0.153 (6.51)*	-0.216* (5.21)
Mother's Age	0.183 (3.77)	-0.030 (0.09)
Mother's Education	0.033 (0.21)	-0.058 (0.44)
Early Bottle Feeding	-3.166 (266.66)***	-2.434*** (131.04)
Model X^2	(436.16)***	(205.09)***
R	.59	.50

[1]Numbers in parentheses are MLE chi squares (Wald statistic)

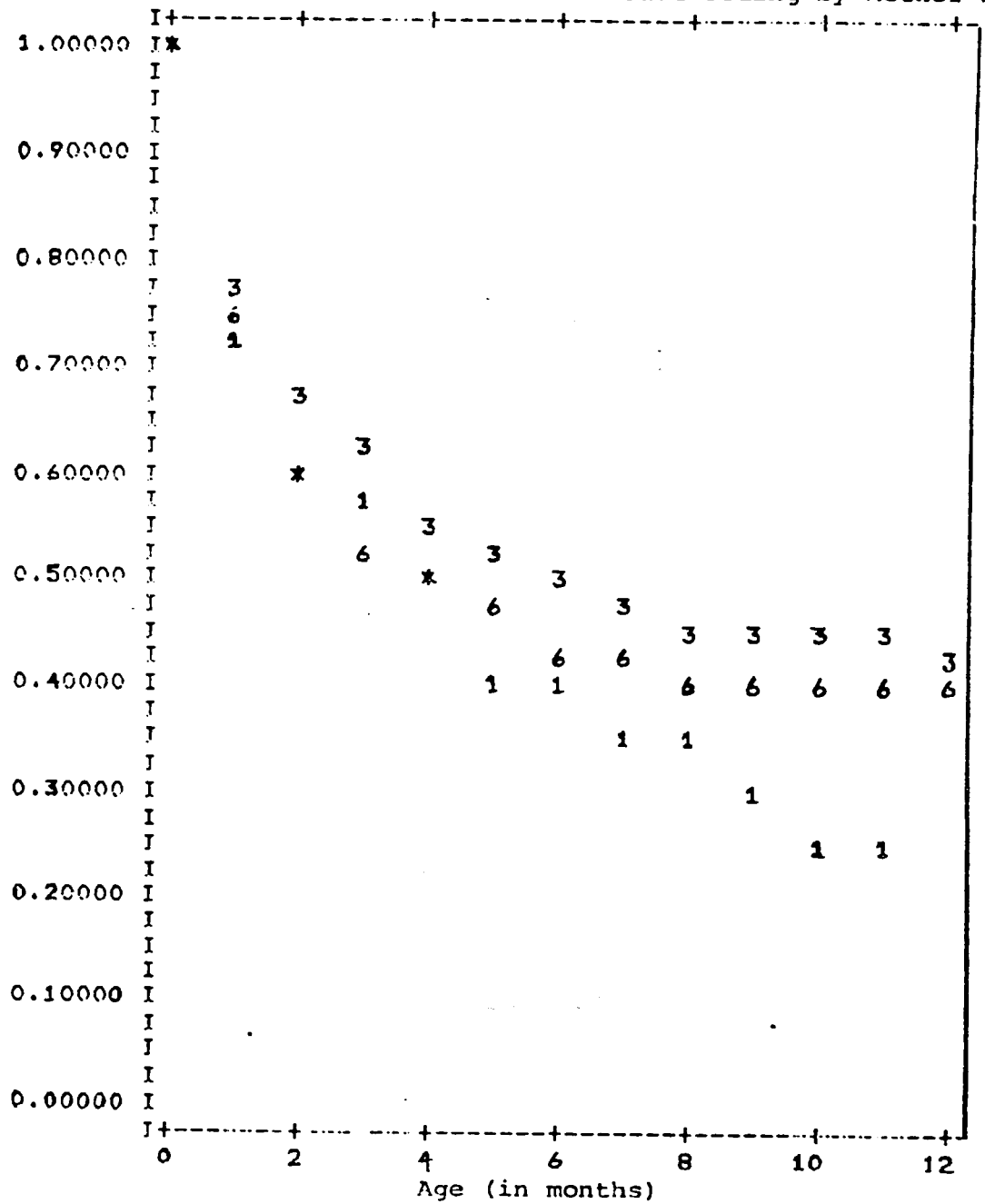
*P<.05, **P<.01, ***P<.001

Table 6-5 Logistic Regression Models for Different Infant Feeding Outcomes:
Adjusted Risk Odds Ratios and 95% Confidence Intervals for Variables with Significant P Values

	BREASTFED 3 MONTHS	BREASTFED 6 MONTHS
Parity (6-7 VS. 2-3)	NS	1.90 (1.37,2.65)
Mother's Birthplace	.57 (.40,.82)	.54 (.36,.82)
Family Income		
3,000-4,000 vs 2,000-3,000 bhat	.86 (.76, .96)	.81 (.67,.97)
6,000-8,000 vs 2,000-3,000	.63 (.56, .71)	.52 (.43,.63)
10,000-15,000 vs 2,000-3,000	.46 (.41, .52)	.34 (.28,.41)
Mother's Age	NS	NS
Mother's Education	NS	NS
Early Bottle Feeding	.04 (.03,.06)	.09 (.06,.13)

Figure 6-1

Duration of Breastfeeding by Mother's Age



Key:

		N	Median Survival
1	19 years or less	104	3.95
3	20-29 years	881	6.01
6	30 years or more	401	3.83

* = more than one group

Figure 6-2

Duration of Breastfeeding by Parity

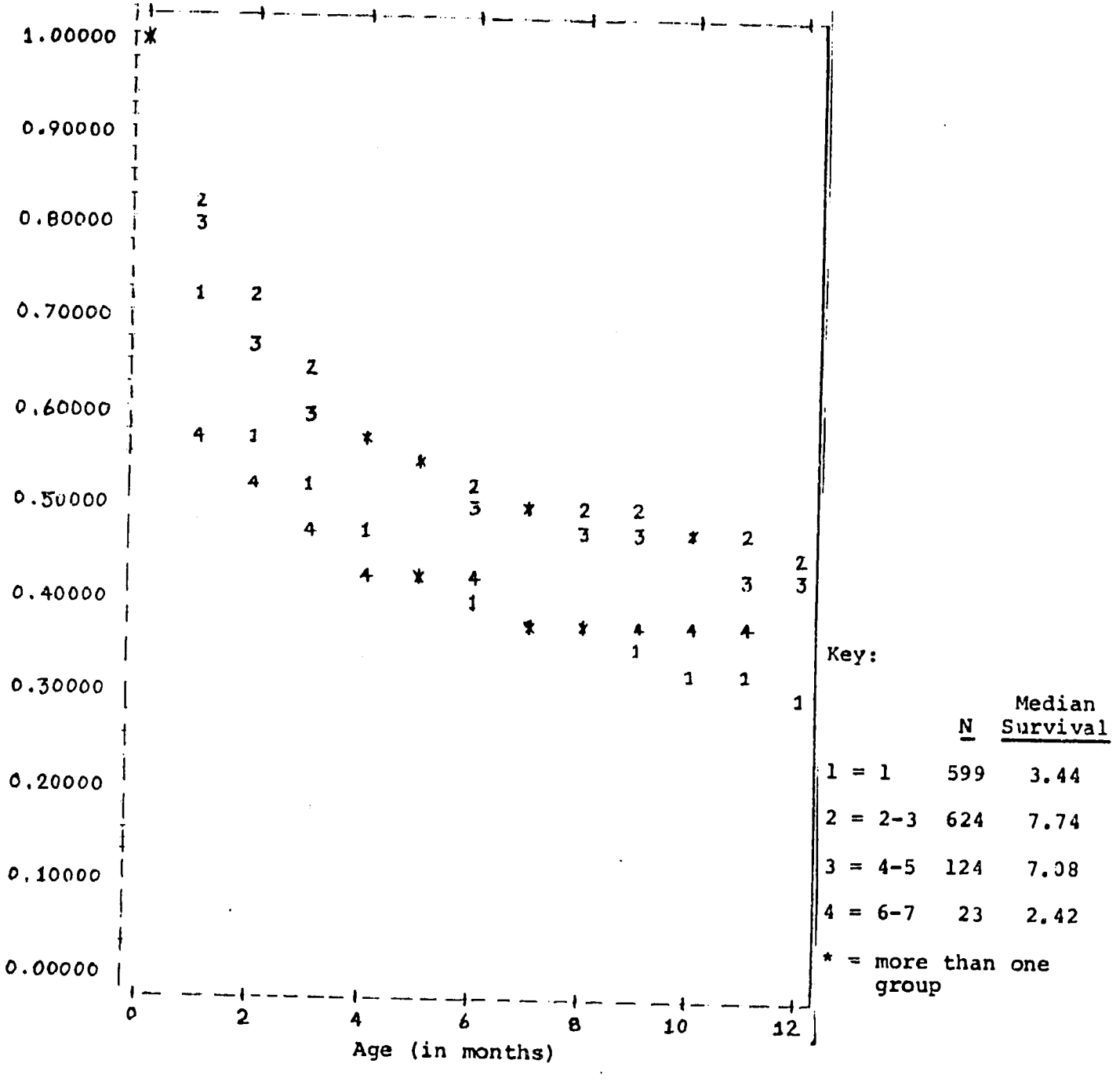


Figure 6-3

Duration of Breastfeeding by Mother's Birthplace

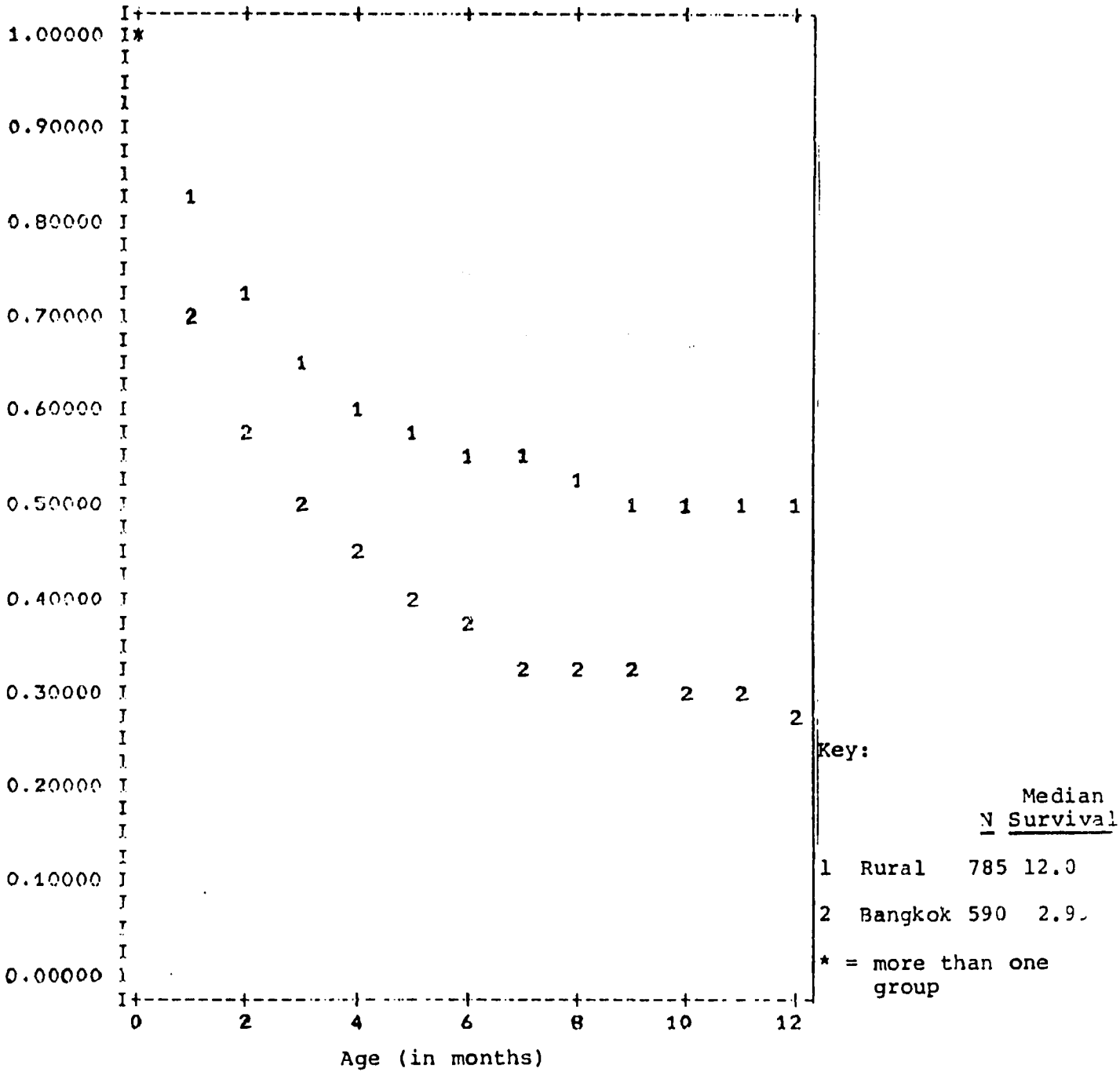
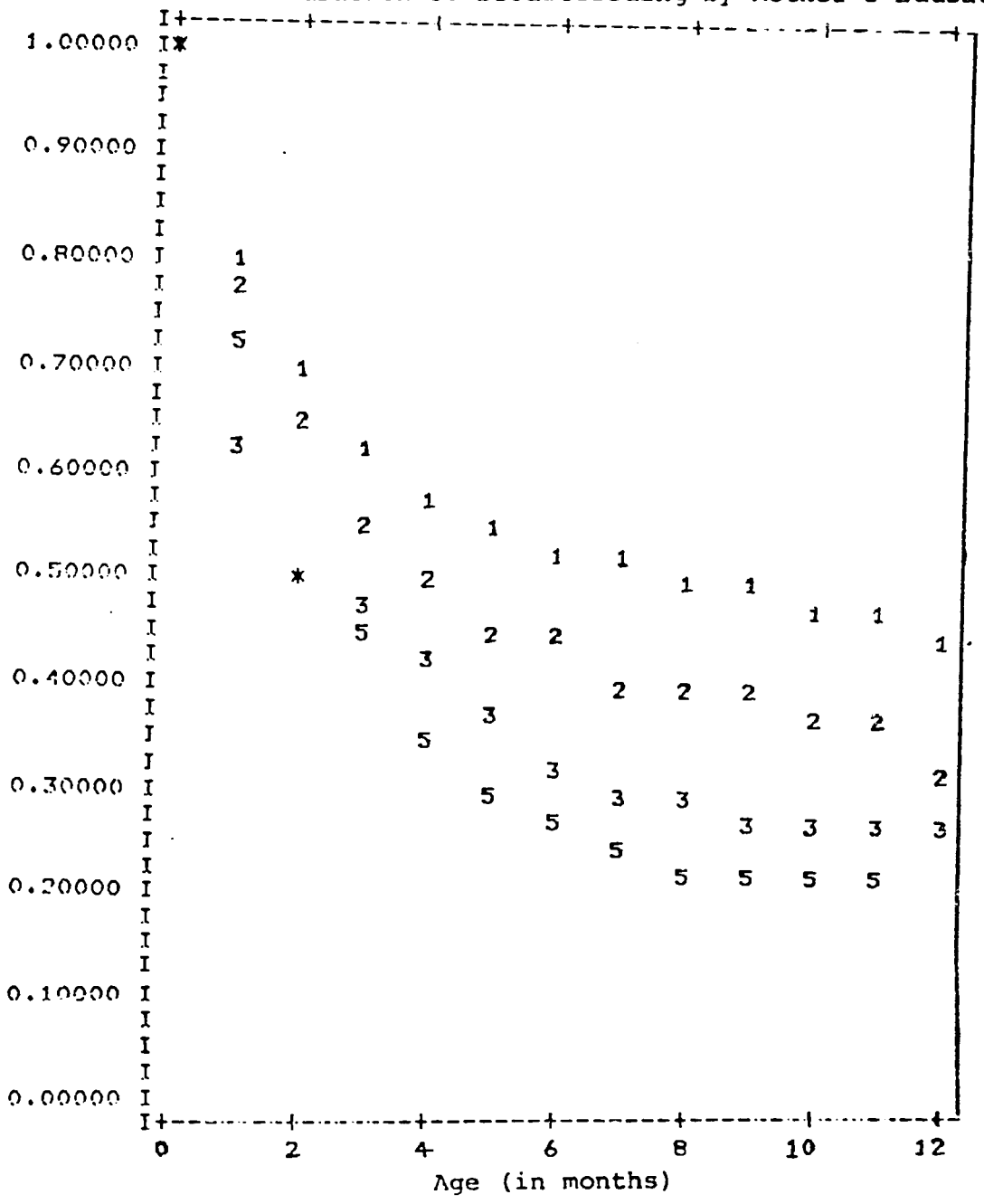


Figure 6-4

Duration of Breastfeeding by Mother's Education

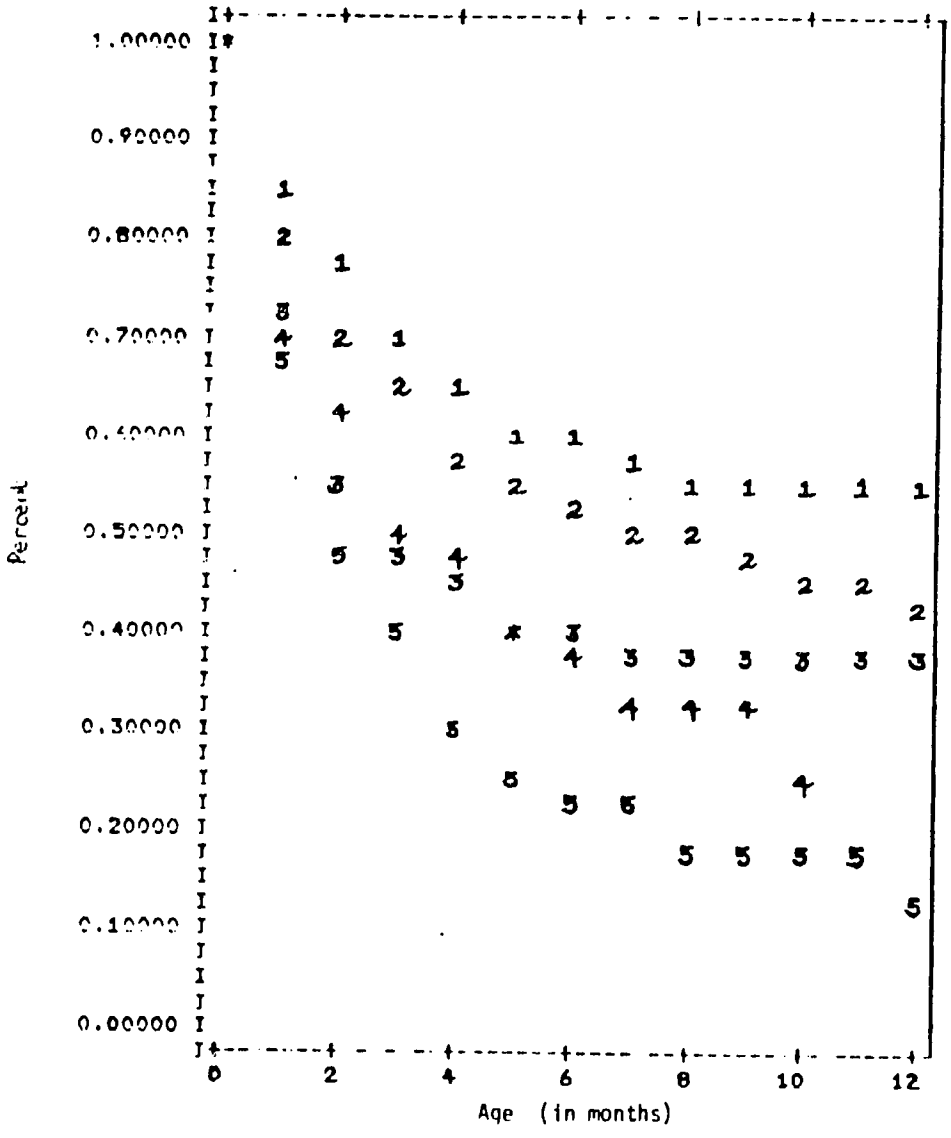


Key:

		N	Median Survival
1	4 years or less	899	7.87
2	5-7 years	190	4.11
3	8-10 years	139	1.96
5	10 years or more	156	2.18

* = more than one group

Figure 6-5
Duration of Breastfeeding by Income Group



Key:

		N	Median Survival
1	≤ 2999 Bhat	367	12.0
2	3000-4499 Bhat	479	7.16
3	5000-7499 Bhat	325	2.71
4	7500-8999 Bhat	60	2.94
5	≥ 9000 Bhat	155	1.86

* = more than one group

VII DETERMINANTS OF INFANT FEEDING PRACTICES: INFANT FOODS MARKETING

Methodology

The general objective of the marketing studies was to examine the role of infant food marketing and distribution strategies on infant feeding behavior. Because commercial marketing strategies and practices are developed, or refined, on a country-by-country basis, and because no prior marketing research studies of infant food marketing had been undertaken in the participating countries, much of the marketing research was descriptive and exploratory in nature. Five research questions guided the researchers:

1. What current practices and strategies characterize the infant food marketing in each nation?
2. What factors account, in whole or in part, for the current marketing environment?
3. What is the intensity of current promotional activity by infant food sellers to mothers, health care workers, and others who influence infant feeding choices?
4. What effects, if any, do the marketing practices and policies of infant food sellers have on infant feeding behavior of mothers?
5. What effects, if any, do the marketing practices and strategies of the infant food sellers have on the behavior of health care providers?

Three specific approaches were used to answer these questions: a retail market study; a study of the state of the industry; and a consumer behavior study.

The retail market substudy explored the distribution of breast milk substitutes by examining the number, variety, and prices of products in a sample of sales outlets (food stores, shops, pharmacies). Preliminary market investigations and ethnographic field research on the commercial products actually used to feed infants were employed to develop a list of products in current use.

The state of the industry substudy provided information about the production, distribution, and advertising policies and practices of infant food wholesalers and retailers. Trade policies and regulations of national governments were analyzed to determine their influence on the production, distribution, and advertising practices of producers and sellers. Information was collected through secondary data analysis and interviews with appropriate industry, government, and health personnel. Specific practices such as the distribution of free samples and promotion

to the medical profession were also examined as part of other subsidies.

The consumer behavior substudy, administered as a segment of the cross-sectional survey in infant feeding practices, provided data on the demand for breast milk substitutes. The decisions to buy and use breastmilk substitutes are manifested in two distinct types of behavior, namely, purchase of a commercial breastmilk substitute and the actual feeding of such a product to the baby. Purchasing behavior was elicited through survey questions on commercial products fed to infants as well as through observation of retail practices. Feeding behavior was explored in the cross sectional survey.

Research questions 1, 2, and 3 were studied through the retail audit and state of the industry analysis. This research provided a baseline of information about commercial infant foods marketing which is currently unavailable in each site. The retail audit analysis consisted of collection and analysis of price, product, and promotional data from retail shops and outlets. These data were collected by local subcontractors on site. All subcontractors were trained or certified as to professional qualifications by Trost Associates Incorporated of Norwalk, Connecticut, the Consortium's marketing subcontractor. Retail audit reports were tabulated and analyzed by Trost Associates prior to submission to the Consortium. The state of the industry analysis consisted of secondary research about the development and size of the infant foods industry; direct observations of industry activity by Consortium staff, consultants, or subcontractors; and interviews of infant food company executives and employees, other businessmen directly involved with the industry, and health providers possessing first-hand information about industry actions.

Research question 4 addresses the "consumer behavior" of mothers. To examine maternal decisionmaking, questions of such topics as product awareness, brand awareness, past feeding behavior, and hospital practices (e.g., receipt of samples) were included in the cross-sectional survey instrument.

Research question 5 was addressed through interviews with health care personnel, infant food company representatives, and through direct observation by Consortium staff, consultants, or subcontractors.

In Bangkok, the retail market and state of the industry substudies were carried out by Deemar Company, Ltd., a major commercial market research firm. Interviews were conducted by Deemar personnel with six manufacturing company executives, four advertising agency directors, and ten managers of leading retail establishments. The protocol for all such interviews was developed by the Consortium's marketing subcontractor, Trost

Associates, Inc., which received summaries of the interviews conducted by Deemar. The state of the industry substudy was supplemented by secondary research, direct observations by other Consortium staff and consultants, and examination of promotional materials, can labels, and posters.

The audit of Bangkok retail establishments was conducted by Deemar staff according to a master sampling frame of the entire city of Bangkok. According to Deemar's audit plan, there are six basic types of outlets in Bangkok plus a "miscellaneous" category. The latter accounts for nearly fifty percent of Bangkok's total retail outlets, but is composed of temporary shops, stands, and kiosks, which makes an accurate count impossible. Based on Deemar's recommendation (and Trost Associates' approval) a total of 182 retail outlets was audited. Because Deemar already had excellent sales data on the six standard categories of stores, it was elected to overrepresent the miscellaneous category among the stores actually visited (115 of 182). The six standard categories show a high percentage of outlets carrying formula, but the miscellaneous category shows a relatively low percentage. The large sampling of miscellaneous outlets was necessary to assess the amount of reselling that might be occurring as products purchased from provision stores or supermarkets were resold through street vendors or temporary shops. There is some, but it is not the predominant distribution method for infant formula in Bangkok.

Each of the audited outlets was visited by a Deemar representative, who recorded information about the names of all infant formulas and foods available in the store, sizes, prices, point of sale promotional material, and other observations. The interviews with retail managers for the state of the industry substudy were conducted at the same time in a subsample of the retail outlets. All retail audit data were recorded, translated, and forwarded to Trost Associates for tabulation and analysis. Trost Associates prepared, in turn, a report that summarized the Deemar data and integrated aspects of the retail and state of the industry substudies.

Four categories of data were collected for the state of the industry substudy: general information (name of companies, past history, local versus multinational firms); competitive environment (market share, pricing patterns, promotional activities, medical relationships); channels of retail distribution and health care system contact; and government regulatory activities. Data were collected from multiple primary and secondary sources for each category.

The state of the industry analysis was prepared by using the Deemar/Trost report, other secondary research materials, and data collected by members of the Consortium staff. Dr. Thonglaw of the Mahidol faculty collected a number of materials not otherwise

available to the research team, including a copy of the Thai regulations governing promotion and marketing behavior. Dr. Thonglaw also conducted interviews with a sample of health care providers and made observations of practices at various hospitals, clinics, and health centers.

Data for the consumer behavior substudy were drawn from the cross sectional survey of mothers in Bangkok. Questions were developed in such areas as products used, awareness of advertising (past and present), product and brand awareness, and advice from various sources including health care providers, friends and relatives. The consumer behavior analysis has utilized these data, and data from other sections of the survey, to assess the influence of marketing activities on maternal decisions to use breastmilk substitutes and to purchase particular products.

The Infant Foods Market in Bangkok

The Bangkok market is one of the most competitive infant foods markets that has ever been studied. It is, by far, the most competitive of the five cities (Bogota, Jakarta, Nairobi, and Semarang) studied in this project. The market structure of sellers is the type associated with a high degree of competition. This is manifested in terms of the number of brands, sizes, competitive pricing, and promotional activities of the sellers.

Breastmilk substitutes, particularly infant formulas, are widely available in the Bangkok market. Thirty-eight percent of all stores audited carried some type of infant formula product. A higher percentage of provision stores (60%), where grocery shopping is commonly done, were found to carry formula than did the other outlets. There is a relatively large number of popular brands of infant formula in the Bangkok market. Four of ten brands in the humanized formula category have more than 20% penetration among audited stores; two of the full protein formula brands show penetration above 20%. These findings illustrate that the Bangkok market for infant formula is characterized by extensive availability and competitiveness.

Based on store data, humanized formulas account for the largest share of formula in the marketplace, with more than twice the shelf presence of the other types of formula. This suggests a seller "push" toward higher priced humanized formulas. It may indicate a consumer preference for humanized formulas as well.

Price competition exists in all segments of the infant formula market. Price competition is most vigorous among the humanized formulas. There is a great variety of package sizes for infant formula products. Two sizes are most popular (454

gr. and 2250 gr.), but many slight size variations were noted. These variations apparently permit sellers to engage in competitive pricing while distorting the price per gram that consumers pay.

Retailers do provide considerable information to potential consumers regarding product quality, attributes, and characteristics. Relatively little point of sale promotional material was discovered in the audit. Retailers, manufacturers/distributors, and advertising agency personnel displayed a general awareness of government regulations and the W.H.O. Code, but limited knowledge of specific regulations. Opinions were divided as to whether the market for breastmilk substitutes would increase or decrease in the future. Equally divided opinions existed as to whether the market had expanded or contracted during the previous five years.

Retail Availability

Twenty-one brands[1] of formula milks were included in the market audit. These products were subdivided into three categories: humanized (10 brands); full protein (3 brands); and miscellaneous (8 brands).

All retail outlets carried multiple brands of formula. The average number of brands carried was approximately six per store. Among retailers who were interviewed, nine of ten reported Bear Brand (full protein) to be the best of their top-two selling formula brands, followed by Lactogen (humanized), Nesprey (full cream powdered) and Wyeth's S-26 (humanized). As the data in Table 7-1 illustrate, there are several leading brands in each product category. Six of these formulas have about 20% penetration in the market, with very few in the mid-range (10-20%), and the remainder at less than 10%. As a whole, humanized formulas have the highest market penetration among all infant foods, followed by full protein formulas and miscellaneous formula/milk products.

Humanized formulas account for the largest amount of formula on store shelves. Humanized formulas appear to have a relative market share twice the size of the others: 48% of the available products based on the volume of all formulas displayed on store shelves (Figure 7-1). When adjusted for retail prices, humanized formula accounts for 50% of the value of products found on store shelves (Figure 7-2).

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[1]Variations in the number of brands are due to different sources of information; possible confusion over a single brand name (e.g., Bear) appearing in several categories; and new brand entries into the market in 1981-82 period.

Infant foods are widely distributed in Bangkok. The retail audit highlighted the broad availability of formula products. Nearly two-thirds of the establishments that might reasonably be expected to carry infant foods actually stocked formula products. (About one-third of the total audit sample would not usually be expected to carry such goods.) Most types of outlets carry humanized, full protein and other milk products as well. This means that the Bangkok consumer has a wide range of product choices in virtually all retail outlets that stock infant foods. Given this wide range of choices, brand loyalty is difficult for sellers to maintain.

Of those stores audited, there is a high degree of availability among the outlets that would most be expected to serve consumers' food needs. Three-fourths of the large and medium size provision stores carried some formula. Only one-third of the chemists and 40% of the medicine shops carried any formula products however. Among the miscellaneous shops audited, about one-quarter carried formula products. In short, the pattern of availability in Bangkok suggests that formula products are sold as food products in the established outlets that normally meet this type of consumer need (Table 7-2).

Of those outlets carrying formula, there was a strong tendency to carry all three types of product (humanized, full protein, miscellaneous) in the provision stores, with the chemists having a decided tendency to carry only humanized formulas. This product array is affected by the large number of brands offered by manufacturers in the Bangkok market and the willingness of outlets to carry an average of more than six brands.

It was also noted that a number of Bangkok hospitals have retail store operations that sell formula products. The presence of these stores is claimed to be a convenience for mothers bringing babies to the hospital clinics for examination but is also a source of retail revenues to the hospitals. The hospital stores appear to be a new marketing innovation, and it is significant that product prices in these outlets are typically 5-10% below retail price norms.

Product distribution by package size is illustrated in Figure 7-3. The seven basic sizes identified are drawn from 17 different can sizes and clustered to the nearest 100 grams. Several points are noteworthy about package size. First, the 2250 gram package had the greatest total volume on the shelves (41%), followed by the 454 gram size (24%) and 2500 gram size (16%). There is a bimodal distribution pattern with the package sizes tending toward the extremes.

Second, although this bimodal cluster accounts for a relatively large proportion of the range of can sizes, there is

considerable variation around these two points. For example, in Figure 7-3, the 454 gram can is represented as a standard size. In fact, there are actually five different can sizes at or near 454 grams: 400 gr., 450 gr., 453 gr., 454 gr., and 460 gr. It is unlikely that a consumer would discern or understand the significance of such size variations. This probably reflects the efforts of some manufacturers to sell their product at a price that is close to others, although on a slightly higher price per gram basis.

A third point of importance illustrated in Figure 7-3 is the tendency of certain products to gravitate toward different sizes. For example, humanized formulas represent about one-half of the volume available in the 454 gram and 2250 gram sizes, but nearly all of the volume available in 1135 and 1350 gram sizes. In the 900 gram and 2250 gram sizes however, full protein and miscellaneous products compete with humanized formula. Depending on shelf placement, then, a consumer who selects on the basis of can size could be tempted to conclude that products in the 900 gram or 2250 gram size are identical or similar to the humanized formula products.

The number of products, and the variety of package sizes contribute to a more complicated consumer choice in Bangkok than in cities with fewer products and sizes. Although it is to be noted that there is an average of six formula products in each retail outlet, multiple sizes for each can easily bring to twelve or more the number of products from which the consumer must select. It is unclear whether size proliferation is likely to change dramatically in the next five years. There appears to be a trend toward standardization, yet there is some indication that individual companies may see a market opportunity in offering or promoting intermediate sizes.

The number and variety of retail outlets in Bangkok, when combined with the large number of brands in the market, present consumers with many product choices. As illustrated in Table 7-2, only chemists and drugstores limit or restrict the type of formula sold. Other outlets--which account for 95% of volume--tend to carry a mix of humanized and full protein formulas, and full cream milks.

Prices

Figures 7-4 and 7-5 illustrate the pricing patterns for brands in the two most popular can sizes, 2250 gr. and 454 grams. In both cases, the largest selection of brands and the widest range of prices exists in the humanized formulas. Miscellaneous products also show a wide price variance. The full protein formulas tend to have the smallest differential between brands.

Competitive Structure

The major multinational sellers of infant formula products operate in Thailand. Nestle, Wyeth Laboratories, Abbott Laboratories, Meiji, and Dumex all have their major products in the market. Carnation and Borden also sell their full-cream and other milk products through the same outlets used by the infant formula sellers. Dumex is the only manufacturer with a major manufacturing operation in Thailand, Dusit, a small Thai-owned company, has a manufacturing facility as well.

All infant formula manufacturers operate through Thai agents, wholesalers, and/or distributors. There are three basic "channels" through which infant formula products reach retailers:

Manufacturer --> Agent --> Retailer
Manufacturer --> Agent --> Wholesaler --> Retailer
Manufacturer --> Agent --> Distributor --> Retailer

Individual companies have developed unique variations of these basic arrangements. The companies involved in each channel are responsible for distribution and marketing activity.

Virtually all infant formula sold in Bangkok is imported by the manufacturers or their agents. According to government statistics, Nestle has about 34% of the market, followed by Dumex (21%), and agents for Bristol-Myers (9%) and Wyeth (11%). Snow (10%) and Meiji (5%) are noteworthy because of their efforts to expand market share at the time of this research. According to government data, in mid-1981, fewer than 200 tons of the 1100 tons manufactured and imported were produced in Thailand. Of this, Dumex accounted for nearly 85% of local production.

Advertising and Promotion

Bangkok is considered by marketing personnel to be a consumer-oriented cultural center, with a population in excess of 5 million. Advertising is a necessary means of reaching the population and its various socioeconomic segments. Mass media was once a popular means of promoting infant foods in Bangkok. Since 1980, however, there has been a large reduction in mass media promotion of infant foods. No radio or television advertising was discovered in this study. Only occasional print advertising was identified by members of the research team. These facts are largely attributable to the government's ban on advertising and compliance by infant formula manufacturers and their advertising agencies. Interviews with company and agency executives disclosed a high degree of awareness about the government policy.

According to executives in industry, advertising agencies, and retailers, promotional efforts have an important stake in reaching doctors, nurses, and hospital administrators. These health personnel have confirmed that the companies do try to reach and influence them, but that this contact is not a source of "pressure."

By all accounts, the hospital and clinic have become sites for marketing and promotional activity. Direct marketing activity, such as the use of milk nurses, has been banned, although observations by research team members indicate that some nurses do represent companies in the hospital setting. Indirect promotion, as through company supplying of product samples or hospital supply needs, is frequent and substantial. During the time of the field research, two companies--Snow and Meiji--reportedly increased their efforts to distribute free samples to mothers in hospitals. The other companies seemed to accept a system in which supplies were turned over to hospital or clinic staff for use in the hospital. In a number of hospitals and clinics, infant formula was supplied as a discharge pack to mothers leaving the facility. The fact that nearly 12% of mothers in the cross sectional survey reported receiving some sample upon leaving the hospital or clinic underscores the importance that companies have given to this promotional tactic. (It is to be further noted that as many as 40% of mothers giving birth in certain hospitals received discharge packs.)

Retail outlets displayed point of sale literature or promotional material infrequently. A few posters and signs were observed, as well as prominent product displays. The former might be interpreted to violate the W.H.O. Code standards, while the latter probably did not. More importantly, both retailers and mothers report that there are frequent discussions between mothers and store operators about the qualities and attributes of individual formula products. The retailers, in particular, claim that mothers frequently discuss their babies' reactions to one type of formula and solicit suggestions for alternative products.

Government Policies

The government has adopted an elaborate system of food and drug regulation. Milk products in general, and infant formula in particular, fall within this system. Industry executives pointed to quality control regulation as necessary, desirable, and effective.

The government has adopted a version of the W.H.O. Code of Marketing for Breastmilk Substitutes. (Thailand voted for the Code at the World Health Assembly). Retail audit data were collected during the first year following adoption of the code. By all accounts, industry had begun to implement provision, such

as those prohibiting mass media promotion, in advance of the Code's passage. By the time of this field research, competitive strategies had shifted to focus on the health care institutions.

The W.H.O. code provision surrounding discharge packs, free samples, and free supplies as well as information gifts, and educational materials to health professionals seem particularly important in Bangkok. Health professionals--nurses, doctors, social service staff--all report continuing efforts by company representatives to convince health professionals of the value of their company's products and the usefulness of accepting samples, supplies, and discharge packs for distribution to mothers.

Commercial Influences and Consumer Behavior

Data from the cross-sectional survey allow us to gain some insights into the factors that are associated with a demand for infant foods, in this instance, formula and non-formula foods in the infant's diet. Direct influences are those experiences or circumstances that have direct bearing on the mother and her child, i.e., the receipt of a promotional sample of infant formula, problems with breastfeeding, and labor force participation. Indirect influences are those that result from previous experiences, or encounters that are likely to shape attitudes and knowledge about commercial infant foods. Thus, indirect influences might be experience with previous children, or recommendations about infant feeding from relatives, neighbors, or health care workers.

In this discussion we will focus on the following consumer-oriented variables: receipt of an infant formula sample from the hospital, recall of mass-market advertising, brand awareness, and attitudes towards commercial infant foods.

Samples

Approximately 12% of the mothers in our sample reported receiving a free sample of infant formula (Table 7-3), and the primary source of that sample was the hospital where the baby was born (96%). Women with higher income and education and women who had worked prior to having their baby were significantly ($p<.001$) more likely to receive a sample of infant formula on discharge. In addition, age was significantly associated with receiving a sample of formula ($p<.001$). At first glance it might appear that higher parity women might have had expectations from previous births regarding the availability of free samples, but the proportion receiving samples by parity did not differ statistically. The most dramatic difference in the proportion receiving and not receiving samples can be seen in the comparison between those delivering in public versus private hospitals.

Fewer than one in ten women who had their baby in a public hospital left with a sample of infant formula, whereas nearly one in three who delivered in a private hospital reported receiving a sample ($p<.001$). Private hospitals in Bangkok are less likely to have rooming-in, and this probably accounts for the observation that women who reported rooming-in were less likely to report that they received free samples of infant formula ($p<.001$).

Advertising Recall

Approximately 83% of the respondents recalled mass market advertising of commercial infant foods (Table 7-4). Although the W.H.O. Code of Marketing has effectively eliminated mass market advertising, this type of product promotion apparently existed for a sufficient duration to be recalled easily by most women in Bangkok. Still, there are some demographic differences. Women with higher income and educational attainment are significantly more likely to recall promotional advertising ($p<.001$), and women who worked prior to giving birth were also more likely to remember advertising ($p<.05$). Although there are some small differences between age groups in the proportion recalling advertising, these differences are not in any consistent direction and were not statistically significant. It is clear, however, that the overall awareness of commercial infant foods among Bangkok mothers is high.

Brand Awareness

Interviewers were instructed to determine the degree of brand awareness among Bangkok mothers by asking them to list brands of commercial foods they could recall; following that, they were asked to indicate recognition of brands from a list that was read to them. Although only a maximum of two brands was recorded in the unaided segment, it is interesting to note that 90% of the respondents could name at least two brands of commercial infant foods (only 3% could not name one). Table 7-5 shows both the mean number of brands recalled and the proportion of all brands recalled for different respondent characteristics. As was the case for recall of advertising and receiving a free sample of infant formula at discharge, mothers with higher income and education were able to name more brands, and a higher proportion of all brands, than mothers with lower income and education ($p<.001$). Receipt of infant formula sample was also highly statistically significantly associated with greater brand recall ($p<.0003$).

Consumer Attitudes

The interview schedule also attempted to determine knowledge and attitudes about infant feeding in general, and formula feeding in particular. It was interesting to note that mothers in Bangkok overwhelmingly agreed that breastfeeding is superior to bottle feeding, and yet there were noteworthy differences in the response to statements regarding attitudes towards bottle feeding.

Table 7-6 shows select characteristics by response to the statement "Formula feeding is less trouble than breastfeeding," and Table 7-7 shows the same characteristics by response to the statement "Using formula milk is modern." Overall, 32% of respondents agree that feeding with formula milks is less trouble than breastfeeding, and 69% agree that it is modern. Women who agree that formula feeding is less trouble and those who think it is modern have significantly higher income ($p<.05$; $p<.01$). No clear pattern emerges by education for agreement that formula is less tangible, but more educated women are less likely to argue that it is modern ($p<.001$). Women who worked prior to delivery are not more likely to agree that formula feeding is less trouble or more modern, and the receipt of free sample of formula does not seem to have any measurable influence on these attitudes. This indicates that any differences in behavior between working and non-working mothers--or those who received samples and those who did not--may not be due to different attitudes towards infant feeding but may be related to the need to work--or the receipt of samples--itself.

The Impact of Samples

In the past, product samples were provided for two purposes--to build brand awareness and encourage brand use. Since the passage of the W.H.O. Code of Marketing of Breastmilk Substitutes, manufacturers have been prevented from distributing samples directly to new mothers. The Code does permit manufacturers to provide supplies of their infant formula products to health institutions and health workers for appropriate purposes, however. Although the Code is clear that these supplies are not to be used as sales inducements but rather for evaluation and the feeding of infants who "must be fed" with breastmilk substitutes, the ability of sellers to place a product in the hands of potential consumers does not appear to have been prevented by the Code.

Table 8 shows the association of receiving a sample with several infant feeding practices. Women who never breastfed are only slightly more likely to have received a sample than breastfeeders, a difference that was not statistically significant. Nor is there a significant difference in likelihood

of having received a sample between those women who did and did not introduce bottle feeding by the end of the first month. Women who are bottle feeding by the end of the second month and women who are not breastfeeding by the end of the third month are significantly more likely to have received samples ($p<.05$). Given the very short duration of weaning observed in Bangkok, it is not surprising that a significant increase in bottlefeeding is followed by a significant drop in the rate of breastfeeding.

Although the overall distribution of samples of infant formula does not appear to be particularly high (12%), at least not if measured against the likelihood of receiving a promotional discharge packet in the U.S., it is still sufficient to examine its potential effect on marketplace behavior and infant feeding patterns. What are the implications of this practice for product use and the early introduction of bottle feeding? As shown in Table 7-8, women initiated breastfeeding at the same rate whether or not they received a sample, an observation that casts doubt on the hypothesis that women who receive free samples are those who could not breastfeed and therefore were appropriate recipients.

Further, as shown in Table 7-5, women who received a sample recalled a greater number of brands than women who did not receive a sample. In Bangkok, virtually every woman who received a sample could name the brand and tell our interviewers whether or not it was available in the local market (Table 7-9). Of those who received a free sample, 79% reported having used it to feed their baby. Among those who did not use the sample to feed their baby, 11 women said, "It was unnecessary." Perhaps more important from a commercial standpoint, 44% of those who have purchased infant formula have purchased the brand they received as a sample, and 31% of those who have purchased formula are currently using the brand they received as a sample.

In order to specify better the factors associated with receiving a sample of infant formula when discharged and whether receiving a sample had an independent effect on infant feeding patterns, a logistic regression model was fit with the following dichotomous outcome variables: receiving a sample, bottle feeding at two months, breastfeeding at three months, and breastfeeding at six months (Tables 7-10).

The logistic regression on receipt of an infant formula sample included the following independent factors: the mother's age, education, income, work status prior to delivery, parity, place of delivery (public or private facility), and whether or not rooming-in was reported. Delivery in a private hospital, education and age are each significantly associated with receiving a sample of infant formula. None of the other factors approaches statistical significance. The most significant factor in this model was the difference in the place of delivery. Women who delivered in a private hospital were nearly five times as

likely to receive a sample on discharge than women who delivered in a public hospital ($\hat{ROR}$ = 4.7).

Considering the other two factors, we can estimate the following probability of receiving a sample of infant formula.[2] A 20-year old Bangkok woman who delivered in a public hospital and has no schooling has a predicted probability of .06 to receive a free sample. Comparatively, a 30-year old Bangkok woman who delivers in a private hospital and has more than ten years of schooling has a predicted probability of .35 to receive a free sample.

The table also shows the results of the multiple logistic regression on bottle feeding at two months and breastfeeding at three and six months. This model included the following independent factors: receipt of an infant formula sample, age, education, income, previous work status, parity, place of delivery (public versus private facility), and whether or not rooming-in was reported. Receiving a sample of infant formula does not appear to exert an independent effect on the introduction of bottle feeding by the end of the second month or breastfeeding at three and six months. Whereas we did observe a significant bivariate relationship between receiving a sample and bottle feeding by the end of the second month, that association disappears in the multivariate model. Furthermore, the significant association between receiving a sample of formula and breastfeeding at the end of the third month also disappears.

Overall, then, these data do not demonstrate that free samples influence early routine bottle feeding. (We cannot rule out that the sample was used, but did not initiate weaning.) Better educated and more affluent mothers do appear more likely to receive this type of promotion, and in this sense may be "targeted". Some women who receive samples live in households that have characteristics that could pose risks to the safe preparation and use of infant formula, however. Although most Bangkok households have running water, it is not safe for consumption, and among those receiving samples, only 13% reported using bottled water for drinking. In addition, more than one-third of those receiving samples have no refrigeration.

Summary

Our preliminary analysis of data relevant to consumer behavior reveals a population that is highly aware of commercial infant foods. Furthermore, Bangkok mothers are not only aware of

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[2] $\hat{p} = \frac{A}{1+A}$, where $A = \exp(b_0 + \Sigma b_i x_i)$

commercial foods, but indicate a high degree of brand awareness. Although the overall rate of sampling, or placement of supplies into the hands of new mothers, is relatively low, the manifest purpose of this type of promotional activity appears to have been met. Women who receive samples are able to recall the brand, report its availability in the local market, and perhaps most important, those who received a sample and are now feeding their baby with formula have purchased the sample brand at least once.

Thus, although the overall rate of sampling in Bangkok was not alarmingly high, it does appear that the placement of a product in the hands of a potential consumer achieves its intended end. Further, the provision of free samples is just one of many marketing techniques companies have adopted since the W.H.O. Code forced a change of strategy. Greater product placement in retail outlets, greater product visibility, culling the loyalty of health care workers, advice from health care workers to use a particular brand (a greater percentage of respondents reported brand recommendation than reported receiving free samples), and distribution of supplies, much of which eventually become samples, together form a total marketing approach.

Table 7-1. Formula Penetration: Bangkok

Base: Total Audits 182
No. carrying formula (38%)
No. not carrying formula (62%)

Leading Brands	Availability in Outlets (%)
Humanized	
S-26	26
Lactogen	24
Bear	20
Meiji	20
Snow P7A	10
Nan	9
Full Protein	
Bear	29
Lactogen	22
Alacta NF	7
Miscellaneous	
Instant Nespray	19
Bear Brand Sweet	14
Klim	9
Dumilk	7

Table 7-2 Percent Distribution of Type of Formula Within Outlets by Type of Retail Outlet

Type of Outlet	Percent carrying Any Formula	Humanized Formula	Full Protein Formula	Misc.
Lge. Prov.	76%	57%	21%	22%
Med. Prov.	76%	44%	32%	24%
Sml. Prov.	63%	52%	22%	26%
Chem/Drug	38%	82%	3%	15%
Medicine Shops	40%	58%	21%	21%
Misc.[1]	23%	44%	22%	34%

[1]Includes hospital stores, kiosks, open air outlets, and other non conventional retail outlets.

Table 7-3 Select Respondent Characteristics by Receipt of Infant Formula Sample
(n = 1422)

	%
Total	11.7
Income (in Bhat/month)	
<3000	7.5
3001-6000	12.3
6001-10,000	13.3
>10,000	24.3
Education	
0-4 yrs.	10.0
5-7 yrs.	8.6
8-10 yrs.	18.5
>10 yrs.	23.6
Age	
<19	4.9
20-24	8.2
25-29	12.7
30+	16.7
Working Prior to Delivery	
No	9.5
Yes	14.0
Place of Delivery	
Public Hospital	7.4
Private Hospital	32.1
Parity	
primiparous	11.7
multiparous	12.1
Rooming-in	
No	16.7
Yes	7.7

Table 7-4 Select Respondent Characteristics and Recall of Commercial Advertising of Infant Foods

	%
Total	83.3
Income (in Bhat/month)	
<3000	78.0
3001-6000	85.5
6001-10,000	90.4
>10,000	93.4
Education	
0-4 yrs.	79.0
5-7 yrs.	86.3
8-10 yrs.	94.2
>10 yrs.	96.2
Age	
<19	77.9
20-24	82.7
25-29	86.5
30+	82.1
Working Prior to Delivery	
No	81.4
Yes	85.4

Table 7-5. Awareness of Commercial Infant Formula Brands

	$\bar{X}$ Brands Recalled	Proportion of All Brands Recalled
Total	7.8	43.4
Income (in baht/month)		
<3000	6.8	37.9
3001-6000	7.6	43.2
6001-10,000	9.6	53.2
>10,000	10.9	60.7
Education		
0-4 yrs	6.8	38.3
5-7 yrs	8.1	45.1
8-10 yrs.	9.8	54.6
>10 yrs.	11.4	63.4
Working Prior to Delivery		
no	7.5	41.8
yes	8.0	44.8
Parity		
primiparous	7.7	42.6
multiparous	8.0	44.4
Receipt of Infant Formula Sample		
no	7.6	42.5
yes	8.7	48.7

Table 7-6. Select Respondent Characteristics and Response to the Statement "Formula feeding is less trouble than breastfeeding."*

	Agree	Disagree
Total	32%	63%
$\bar{X}$ Income (in baht/month)	5590	4894
Education		
0-4	35.0	59.0
5-7	28.9	65.8
8-10	23.0	72.7
>10	32.5	62.4
Working Prior to Delivery		
no	33.0	61.0
yes	32.5	63.2
Received of Infant Formula Sample		
no	33.0	62.0
yes	31.3	62.0

*Respondents with "no opinion" excluded from the table for clarity. "No opinion" ranges between 4-6 percent for each sub-table.

Table 7-7. Select Respondent Characteristics and Response to Statement "Using Formula Milk is Modern."

	Agree	Disagree
Total	69.0%	26.0%
$\bar{X}$ Income (in baht/month)	4833	5760
Education		
0-4	75.0	20.0
5-7	64.7	28.4
8-10	58.3	36.7
>10	49.0	43.9
Worked Prior to Delivery		
no	71.0	24.0
yes	66.4	27.3
Received an Infant Formula Sample		
no	69.0	25.0
yes	67.0	30.0

*Respondents with "no opinion" excluded from the table for clarity. "No opinion" ranges between 3-7 percent for each sub-table. Significance tests based on agree/disagree distribution.

Table 7-8 Infant Feeding Characteristics and Receipt of Infant Formula Sample

Infant Feeding Pattern	Received Sample %
Ever Breastfed	
No	12.7
Yes	11.9
Breastfeeding at 3 Months	
No	15.4
Yes	10.6
Bottle by end of 1st Month	
No	11.1
Yes	13.1
Bottle by end of 2nd Month	
No	10.0
Yes	14.2

Table 7-9 Receipt of Discharge Packet of Infant Formula, Local Availability of Sample Brand and Purchase of Sample Brand (n = 169)

	%
Awareness of Sample Brand	96.0
Awareness of Sample Brand Availability	98.0
Use of Sample Brand	
Ever Used	79.0
Ever Purchased*	44.0
Currently Used*	31.0

* Includes only those women who both received a sample and have purchased infant formula (n = 116).

Table 7-10 Logistic Regression Models for Receipt of Formula Sample and Infant Feeding Outcomes: Beta Coefficients for Select Independent Variables

	GOT SAMPLE	BOTTLE BY 2 MONTHS	BREASTFED 3 MONTHS	BREASTFED 6 MONTHS
Intercept	-5.72 (100.57)***	-2.07 (28.86)***	1.35 (9.64)**	1.64 (9.8)**
Got Sample		.059 (.08)	-.221 (.93)	-.169 (.35)
Mother's Education	.20 (8.8)**	.158 (8.67)**	-.091 (2.48)	-.126 (2.85)
Mother's Age	.055 (7.65)**	.033 (5.74)*	.008 (.26)	-.013 (.5)
Income Group	.028 (.21)	.235 (30.0)***	-.231 (22.53)***	.235 (14.98)**
Parity	-.104 (.52)	-.181 (3.19)	.204 (2.48)	.353 (5.52)*
Rooming-in	-.235 (3.15)	-.113 (3.49)	-.010 (.03)	.032 (.16)
Work Before Delivery	.239 (1.51)	.55 (18.13)***	-.643 (18.16)***	-.595 (11.3)***
Hospital Group+	1.45 (52.62)***	.127 (.53)	.016 (.01)	-.379 (2.44)
Model X^2	128.69	109.8	77.0	63.11

*P <.05, **P <.01, ***P <.001
+ Private vs. Public

Figure 7-1

MARKET SHARE BY TYPE OF FORMULA BASED ON VOLUME OF PRODUCT IN RETAIL OUTLETS BANGKOK, 1982

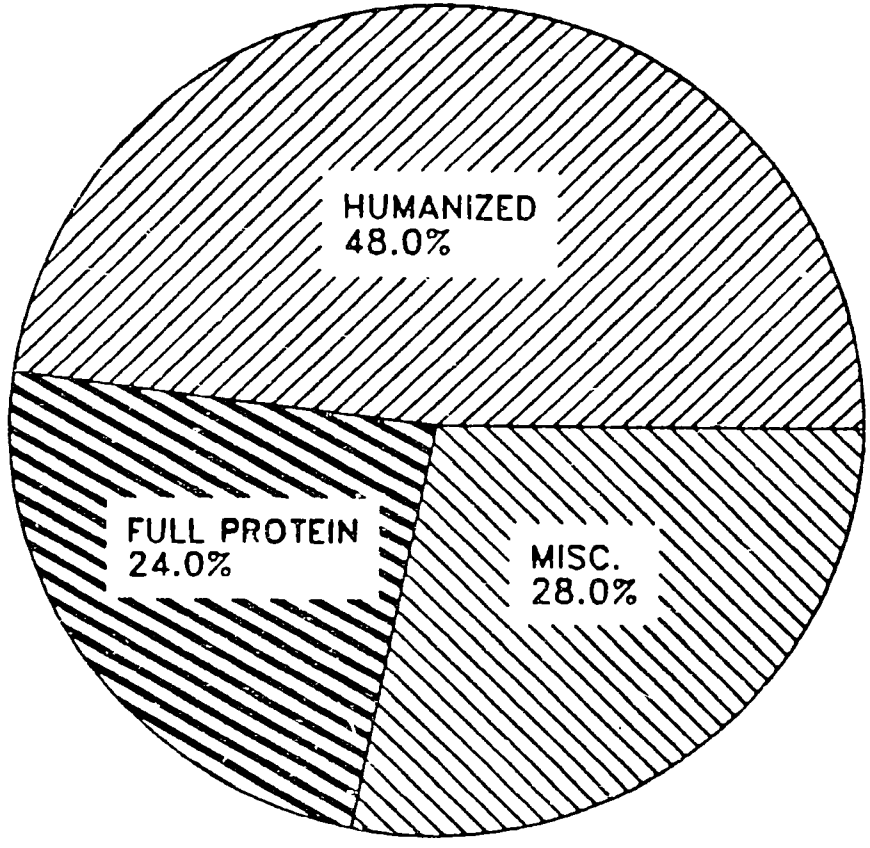


Figure 7-2

MARKET SHARE BY VALUE OF FORMULA
based on retail prices
BANGKOK, 1982

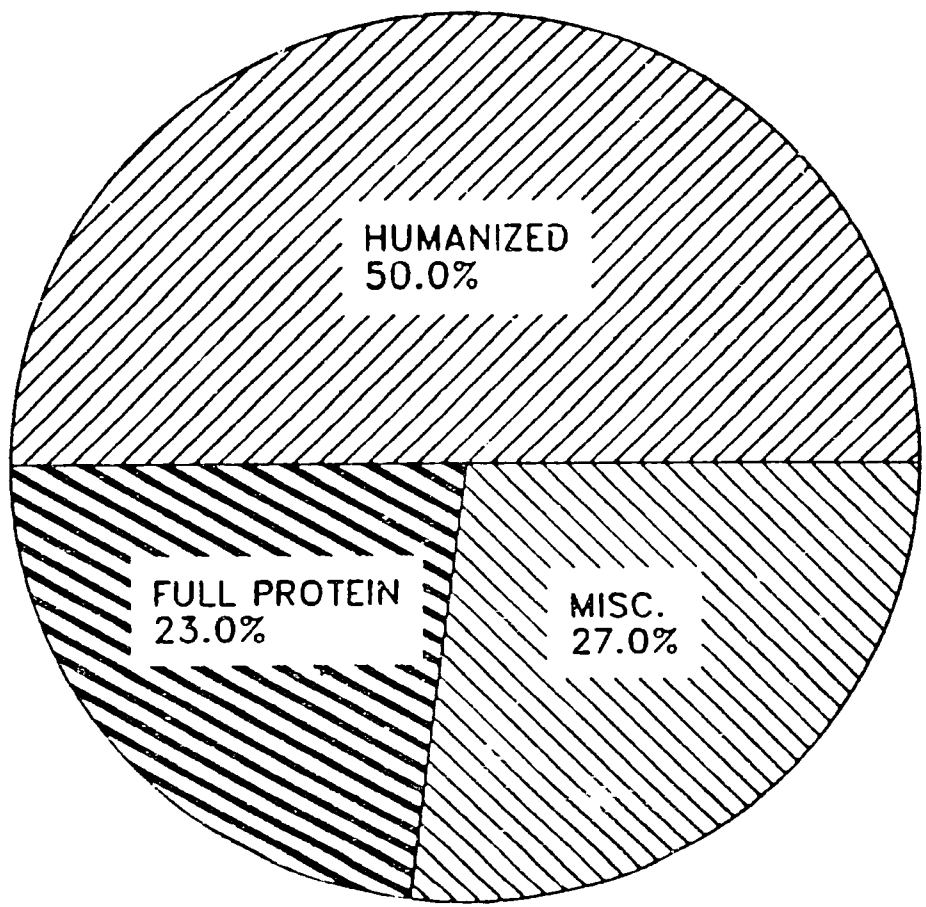


Figure 7-3

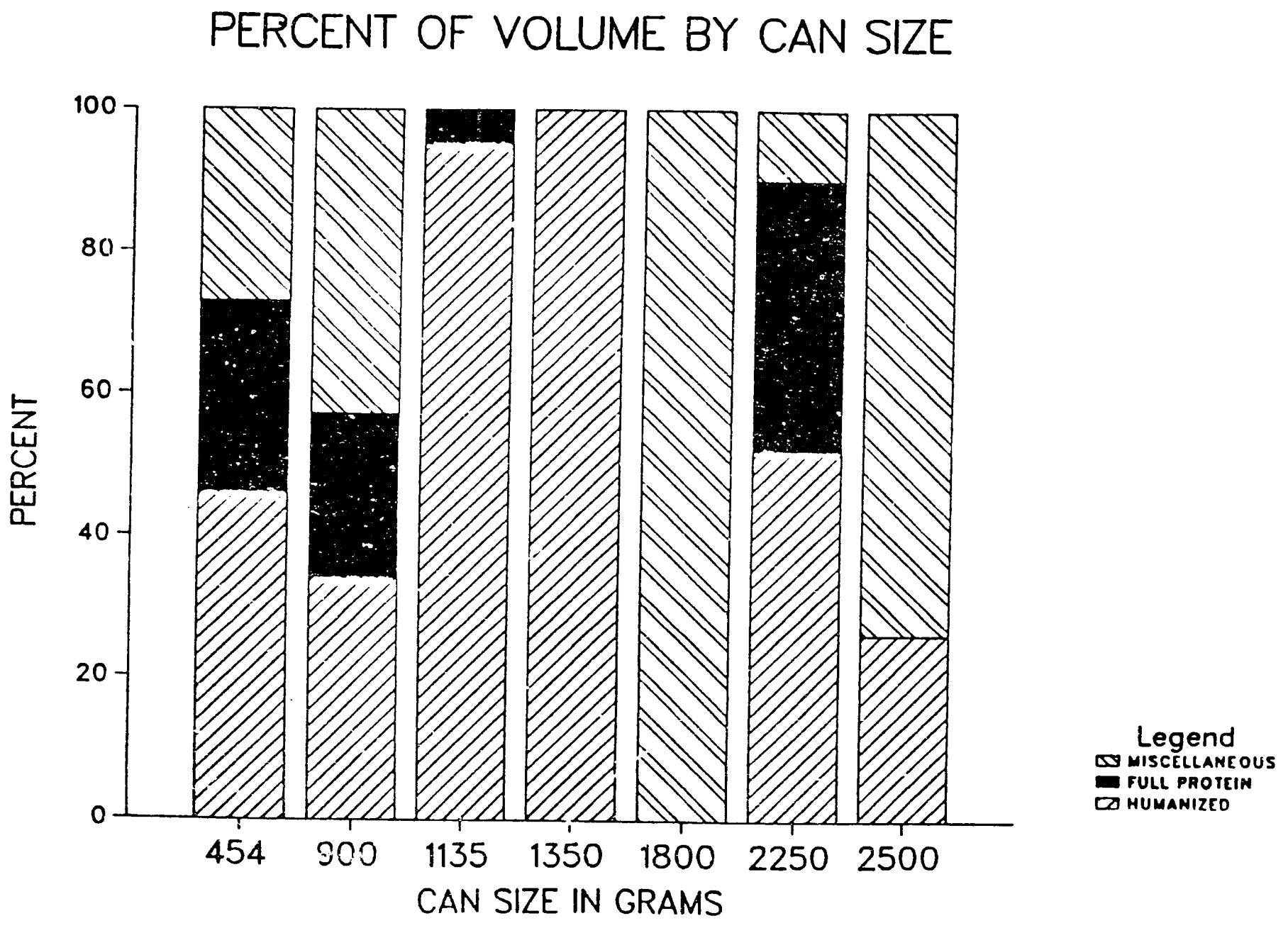

PERCENT OF VOLUME BY CAN SIZE
PERCENT
100
80
60
40
20
0
454
900
1135
1350
1800
2250
2500
CAN SIZE IN GRAMS
Legend
MISCELLANEOUS
FULL PROTEIN
HUMANIZED

Figure 7-4
INFANT FORMULA

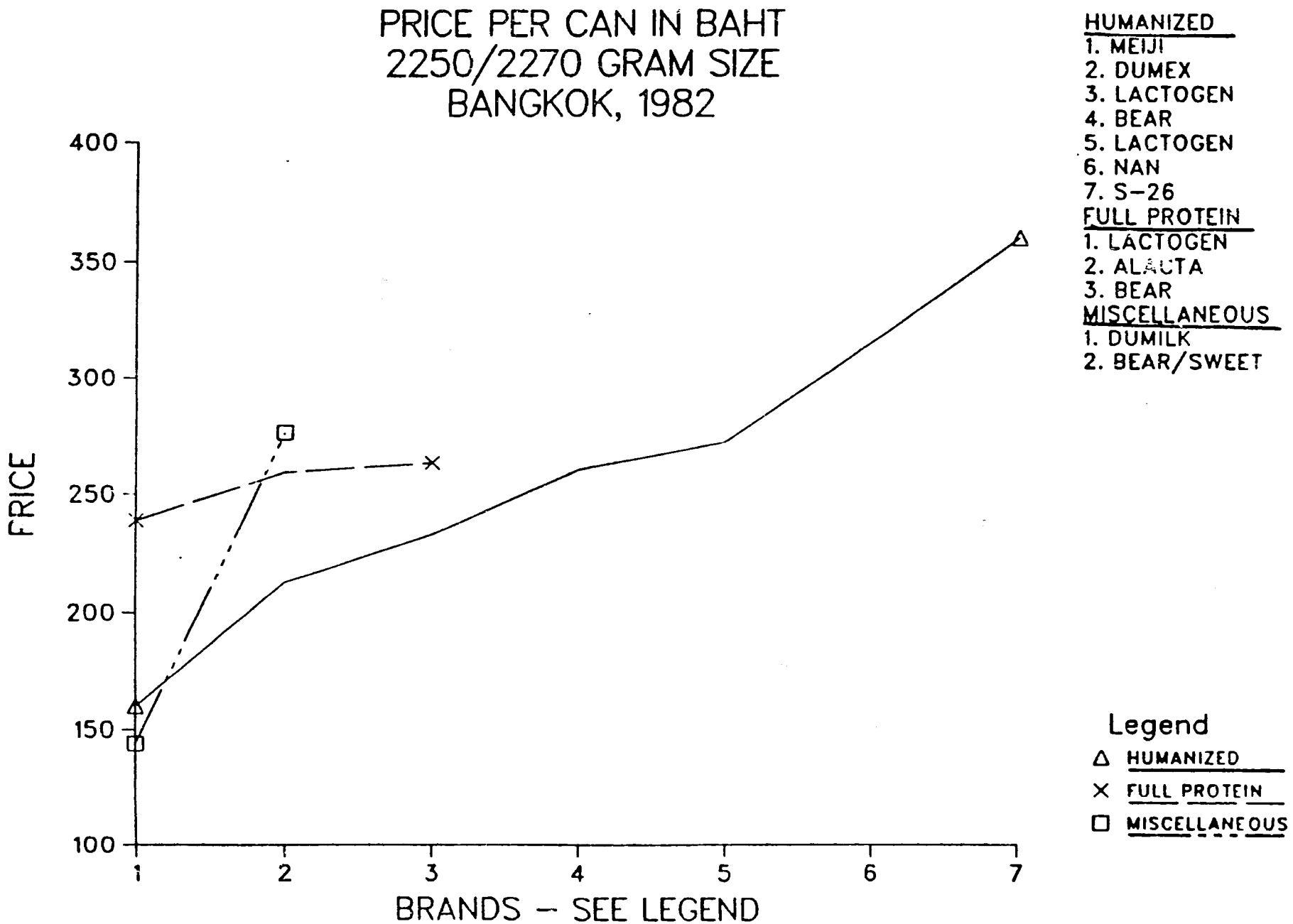
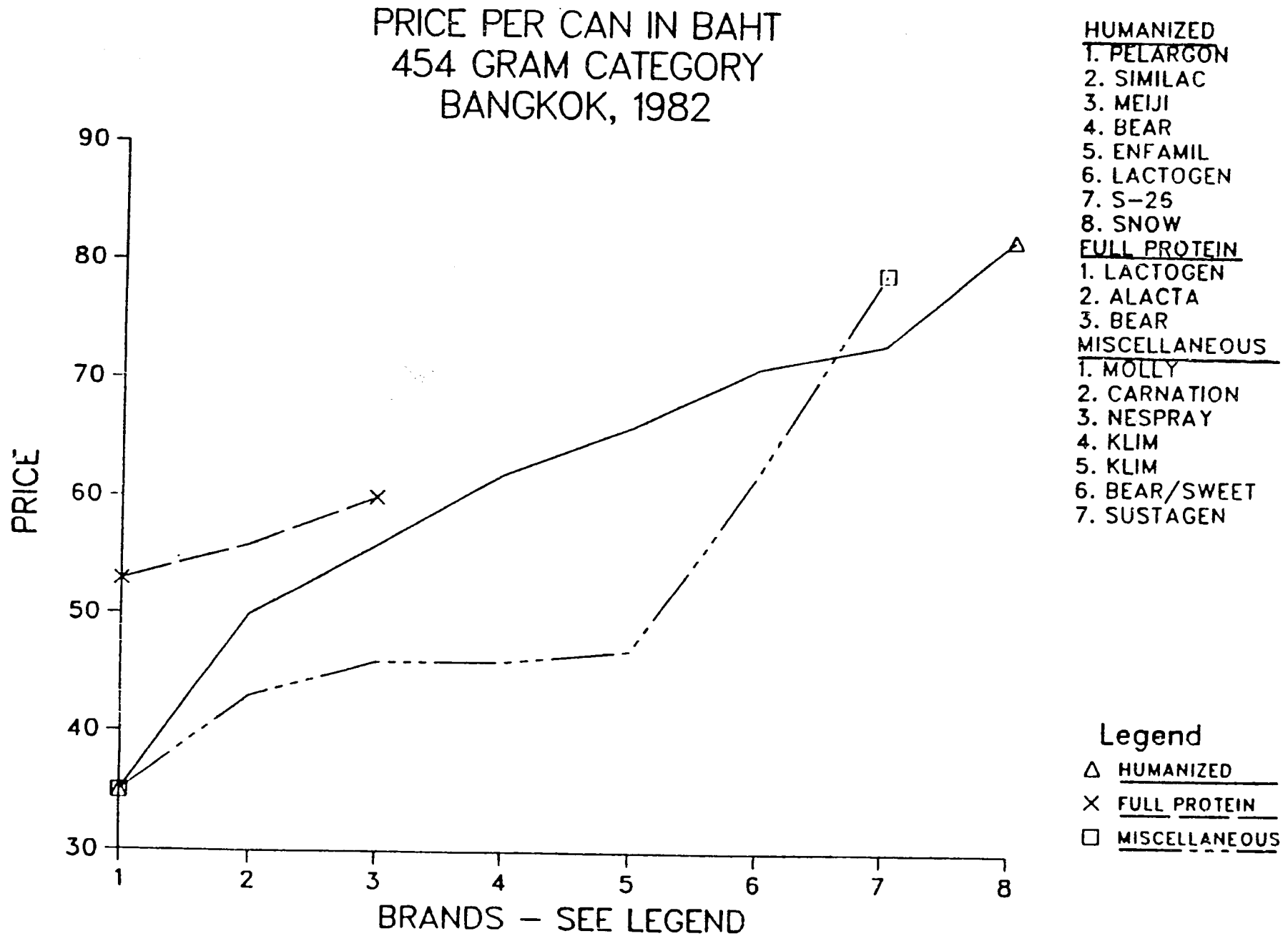


Figure 7-5
INFANT FORMULA



VIII DETERMINANTS OF INFANT FEEDING PRACTICES: MATERNAL EMPLOYMENT

Work Patterns and Infant Feeding

The following section examines the relationship between maternal employment and infant feeding behavior. Maternal employment has been linked to infant feeding behavior in various studies, and the potential of such an association is one of the central concerns of the current study as well. At the time of the cross-sectional survey, almost two-thirds of the Bangkok mothers were not employed in any form of income-generating activity (Table 2-8). Very few mothers engaged in any form of income generation in the first postpartum month (about 7%). Income generation can occur at home or away from home, each of which might have different implications for child care. From the end of the first month through the remainder of the first year, in-home income generation fluctuates from 7-12%. In all, about 9% of the total sample are engaged in income generation at home (Table 8-1). Employment outside the home, however, is much more sensitive to the age of the child. The number of mothers who work outside the home rises steadily through the four months of the infant's age and then levels off between 25 and 30%. Through the end of the first year, the number of women who work outside the home remains a distinct minority (Table 8-1). In particular, in the earliest months of life, very few mothers work away from home.

Employment might be thought to affect infant feeding most strongly if the mother worked for long hours or spent a considerable portion of the day away from the infant. Thus, these factors were examined in order to characterize maternal income generation activities. The specific occupations of women engaged in income carrying activities are listed in Table 2-8. The most frequently cited activities are service /daily wage labor, civil servants and clerical commerce. Among women who reported working for pay at the time of the survey, the largest group (56%) said that they worked 8-9 hours a day (Table 8-2). The next largest group reported a 10-12 hour work day.

The type and location of child care arrangements and the degree to which the particular arrangement facilitates or inhibits contact between mother and child might also influence infant feeding behavior. Table 8-3 indicates the additional travel time required of mothers who commute to work in Bangkok. Three-quarters of mothers have less than one hour of travel time per day with over 40% reporting less than one-half hour of travel time. On the other hand, one-quarter of the sample reported travel of 80 minutes or more--with fully half of these mothers reporting two hours of travel. Table 8-4 shows that, in Bangkok, most infants of mothers who work outside the home remain in the

home (76%) or at a relative's home (13%). Only 2% of mothers report bringing children to the workplace. This suggests that for this urban cohort, virtually all women who work away from home are separated from their children during working hours.

Many more mothers worked prior to the birth of the index child (Table 8-5) than reported current employment. Just over half the women were employed during the prenatal period. Overall, about one-third of women employed before the birth of the child were no longer working at the time of the survey. Nonetheless, women who worked prenatally constitute almost all of those who work during the early postnatal months (87%). When infants were less then six months old, about half of the mothers who had worked prenatally were working. Only 8.5% of the mothers who had not worked prenatally were in the labor force (Table 8-6).

Only 30% of women who worked prior to their child's birth reported receiving the benefit of any maternity leave (Table 8-7). In most cases (60%), mothers receive 30 days of maternity leave. An additional 19% received 45 days, and 14% received 60 days (Table 8-8). This may account for the large increment (250%) in women reporting outside employment between months one and two. Most women who receive maternity leave return to the work force. A far larger proportion of mothers who received maternity leave are currently employed as opposed to those who did not receive leave (67.1% versus 45.3%), (Table 8-9 and 8-10). This may mean that mothers who receive leave and return to work have different sorts of jobs than those who do not report such a work benefit. Indeed, Table 8-10 confirms this impression most strongly. Most professionals and civil service /clerical workers do receive leave while most day laborers and virtually all women engaged in commerce (and, presumably self-employed) do not. For those occupational categories in which leave is common, a certain percentage of women appear to have chosen to end their employment at the time of childbirth. This may have been done in preference to taking an available leave. The data do not permit analysis of whether leave was available to those who chose not to work. For women with occupations where leave was generally not available, a large portion suspended work temporarily, presumably to accommodate the demands of early infant care. Such a pattern was virtually absent among women who were likely to have the option of maternity leave.

Since there are great differences in occupation among the women who do and do not receive maternity leave, and since receipt of maternity leave is highly correlated with current work patterns, it is likely to be the women with the highest incomes (and most education) who are most likely to be working outside the home during the infancy of their young children. Tables 8-11 and 8-12 demonstrate that this is indeed the case. Mothers in the highest income group are more than three times as likely to

be working outside the home as mothers in the lowest income group. Similarly, women with the highest educational attainment were about four times as likely to engage in such work as women with no education. Throughout the whole sample, only 14% of the women in the two lowest income groups were working outside the home. Clearly, then, it is important to characterize women who work outside the home during the early infancy of their children: they are a minority of the sample and they tend to be of higher than average income families, perhaps, in part because of the contribution of their own earnings. Educational attainment in this group is modest, however, because, although the probability of work is highest for the most educated group, there are more women with little education in the sample.

The associations of various attributes of maternal employment with infant feeding behaviors are displayed in Table 8-13. There is no difference in breastfeeding initiation (EVER BREASTFED) between the mothers who worked prior to the birth of the child and those who did not. As the table indicates, prevalence of initiation is essentially equal to the sample average of 90% for both groups. When breastfeeding duration is considered, however, clear differences emerge. The percentage of mothers who go on to breastfeed for three or six months is about 50% higher among mothers who did not work during the prenatal period. Since these women also tend not to work during the postnatal period (Table 8-5), this variable may be a proxy for the postnatal work status that influences breastfeeding duration and introduction of early bottle feeding.

The relationship of work status at the time of the survey and infant feeding behavior reveals important distinctions. Initiation appears substantially the same among women who do not work, those who work at home, and those who work away from home, with slightly more non-workers initiating breastfeeding. Work appears to affect duration of breastfeeding much more substantially than it affects initiation, but in an interesting pattern. Women who work at home are only slightly less likely to breastfeed for three and six months than those who do no work, but women who work <u>away</u> from home have only one-half the probability of non-employed women of breastfeeding for three or six months. Similarly, women who work outside their homes are twice as likely as non-workers to introduce bottles by two months whereas women who work at home are only slightly more likely to do so. In sum, it appears very clearly that women who earn money at home resemble the non-working women in their feeding patterns much more closely than they resemble other working women. This is demonstrated in the lifetable of breastfeeding and maternal work status (Figure 8-1). The very different experiences of women with different work status is clearly represented. The proportion of women who work outside the home still breastfeeding plummets during the first two postpartum months. By the third month, fewer than 40% of these women are still

breastfeeding. This is in stark contrast to the non-working and working at home portions of the sample where, at the same point in time, the proportion of women still breastfeeding is well above 60%. Clearly, employment outside the home during the postnatal period is strongly associated with truncated breastfeeding. The fact that women who earn income at home display infant patterns similar to those who do not earn income suggests that income generation, as such, is not the critical factor in determining feeding patterns.

The number of hours worked per day appears to be unassociated with breastfeeding initiation. Breastfeeding duration, however, appears longer among the small group of mothers who work 1-3 hours per day, but otherwise no consistent association is apparent. Generally, greater percentages of women report early introduction of bottlefeeding as the length of the work day increases.

Maternity leave displays quite clearly the paradoxical association with infant feeding patterns suggested above. Women who report having received maternity leave are slightly less likely to initiate breastfeeding, more than twice as likely to have weaned by 3 months, and about three and a half times more likely to have weaned by 6 months. They are also almost twice as likely to have introduced bottles by two months--with a resounding 83% of mothers who had maternity leave choosing this feeding option. These findings may give pause to those who believe that provision of maternity leave will alone promote breastfeeding. Without other support, a 30-60 day leave for women committed to return to work may not be sufficient to overcome the powerful influences promoting early weaning. It is most likely that the physical separation and scheduling problems associated with being at a work place outside the home interfere profoundly with continuation of breastfeeding for most working women. For example, most women work five to seven days per week, and they work long hours (56% work 8-9 hours and an additional 20% work 10 or more). Among the majority of employed women who work outside the home, 25% have additional travel time between home and the place of employment of more than one hour per day. The combination of long hours away from home and the necessity to provide supplementary food for infants left with caretakers conflict with the desire to engage in prolonged breastfeeding.

An example from the ethnography illustrates problems faced by some mothers who work outside the home in low-level industrial jobs. In one case, a 26-year old mother from northeast Thailand, who works in the textile industry with her husband, describes her situation:

> "Earlier, the milk did not drop and I fed with water for three days. I just began breastfeeding yesterday...I think I will breastfeed for one month and send the infant to Susin

to be taken care (of) by my mother...I cannot raise the baby myself because I work in shifts...six hours of work (then) twelve hours of recess and then another six hours (of work), continuous like this..."

Logistic Regressions

The full impact of working outside the home on infant feeding outcomes can be seen by examining a set of logistic regression models which build upon those presented earlier in the section dealing with background socioeconomic determinants (Chapter 6). The results of these new analyses, presented in Tables 8-14 and 8-15 show the effect of adding a new predictor variable, earning income outside the home to the set of predictor variables presented in the earlier section. For this analysis, working away from home rather than all paid employment was chosen as the variable of interest since women working at home seem to have feeding patterns quite similar to non-working women.

As suggested earlier, there appears to be no significant difference in breastfeeding initiation whether a woman does or does not work outside the home during the postnatal period. Indeed, the model indicates that the predictive variable "Workout" has no significant effect on the probability that a child will be breastfed (Table 8-14).

The results from the other three models (breastfeeding for 3 and 6 months, and early supplementation) are different in each of these cases; working outside the home exerts a very strong influence on the probability of the particular infant feeding outcome. The magnitude and direction of the beta coefficients for "Workout" in the "Breastfed 3 Months" and "Breastfed 6 Months" models indicate that working outside the home greatly reduces the likelihood that the child will be breastfed for these durations. The adjusted risk odds ratios for the models (Table 8-15) indicate that the child of a mother who works outside the home is only one-quarter as likely to be breastfed for three or six months as the child of a mother who does not work or works at home. The additional significant effects of high family income, being born in Bangkok and of low parity add to the growing picture of what characteristics label a mother at risk for early cessation of breastfeeding. Interestingly, mother's age and education do not seem to exert a significant effect on breastfeeding duration in Bangkok once other factors are controlled.

Working outside the home exerts a comparable degree of impact on the probability of early bottle feeding. As Table 8-15 shows, women who work out are 3.75 times as likely to introduce early bottle feeding as those who do not. Increasing maternal age, low parity, high family income, and being a Bangkok-born

mother also increase the odds that bottle feeding will be introduced by two months. When the working out and non-working out groups of women are examined separately, it is clear that the same background variables are related to feeding outcomes for the women who do not work out as they were for the whole group although the association is less strong (Table 8-16). For women who do work out, on the other hand, almost no variables are significantly associated with the feeding outcomes in question. Bangkok birth of the mother remains significant for breastfeeding initiation and early supplementation. Only parity--and only for 3 months of breastfeeding--remains significantly associated with longer duration of breastfeeding (Table 8-17).

Although maternal employment outside the home emerges from these regressions as a significant predictor of infant feeding behavior in Bangkok, it is important to bear in mind that at the present time relatively few Bangkok women work outside their homes during the postnatal period. Consequently, the potential population-wide impact of this behavior is limited. To the degree that greater numbers of Bangkok women begin to work in the future, the potentially negative effects may well become more common. Among those who do work, the impact on infant feeding patterns is primarily that of shorter breastfeeding durations and greater use of early bottle feeding. The impact on breastfeeding initiation is negligible because employed women either receive maternity leave or they quit their jobs temporarily or permanently. In either case, this may permit enough time to at least initiate breastfeeding.

Table 8-1 Percentages of Women Earning Income At Home and Away from Home by Age of Child

Age Child	Work Outside the Home		Work in the Home	
	N	%	N	%
0	5	6.2	1	1
1	17	15.6	11	10.1
2	20	19.8	10	9.9
3	28	24.6	14	12.3
4	41	30.1	10	7.4
5	36	27.5	10	7.6
6	36	31.3	10	8.7
7	45	33.1	14	10.3
8	30	25.0	12	10.0
9	26	27.7	9	9.6
10	25	28.7	11	12.6
11	28	26.4	6	5.7
12	19	38.8	5	10.2

Table 8-2 Hours Worked Per Day

	Total N	%
1-3 hours	16	4
4-5	33	8
6-7	52	12
8-9	239	56
10-12	70	17
$\geq$13	14	3
TOTAL	424	100%

Table 8-3 Daily Travel Time Among Women Employed Outside the Home

	Total N	%
2-30 minutes	121	41
40-60 minutes	101	34
80-120 minutes	56	19
>120 minutes	17	6
TOTAL	295	100%

Table 8-4 Location of Child When Mother is Out Working

	Total N	%
Private day care	4	1.1
Relative's house	47	13.1
Own home	275	76.4
Work place	7	1.9
Other	27	7.5
TOTAL	360	100%

Table 8-5 Work Before Current Birth

	Total N	%
No	708	49.8
Yes	714	50.2
TOTAL	1422	100%

Table 8-6 Association of Prenatal Employment and Current Employment of Mothers with Children aged <6 Months

Prenatal Work	Currently Employed: No	Yes	Total
No	353 (91.5%)	33 (8.5%)	386 (100)
Yes	181 (45.3%)	219 (54.8%)	400 (100)

Table 8-7 Maternity Leave

	Total N	%
No	503	70
Yes	211	30
Total	714	100%

Table 8-8 Length of Maternity Leave

	N	%
30 days	127	60
45 days	41	19
60 days	29	14
OTHER	13	6

Table 8-9 Association of Maternity Leave and Postnatal Employment

Maternity Leave	Current Employment:		
	No	Yes	Total
No	273 (54.5%)	228 (45.5%)	501 (100)
Yes	27 (12.9%)	183 (87.1%)	210 (100)

Table 8-10 Occupation of Mother and Report of Maternity Leave

Occupation	N	% Reporting Leave	% All Mothers Reporting Leaves	% Minority Employ. After Childbirth	% Stopping Work Temp.
wagelabor/ service	327	18	27	39	36
merchant/ commerce	182	2	1	8	87
civil service/ clerical	171	78	62	19	2
Professional	23	83	9	17	0

Table 8-11 Relationship of Family Income and Work Outside the Home

Income Group	Probability of Emp.outside the Home	% of All Women working outside the Home
0-2400 bhat per month	13.9	9.0
2401-3450	14.4	14.4
3451-4800	25.8	21.5
4801-8500	40.8	38.4
>8500	42.4	16.7

Table 8-12 Relationship of Mother's Schooling and Work Outside the Home

Years of School	Probability of Emp. outside the Home	% Of all Women working outside the Home
none	13.2	2.5
1-4 (elementary)	21.2	49.0
5-7	24.7	13.1
8-10	33.3	12.8
>10	51.6	22.6

Table 8-13.Association of Infant Feeding Outcomes with Maternal Employment Variables

	EVER BREASTFED		BREASTFED 3 MONTHS		BREASTFED 6 MONTHS		BOTTLE BY 2 MONTHS	
	TOTAL N	% YES	TOTAL N	% YES	TOTAL N	% YES	TOTAL N	% YES
Work Status								
No	1897	91.6	606	76.4	390	65.4	735	36.1
Homework	123	87.8	90	70.0	61	60.7	111	43.2
Workout	357	87.4	273	37.4	181	27.1	332	73.8
Worked Before Birth								
No	677	91.0	471	74.7	313	63.9	598	39.8
Yes	711	89.3	503	55.9	323	44.6	617	56.2
Maternity Leave								
No	502	90.6	361	66.5	231	55.8	438	45.4
Yes	203	86.1	142	28.9	92	16.3	179	82.7
Hours Worked/Day								
1-3 Hours	16	81.2	11	63.6	8	62.5	15	40.0
4-5	33	93.9	25	52.0	16	37.5	30	46.7
6-7	51	86.3	37	48.6	27	40.7	46	56.5
8-9	237	86.9	181	34.8	117	23.1	221	77.8
10-12	70	84.3	52	51.9	33	48.5	67	61.2
13+	14	92.9	13	61.5	10	40.0	13	61.5

Table 8-14 Logistic Regression Models for Different Infant Feeding Outcomes:
Beta Coefficients for Socioeconomic and Maternal Employment Variables

	EVER BREASTFED	BREASTFED 3 MONTHS	BREASTFED 6 MONTHS	BOTTLE BY 2 MONTHS
Intercept	3.971 (99.19)[1]***	1.351 (19.40)***	1.190 (9.87)**	-1.719 (39.41)***
Parity	0.057 (0.17)	0.318 (6.09)*	0.467 (9.48)**	-0.308 (9.23)**
Urban Mother	-0.739 (14.40)***	-0.482 (9.73)**	-0.525 (7.91)**	0.277 (4.29)*
Income Group	-0.086 (2.00)	-0.189 (14.34)***	-0.184 (8.68)**	0.191 (19.80)***
Mother's Age	-0.286 (9.42)**	0.007 (0.01)	-0.114 (1.52)	0.220 (11.49)***
Mother's Education	0.018 (0.06)	-0.007 (0.01)	-0.102 (1.71)	0.101 (3.26)
Workout	-0.187 (0.79)	-1.426 (76.48)***	-1.300 (39.18)***	1.322 (75.99)***
Model X^2	(34.47)***	(155.51)***	(114.15)***	(188.75)***
R	.16	.34	.35	.33

[1]numbers in parentheses are MLE chi squares (Wald statistic)
*P<.05, **P<.01, ***P<.001

Table 8-15. Adjusted Risk Odds Ratios and 95% Confidence Intervals for Socioeconomic Maternal Employment Variable

	EVER BREASTFED	BREASTFED 3 MONTHS	BREASTFED 6 MONTHS	BOTTLE BY 2 MONTHS
Parity				
1 vs 2-3	NS	1.37 (1.07,1.77)	1.60 (1.18,2.15)	.74 (.60,.90)
2-3 vs 6-7	NS	1.89 (1.47,2.43)	2.54 (1.89,3.43)	.54 (.44,.66)
Urban Mother	.48 (.33,.70)	.62 (.46,.84)	.83 (.74,.94)	1.32 (1.01,1.72)
Income Group				
3,000-4,000 vs 2,000-3,000 bhat	NS	.83 (.75,.91)	.83 (.74,.94)	1.21 (1.11,1.32)
6,000-8,000 vs 2,000-3,000	NS	.57 (.51,.63)	.58 (.51,.65)	1.77 (1.61,1.95)
10,000-1,500 vs 2,000-3,000	NS	.39 (.35,.43)	.40 (.35,.45)	2.60 (2.36,2.86)
Mother's Age				
25-29 vs 20-24 years	.75 (.63,.90)	NS	NS	1.25 (1.10,1.42)
35-39 vs 25-29	.56 (.47,.68)	NS	NS	1.55 (1.37,1.76)
40+ vs 25-29	.42 (.35,.51)	NS	NS	1.93 (1.70,2.20)
Mother's Education	NS	NS	NS	NS
Workout	NS	.24 (.18,.33)	.27 (.18,.41)	3.75 (2.78,5.05)

Table 8-16 Logistic Regression Models for Different Infant Feeding Outcomes: Background Socioeconomic Variables Among Women Who Do Not Workout

	Ever Breastfed	Breastfed 3 Months	Breastfed 6 Months	Bottle By 2 Months
Intercept	4.157	-.260	-.474	.093
Parity	.057 (0.13)[1]	.208 (1.81)	.517 (8.22)**	-.251 (4.84)*
Urban Mother	-.743 (10.18)**	-.533 (7.72)**	-.534 (5.69)*	.426 (7.52)**
Income Group	-.078 (1.23)	-.227 (14.73)***	-.215 (9.16)**	.239 (23.81)***
Mother's Age	-.247 (5.08)*	.039 (0.18)	-.516 (2.14)	.201 (7.35)**
Mother's Education	.010 (0.01)	.052 (0.39)	.063 (0.44)	.048 (0.50)
R	.12	.14	.17	.19

[1]Numbers in Parentheses are MLE CHI Squares (Wald Statistics)

* P .05, ** P .01, *** P .001

Table 8-17 Logistic Regression Models for Different Infant Feeding Outcomes: Background Socioeconomic Variables Among Women Who Workout

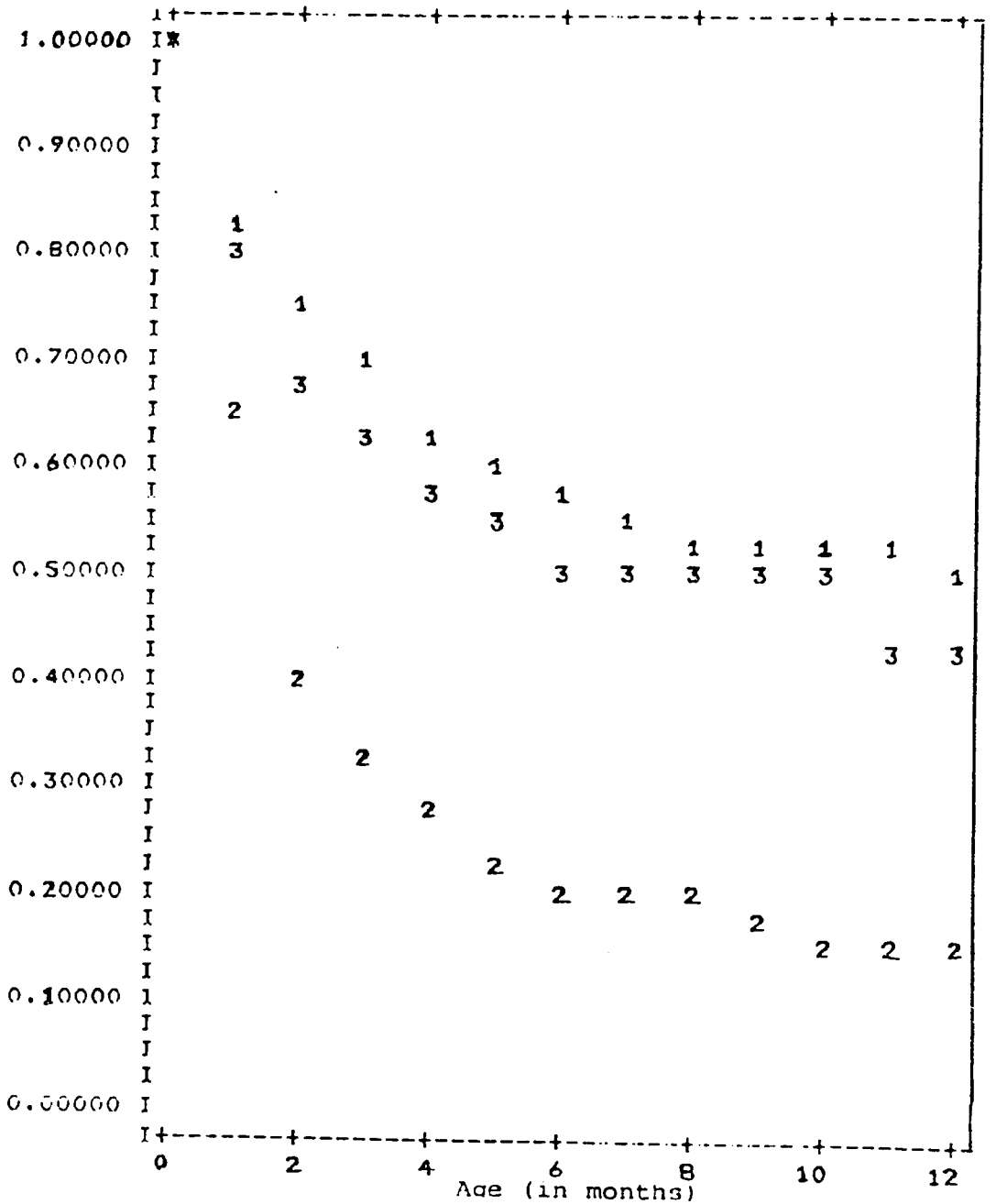
	Ever Breastfed	Breastfed 3 Months	Breastfed 6 Months	Bottle By 2 Months
Intercept	3.778	1.468	1.307	.093
Parity	-.065 (0.06)[1]	.520 (5.10)*	.329 (1.31)	-.383 (3.25)
Urban Mother	-.874 (6.23)*	-.419 (2.53)	-.536 (2.41)	-.121 (0.22)
Income Group	-.080 (0.49)	-.090 (0.96)	-.089 (0.47)	.002 (0.00)
Mother's Age	-.313 (3.41)	-.070 (0.26)	.009 (0.00)	.250 (3.53)
Mother's Education	.012 (0.01)	-.109 (1.12)	-.224 (2.24)	.304 (7.53)**
R	.12	.13	.11	.17

[1]Numbers in Parentheses are MLE CHI Squares (Wald Statistics)

* P .05, ** P .01, *** P .001

Figure 8-1

Duration of Breastfeeding by Work Status



Key:

		N	Median Survival
1	not working	896	11.66
2	working outside home	356	1.62
3	working at home	123	6.81

* = more than one group

CHAPTER IX DETERMINANTS OF INFANT FEEDING PATTERNS: HEALTH SERVICES

Characteristics of Maternity Care

A distinctive feature of modern maternity care in Bangkok is its pervasiveness among the sample mothers. More than 99% reported receiving some form of prenatal care (Table 9-1) and almost all births occurred in hospitals (98%) (Table 9-2). A large majority of women (72%) visited public hospitals for their prenatal care, with an additional 20% reporting private clinics as the service provider (Table 9-3). Most women had multiple consultations during the prenatal period (Table 9-4). Only 8% of the women reported having just one consultation, with the median number of consultations at 5.2. Mothers were asked if they had ever received advice on infant feeding from a physician or nurse during the prenatal period (Table 9-5). Only 12% reported receiving advice on breastfeeding, while 68% received no advice whatsoever.

Hospital births are clearly the norm in Bangkok, with 80% occurring in public hospitals and another 18% in private institutions (Table 9-2). Nine percent of all the index children were delivered by Caesarean section (Table 9-6). Just over half the infants roomed with the mother during the hospital stay; 47% were kept in the nursery, and a small group had both experiences (Table 9-7). Mothers who roomed with their babies are presumed to have had the maximum opportunity for contact with the child. Among infants who were kept in a nursery, there is a range of possible types of contact between mother and infant (Table 9-8). Some are not brought for breastfeeding and spend essentially all their time in the hospital nursery (51%). In this case, there may be essentially no opportunity for contact until the mother and child leave the hospital. In other cases, although the mother and baby do not stay in the same room, the baby is brought by the nurse to the mother's room for breastfeeding (33%). Finally, in few cases, the infant does not room with the mother, is brought to the mother's room periodically to visit, but no breastfeeding occurs. When the infant was not brought to the mother for breastfeeding during the hospital stay, the most prevalent reason given (32%) was a hospital rule against this practice (Table 9-9). Illness in the infant and illness in the mother were the next two most common responses given, accounting together for about half of all instances. It is thought that these various degrees of contact and the experience of breastfeeding in the hospital will influence subsequent infant feeding behavior, and this will be listed below.

Mothers were asked to estimate the duration between birth of the infant and the time when they first had contact with the infant. As can be seen in Table 9-10, there is a bimodal

distribution in reported elapsed times. Equal percentages (18%) of women stated they first had contact with the infant during the first and second six-hour periods following the birth of the child. Only small numbers of women reported the first contact during the second half of the first day. There is an increase in reports of being brought the baby during the second day postpartum, and a somewhat smaller percentage reporting the event as occurring after the second day. There may be some error in the high frequency of cases reporting first breastfeeding after one day. Some women who gave birth late on one day and first received the infant in the early hours the second day may report that they first breastfed on the "second day" in the hospital. While it is true they first received the infant "after the first day," the elapsed time might have been substantially less than one day (e.g., 10 P.M.-6 A.M.).

Women were asked how long they stayed in the hospital after giving birth. The median postnatal stay is 3.4 days (Table 9-11). Twenty percent of women reported staying in the hospital longer than one week, a somewhat surprising finding given only a 9% caesarean delivery rate. Receipt of advice on breastfeeding during the hospital stay is reported only by about one-half the mothers (Table 9-12). Nurses appear to be the most common source of advice for these mothers (70%). Forty-one percent of the women remembered receiving some information on feeding and/or childcare at the hospital (Table 9-13). Nine percent of the respondents stated they received pamphlets that dealt specifically with infant feeding.

Although the practice of giving free formula samples in Bangkok hospitals does not appear to be frequent, it has been alleged to have a detrimental effect on infant feeding practices and therefore deserves careful examination. A small proportion of women, (12%), recalled receiving infant formula samples during their hospital stay (Table 9-14). This proportion is far higher in some hospitals than in others. For example, receipt of samples was reported among 40.4% of mothers who gave birth in Huacheay Hospital[1].

Health services might influence infant feeding behavior by contacts after the discharge of the mother and infant from the hospital. Since Bangkok has a health visiting system which is supposed to extend to every new mother, these contacts were explored. As can be seen in Table 9-15, most mothers (70%) never, in fact, received a postdischarge visit.

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[1] This subject and its implications for marketing and use of infant formula was described in more detail in the section of this report that covers infant foods marketing in Bangkok.

Bivariate Relationships

A preliminary indication of the association of health service characteristics and infant feeding practices can be presented by cross-tabulations. Three health service variables were chosen for examination. The first is place of infant birth (home birth, private hospital, public hospital). Infant feeding practices seem to vary depending upon location of birth (Table 9-16). The prevalence of initiation of breastfeeding is highest among home births, (96.4%), although the sample is small. Initiation is somewhat lower among infants born in public hospitals (91.3%), and is lowest (84%) among private hospital births. The same trend is evident with respect to probability of breastfeeding three and six months. There is an opposite trend for introduction of bottle feeding by two months, with twice as many private hospital-born children receiving early bottle feeding as home births. Clearly, then, infant feeding of children born in Bangkok appears to differ depending on place of birth. Whether this is due to specific attributes of the health care institutions or to confounding with other attributes of the women who are likely to give birth in each place remains to be explored.

Two hospital procedures that may be of significance are whether the infant stays with the mother in the hospital and whether the mother receives a free formula sample during her hospital stay. Initiation of breastfeeding is somewhat higher (93.5% versus 86.8%) among infants who room with the mother than among those who are kept in the nursery. Rooming-in does not seem to be associated with probability of breastfeeding for three months, but a slightly higher percentage of rooming-in children (57% versus 50%) breastfeed for at least six months. There is a greater difference with respect to early bottle feeding. More children (58% versus 46%) who are kept in the hospital nursery initiate bottle feeding by two months than do those children who room with the mother. Again, children of mothers of certain socioeconomic strata or in some hospitals may be more likely to be kept in the nursery, and these factors must be controlled.

There is also a suggested association in the data between receipt of formula sample and the infant feeding patterns (Table 9-16). For initiation of breastfeeding three months, the association is slight. More clearly, fewer mothers who received formula samples continued to breastfeed their children for at least three months or six months, and more of these women (58%) initiated early bottle feeding than did mothers who did not receive a sample during the hospital stay (46%).

One factor that may influence formula use among hospital-born children, either in the hospital or after discharge, relates to the continued contacts between health service personnel and sales representatives (detailers) from the formula companies.

The contacts are particularly congenial between the nurses and detailers because many of the latter were once nurses themselves and maintain ties with their former colleagues. The ethnographers observed these interactions in two hospitals in Bangkok. In the course of meeting with nurses in the hospital lunch room and the nurses' dormitory, a group of detailers described their work:

> "Every company's detailers are all here...detailers know the nurses working in these hospitals. Milk detailers are assigned to specific zones or groups of hospitals...we are here to meet doctors and nurses...we cannot talk to mothers because the Ministry of Public Health prohibits us...
>
> Now (that) the Ministry is campaigning for breastfeeding, they forbid us to make direct contact with mothers...(so) we find the way out by approaching through medical personnel...Ordinarily patients and mothers do believe the words of the medical doctors--once they know the brands of formula the hospitals use they tend to follow...which is helpful to us...We sell (at) a very special price to hospital staff like nurses and doctors. The price for these persons has to be lower than anywhere else...It's a kind of persuasion, or public relations. These people are of good help to us...Nurses often buy directly from detailers because they can get it cheap. They...order (formula) for relatives and friends.
>
> All detailers are nurses with B.A. degrees. We used to work as nurses in these hospitals before...There is no rule of the hospital against the detailers. It is our right to contact doctors or nurses..."

The influence of health services characteristics on breastfeeding duration can be represented graphically through lifetable analysis. Figures 9-1 through 9-4 show duration of breastfeeding by: place of birth, rooming-in, extent of contract and receipt of formula sample. The pattern of breastfeeding is markedly different by place of infant birth (Figure 9-1). There are too few home births to provide meaningful data, but the pattern of breastfeeding duration for children born in public versus private hospitals seems to diverge markedly from the fourth month on. There are distinct curves for the two rooming-in categories (Figure 9-2), showing clear, consistent differences between mothers who had their babies room-in with them and those who did not. Mothers whose babies stayed with them had, in all intervals, about 10% greater chance of still breastfeeding than mothers who did not. The variable "Room-in" is a dichotomous, independent variable based on the mother's report of whether she roomed with her infant or not. Because of the variation in mother-infant contact in the hospital described

above, an attempt was made to combine the information available on rooming-in, having access to non-rooming in infants, and whether or not the baby was breastfed in the hospital to create a graded scale of extent of contact. The sample was divided into five groups: 1) no rooming-in, child never brought to mother; 2) no rooming-in, child brought but no breastfeeding; 3) no rooming-in, child brought and mother breastfed; 4) rooming-in but no breastfeeding; 5) rooming-in and breastfeeding (Figure 9-3).

The results show clearly that those who both room-in and breastfeed (Group 5) have the highest proportion of breastfeeders at each age interval. Groups who experience any breastfeeding (whether rooming-in or not) have the highest likelihood of continued breastfeeding in every monthly interval until the infant is six months of age. Beyond age six months, those groups of mothers who room-in, whether breastfeeding took place or not, have consistently higher proportions of breastfeeders. Among those who did not room-in, having the child brought to the mother for breastfeeding in the hospital (Group 3) is associated consistently with longer duration of breastfeeding as compared to those (Groups 1 and 2) who did not room-in and also did not breastfeed.

One perplexity is that Group 1 mothers (who had no contact or breastfeeding at all during the hospital stay) display consistently greater breastfeeding duration than Group 2 mothers who, although they did not room-in or breastfeed, at least had the infant brought to the mother's room during the time in the hospital. One explanation may be that Group 2 contains mothers who definitely decided they were not going to breastfeed: they did not room with the infants, and, when the infant was brought by the nurse to the mother's room, they declined to breastfeed. The group of women who were completely separated from the infants during the hospital stay (Group 1), contained a large proportion (47%) who stated that the reason for complete separation was either mother or infant illness, or a hospital rule (32%). Conceivably, this group included women who wanted to breastfeed but could not due to illness or enforcement of rigid policy. Upon leaving the hospital, with mother and infant reunited, breastfeeding could be initiated.

Receipt of a sample of infant formula in the hospital is consistently associated with lower probability of continued breastfeeding. The difference between the two groups is small, however, until about the fifth month.

A further analysis was performed to see if specific hospitals had consistent effects on the feeding patterns of the infants born there. If hospital personnel communicated very strong messages about feeding choices, such effects might be discernible apart from the effects due to specific socio-economic attributes of the mothers or the specific practices which could

be quantified, such as rooming-in or receipt of formula samples. In fact (Table 9-17), the nine hospitals in which 72% of the reported births took place had completely different clientele, and service delivery patterns. Feeding patterns also differ markedly--and not necessarily consistently. For example, one hospital with among the highest initiation rates had the lowest reported continuation rates. Each hospital seemed to have several striking characteristics, either of the mothers or the health services. Descriptions of several institutions and the behavior of the mothers who delivered there follow.

Huacheay Hospital is one of Bangkok's largest private institutions, and one in which many ethnic Chinese are patients. In this hospital, prevalence of breastfeeding initiation and breastfeeding duration are among the lowest. At the same time, prevalence of rooming-in is very low and receipt of infant formula is the highest of all hospitals studied. This would seem to form a consistent pattern of relationship between hospital practices and infant feeding behavior. Women who give birth in Huacheay Hospital, are also, however, more highly educated, from higher income families, and predominantly Bangkok-born; all factors associated with lower breastfeeding initiation and shorter duration. Thus, hospital practices are only part of an overall pattern that would predict less breastfeeding for women using this hospital. An inconsistency in this picture is the fact that patients at Huacheay are considerably less likely than women who gave birth in other institutions to work outside their homes.

Rajvithi Hospital is a public hospital operated by the Ministry of Public Health for lower income patients. As Table 9-17 shows, the level of breastfeeding initiation is among the highest, as is the prevalence of mothers who continue to breastfeed for at least six months. The level of rooming-in is also very high (85.7%) and formula sampling is very low (3.9%). For both infant feeding behavior and health services, the pattern is the opposite of that seen in Huacheay. Yet, the same dilemma exists in trying to assign any effects to these practices since the socio-economic characteristics of the mothers (less education, lower family income and more non-Bangkok born mothers) are all associated with higher initiation and longer duration of breastfeeding.

Ramathibodi Hospital is the teaching hospital of Mahidol University, and, although the hospital has a stated policy of promoting breastfeeding, certain observed hospital practices and characteristics of the mothers may serve to counteract such a policy. It can be seen that while initiation is very high among these mothers, breastfeeding duration is low. Only 44% breastfeed for as long as three months. Fewer than half of the mothers room-in, and 12.3%, about the sample average, report receipt of formula samples. At the same time, these mothers are

the most highly educated mothers from the highest income families, and they have the highest frequency of work outside the home, all of which may exert a significant influence to shorten breastfeeding durations.

It is clear, then, that while breastfeeding behavior does appear to vary among the sample mothers depending upon the specific hospital in which the infants birth took place, so do the health practices observed in these hospitals and the characteristics of the mothers. Thus, subtle institution-specific hospital effects were not easily discernible from the cross-tabulation. To examine institutional effects further, the specific hospital birthplace was added to the set of health service and socio-economic variables in a logistic regression. No significant independent hospital effect was seen after controlling for these other variables.

Logistic Regression

The logistic regression analyses can be expanded by including variables to represent possible effects of health system characteristics suggested by the cross-tabulations and Life tables. Two such variables were chosen, contact and receipt of formula sample.

Contact, as noted earlier, was defined to represent the five different combinations of rooming-in, having the child brought to the mother's room and breastfeeding in the hospital, according to the mother's report of her experiences in the hospital. The least contact between mother and child occurred in Group 1 with increasing contact in Groups 2,3, and 4. The most intense contact occurred between Group 5 mothers and their babies. The variable for receipt of formula sample is dichotomous, coded to indicate whether or not the mother reported receiving a free sample of infant formula during her hospital stay or upon discharge.

Models that include socio-economic, maternal employment, and health services variables as independent predictors of infant feeding behavior are presented in Table 9-18. In the case of the model in which initiation is the dependent variable, both contact and being born outside Bangkok have highly significant associations with the probability of initiating breastfeeding. Mother's age is significant as well. The RORs in Table 9-19 suggest that contact almost doubles the likelihood that breastfeeding will be initiated while being a Bangkok-born mother reduces the odds by about one-half. When the more complex contact variable is replaced by a dichotomous variable representing only rooming-in or not, this factor is highly significant for initiation of breastfeeding.

When breastfeeding duration is considered, neither of the health services variables exerts a significant effect. High income level, low parity, urban birth and, most especially, working outside the home for income appear to shorten duration in these models. Even controlling for family income and maternal education; working outside the home appears to have a strong independent effect on duration.

Early introduction of bottlefeeding is associated with lower parity, higher age, education, and income and working outside the home. More intense contact with the mother also strongly decreases the odds of early bottle feeding (as does rooming-in alone, in a separate analysis). Infants who have more contact with their mothers in the hospital have only two-thirds the chance of other infants to be given bottle feeding by two months (Table 9-19). Working outside the home exerts perhaps the strongest effect with mothers who work outside the home almost four times as likely to introduce early bottle feeding to their infants as those mothers who do not engage in such work, even controlling for family income and mothers education.

Given the extreme magnitude of the effect of working outside the home in three of the four models, it can be postulated that women who do and do not have outside employment may be so different in terms of the determinants of their infant feeding behavior that models should be constructed separately for each of the two groups. In doing so, any differences in the effects of health service practices on the two groups of women could be expected to become apparent.

Results of the segregated models present striking contrasts (Tables 9-20 and 9-22). Many fewer explanatory variables are related to the behavior of women who work outside the home than those who do not, suggesting that work itself is overriding in its importance. For these women contact remains an important predictor of initiation of breastfeeding. The odds are two and one-half times as great that a child will be breastfed if it has more contact with its mother (Table 9-21). Mother's birthplace also remains significant in the model of working women alone. Mother's age no longer exerts a significant effect on the outcome. For the other two duration models (3 and 6 months) among women who work away from home, there is a startling lack of significant associations. Only parity appears to be significantly associated, and not extremely strongly, at the 3 month interval. For early bottlefeeding, educational level, which was not significantly related for the full combined sample, is seen to be associated with this outcome among the subsample of women who do work outside the home. Contact is also significantly, negatively, related to early bottle feeding for this group of mothers.

When the same set of analyses is duplicated for mothers who do not work outside the home, there are many more variables significantly associated with the outcome variables (Tables 9-22, 9-23). As was the case for women who work outside the home, contact is extremely significantly associated with the probability of initiation of breastfeeding. Associations with duration of breastfeeding in this group (Tables 9-22,9-23) are markedly different from those of the women who work outside the home with many variables appearing important. Parity, urban birth and especially income level all have significant associations with duration of breastfeeding. Receipt of formula samples in the hospital also is significantly related to breastfeeding duration among these women. Women who receive a free formula sample in the hospital are only .60 times as likely to breastfeed for at least three months as those who do not receive samples (Table 9-23). This pattern contrasts with the experience of the women working outside their homes for whom there are virtually no significant relationships with breastfeeding duration (Table 9-21).

The model for the early bottle feeding is also substantially different for Bangkok women who do and do not work outside the home. Table 9-23 shows that among the non-working out group, four predictors (urban birth, higher family income, older age and lack of contact with infants in the hospital) are identified as significantly related to the probability of early bottlefeeding. Lack of contact is very significantly related to early bottlefeeding in this group. Among the women who work away from home, however, the negative relationship between contact and early bottlefeeding, while significant, is not as strongly so as among the non-working out mothers. Perhaps the mothers who workout are under such strong pressures to add early bottles, because of their employment, that other, countervailing, influences operate less consistently. Finally, whereas educational level is significantly related to early bottle use for women working away from home it has no significant effect on probability of early bottlefeeding for mothers who do not work away from home once other variables are controlled. The addition of early bottles as an explanatory factor for each of the groups of sample women (total sample, women who workout, women who do not work out) was tested for the two duration variables. For the entire group and both subgroups of women separately, the variable was highly significant at both 3 month and 6 month durations (Table 9-24).

Addition of this factor changed very little in the models for the entire sample, where workout, urban mother and income group remained significantly associated with duration. Only parity disappears as significantly related in this model.

For women who do not work away from home, addition of the early bottle variable removes the significant independent

relationship of hospital samples, urban mother and income group, and allows mother's age to emerge as significantly related to higher probability of longer breastfeeding. For those who do work out, the early bottle variable is, again, overwhelmingly related to outcome. Urban mother is now independently significant (but only for 3 months duration) and parity disappears as an associated variable (Table 9-24).

The results of the above logistic regression analyses indicate that health services variables may exert an important influence on the probability of different feeding outcomes in Bangkok. Such effects seem most important among women who do not work outside the home. Since most women do not work outside the home, especially in the first half-year of an infant's life, these effects deserve careful consideration. As Table 9-22 and Table 9-23 show, health services are of importance in three of the four outcomes examined. The hospital practices relating to rooming-in and distribution of free formula samples appear more likely to influence decisions regarding breastfeeding initiation, duration, and early bottle feeding in this group.

The effects of both rooming-in and hospital samples are stronger and more pervasive among women who do not work outside the home than those who do engage in this activity, however, rooming-in appears to be of potential importance for all women in its influence on breastfeeding duration.

For the smaller subgroup of women working outside the home, infant feeding decisions appear to be tied to the fact of their employment. With respect to health services for this group, only rooming-in is significant for the decision to initiate breastfeeding. Since women who work outside the home tend, as a group, to have a lower rate of breastfeeding initiation, the strong positive effect of this health services practice is noteworthy.

Table 9-1 Mother Received Prenatal Care

	Total N	%
No	5	0.4
Yes	1362	99.6
TOTAL	1367	100%

Table 9-2 Place of Infant Birth

	Total N	%
Public Hospital	1133	80
Private Hospital	253	18
Home or other	32	2
TOTAL	1418	100%

Table 9-3 Location of Prenatal Care

	Total N	%
Public Hospital	978	72
Private Clinic	270	20
Health Care Center	112	8
Relative/friend	1	0
Thai Health Project	1	0
TOTAL	1362	100%

Table 9-4 Prenatal Care: Number of Visits

	Total N	%
1	112	8
2-4	377	28
5-7	321	24
8-10	232	17
11-13	249	18
>13	52	4
TOTAL	1343	100%

Table 9-5 Advice From Physicians or Nurses about Infant Feeding

	Total N	%
None	914	68
Advice about breastfeeding	166	12
Advice about infant feeding and child rearing	91	7
Use of supplementary foods	85	6
Maternal diet	33	2
How to use formula milk	10	1
Can't remember subject	48	4
TOTAL	1347	100%

Table 9-6 Caesarean Section

	Total N	%
No	1300	91
Yes	121	9
TOTAL	1421	100%

Table 9-7 Location of Infant in Hospital

	Total N	%
In mother's room	705	51
Hospital Nursery	655	47
Both	28	2
TOTAL	1388	100

Table 9-8 Contact and Breastfeeding Behavior Between Mothers and Infants That Did Not Room Together

	Total N	%
Not brought for breastfeeding	321	51
Brought for breastfeeding	208	33
Brought but did not breastfeed	98	16
TOTAL	627	100%

Table 9-9 Reason Nurse Did Not Bring Child for Breastfeeding

	Total N	
Hospital rule	96	32
Mother ill	76	25
Infant ill	66	22
No milk	22	7
Brief hospital stay	17	6
Don't know	19	6
Nurse forgot	5	2
TOTAL	301	100%

Table 9-10 Elapsed Time in Hospital Between Birth and When Child First Brought to Mother

	Total N	%
0-6 hours	202	18
7-12 hours	201	18
13-18 hours	57	5
19-24 hours	17	2
>1 day	396	36
>2 days	244	22
TOTAL	1117	100%

Table 9-11 Duration of Postnatal Hospital Stay

	Total N	%
<1 day	29	2
1-3 days	717	52
4-6	357	26
7-9	234	17
10-12	24	2
13-15	19	1
>15	5	0
TOTAL	1385	100%

Table 9-12 Advice on Breastfeeding in Hospital

	Total N	%
No advice	666	49
Advice	701	51
Source of Advice		
Nurse	488	70
M.D.	161	23
Midwife	23	3
Public health nurse	21	3
Can't remember source	5	1
Audio-visual	3	0
TOTAL	1367	100%

Table 9-13 Type of Information Received from Hospital

	Total N	%
None	816	59
Child rearing	337	24
Feeding	120	9
Maternal and child care	29	2
Post-delivery maternal care	24	2
Child rearing and family planning	19	1
Vaccination	16	1
Can't remember	15	1
Family planning	14	1
TOTAL	1390	100%

Table 9-14 Received Free Formula Sample in Hospital

	Total N	%
No	1219	88
Yes	171	12
TOTAL	1390	100

Table 9-15 Post-discharge Home Visits by Health Personnel

	Total N	%
None	979	70
Public health nurse	342	25
Nurse	62	4
M.D.	4	0
Can't remember who visited	1	0
TOTAL	1388	100

Table 9-16. Association of Health Services Variables with Infant Feeding Outcomes

	EVER BREASTFED		BREASTFED 3 MONTHS		BREASTFED 6 MONTHS		BOTTLE BY 2 MONTHS	
	TOTAL N	% YES	TOTAL N	% YES	TOTAL N	% YES		
Place of Birth								
Private Hospital	1113	91.3	780	65.6	509	56.0	954	46.4
Public Hospital	243	84.0	171	60.2	112	40.2	229	58.1
Home	28	96.4	19	78.9	12	91.7	28	28.6
Room-in								
Yes	705	93.5	512	65.8	342	57.0	602	41.7
No	680	86.8	461	64.0	293	50.5	583	53.0
Formula Sample								
Yes	171	88.9	125	57.6	76	43.4	150	58.0
No	1216	90.3	849	66.1	560	56.6	1037	45.7

Table 9-17. Prevalence of Breastfeeding, Health Services, Socioeconomic Characteristics and Maternal Employment by Hospital Birthplace

HOSPITAL NAMES	% OF TOTAL	N	EVER BREAST-FED	BREAST-FED 3MONTHS	BREAST-FED 6MONTHS	ROOMING IN	NO CONTACT FOR FEEDING	RECVD. SAMPLE	<4 YEARS EDU-CATION	INCOME <3,000 BHAT/MONTH	WORK OUTSIDE	% MOTHERS BORN BANGKOK
Siriraj	12.8	178	93.8	63.4	53.7	21.9	32.8	5.1	69.1	34.7	27.1	47.1
Pramongkut	3.5	49	87.8	70.6	59.1	45.1	37.3	9.8	60.8	28.0	31.4	30.0
Vachira	6.8	94	90.4	73.7	60.5	72.3	16.0	10.6	67.0	30.9	17.2	40.2
Rajvithi	16.7	232	92.2	65.7	63.5	85.7	6.9	3.9	68.8	27.4	21.2	42.4
Ramathibodi	4.2	58	94.8	43.9	36.0	43.9	15.8	12.3	49.1	12.3	40.0	32.7
Chulalongkorn	12.8	177	92.1	68.3	57.1	54.5	18.0	5.6	69.7	28.2	24.9	37.2
Pra Pinkloag	3.9	54	96.3	73.8	66.7	83.3	5.6	11.1	72.2	37.0	25.9	41.2
Taksin	4.8	67	88.1	58.7	44.1	76.1	9.0	1.5	64.2	28.6	25.8	53.2
Huacheay	6.4	89	85.4	59.3	41.5	5.6	23.6	40.4	55.0	16.7	19.5	53.0

Table 9-18 Logistic Regression Models for Different Infant Feeding Outcomes: Beta Coefficients for Background and Health Services, and Maternal Employment

	Ever Breastfed	Breastfed 3 Months	Breastfed 6 Months	Bottle By 2 Months
Intercept	3.002 (48.71)***	1.190 (11.73***	0.811 (3.67)	-1.165 (14.52)***
Parity	0.002 (0.00)	0.307 (5.61)*	0.463 (9.14)**	-0.289** (7.90)
Urban Mother	-0.710 (12.95)***	-0.469 (9.18)**	-0.510 (7.39)	0.261 (3.73)
Income Group	-0.069 (1.22)	-0.184 (13.58)***	-0.175 (7.80)**	0.182 (17.85)***
Mother's Age	-0.248 (6.97)**	0.023 (0.09)	-0.084 (0.81)	0.188 (8.17)**
Mother's Education	0.003 (0.00)	-0.004 (0.00)	-0.105 (1.75)	0.107 (3.59)
Contact	0.312 (31.40)	0.040 (0.84)	0.092 (3.16)	-0.153 (16.19)***
Hospital Sample	0.171 (0.36)	-0.237 (1.13)	-0.435 (2.40)	0.249 (1.55)
Workout	-0.258 (1.44)	-1.444 (77.27)***	-1.339 (40.94)***	1.377 (80.01)***
Model X^2	(67.75)***	(156.40)***	(112.20)***	(193.12)***
R	.25	.34	.35	.35

[1]Numbers in parentheses are MLE chi squares (Wald Statistic).

*P .05, **P .01, ***P .001

Table 9-19. Adjusted Risk Odds Ratios and 95% Confidence Intervals for Background, Health Services, and Maternal Employment Predictor Variables

	EVER BREASTFED	BREASTFED 3 MONTHS	BREASTFED 6 MONTHS	BOTTLE BY 2 MONTHS
Parity				
6-7 vs 2-3	NS	1.85 (1.43,2.38)	2.52 (1.87,3.41)	.56 (.46,.69)
Urban Mother	.49 (.33,.72)	.63 (.46,85)	.60 (.42,.87)	NS
Income Group				
10,000-15,000 vs 2,000-3,000	NS	.40 (.36,.44)	.42 (.37,.47)	2.48 (2.28,2.70)
Mother's Age				
35-39 vs 25-29	.60 (.50,.72)	NS	NS	1.45 (1.27,1.65)
Mother's Education	NS	NS	NS	NS
Contact	3.48	NS	NS	.54
Highest Vs. Lowest	(3.12,3.89)			(.50,.58)
Hospital Sample	NS	NS	NS	NS
Workout	NS	.24 (.17,.32)	.26 (.17,.39)	3.98 (2.94,5.38

Table 9-20 Logistic Regression Models for Different Infant Feeding Outcomes: Beta Coefficients for Background and Health Services Variables - Women Who Work Out

	Ever Breastfed	Breastfed 3 Months	Breastfed 6 Months	Bottle By 2 Months
Intercept	2.894 (12.75)[1]***	-0.142 (0.05)	-0.619 (0.55)	0.798 (1.63)
Parity	-0.030 (0.01)	0.528 (5.18)*	0.331 (1.33)	-0.404 (3.52)
Urban Mother	-0.786 (4.85)*	-0.443 (2.77)	-0.520 (2.23)	-0.185 (0.49)
Income Group	-0.033 (0.07)	-0.094 (1.05)	-0.084 (0.41)	-0.024 (0.07)
Mother's Age	-0.323 (3.47)	-0.079 (0.33)	0.009 (0.00)	0.253 (3.54)
Contact	0.362 (13.15)***	-0.028 (0.13)	0.036 (0.13)	-0.171 (4.63)*
Hospital Sample	-0.220 (0.26)	0.422 (1.25)	-0.080 (0.02)	0.110 (0.07)
Mother's Education	0.015 (0.01)	-0.123 (1.40)	-0.226 (2.27)	0.312 (7.83)**
Model X^2	(27.81)***	(16.93)*	(12.19)	(22.73)**
R	.23	.10	0	.15

[1]Numbers in parentheses are MLE chi squares (Wald Statistic)

*P .05, **P .01, ***P .001

Table 9-21 Adjusted Risk Odds Ratios and 95% Confidence Intervals for Background and Health Services Variables - Women Who Work Out

	Ever Breastfed	Breastfed 3 Months	Breastfed 6 Months	Bottle By 2 Months
Parity				
6-7 vs 2-3	NS	2.85 (1.81, 4.50)	NS	NS
Urban Mother	.46 (.23, .92)	NS	NS	NS
Income Group	NS	NS	NS	NS
Mother's Age	NS	NS	NS	NS
Mother's Education				
8-10 vs 1-4	NS	NS	NS	1.87 (1.50, 2.32)
Contact				
Highest vs Lowest	3.68 (3.61, 3.76)	NS	NS	.50 (.43, .59)
Hospital Sample	NS	NS	NS	NS

Table 9-22 Logistic Regression Models for Different Infant Feeding Outcomes: Beta Coefficients for Background and Health Services Variables - Women Who Do Not Work Out

	Ever Breastfed	Breastfed 3 Months	Breastfed 6 Months	Bottle By 2 Months
Intercept	2.297 (31.83)[1]***	1.166 (7.49)**	1.856 (2.96)	-1.272 (12.63)***
Parity	0.006 (0.00)	0.183 (1.37)	0.512 (7.83)**	-0.222 (3.69)
Urban Mother	-0.741 (9.92)**	-0.515 (7.12)**	-0.535 (5.63)*	0.426 (7.37)**
Income Group	-0.073 (1.05)	-0.220 (13.72)***	-0.208 (8.50)**	0.234 (22.44)***
Mother's Age	-0.212 (3.65)	0.079 (0.70)	-0.111 (1.04)	0.158 (4.37)*
Mother's Education	-0.011 (0.01)	0.056 (0.45)	0.061 (0.39)	0.055 (0.66)
Contact	0.287 (18.90)***	0.072 (1.80)	0.100 (2.78)	-0.165 (14.36)***
Hospital Sample	0.495 (1.57)	-0.552 (4.36)*	-0.518 (2.64)	0.284 (1.51)
Model X^2	(40.25)***	(30.80)***	(32.62)***	(63.67)***
R	.21	.15	.18	.22

[1]Numbers in parentheses are MLE chi squares (Wald Statistic)

*P .05, **P .01, ***P .001

Table 9-23 Adjusted Risk Odds Ratios and 95% Confidence Intervals for Background and Health Services Variables - Women Who Do Not Work Out

	Ever Breastfed	Breastfed 3 Months	Breastfed 6 Months	Bottle By 2 Months
Parity				
6-7 vs 2-3	NS	NS	2.78 (1.94, 3.98)	NS
Urban Mother	.48 (.31, .76)	.60 (.41, .88)	.59 (.38, .92)	1.53 (1.12, 2.08)
Income Group				
10,000-15,000 vs 2,000-3,000	NS	.33 (.30, .37)	.35 (.31, .41)	3.22 (2.93, 3.55)
Mother's Age				
35-39 vs 25-29	NS	NS	NS	1.37 (1.18, 1.54)
Mother's Education	NS	NS	NS	NS
Contact				
Highest vs Lowest	3.15 (2.77, 3.58)	NS	NS	.52 (.47, .56)
Hospital Sample	NS	.58 (.34, .97)	NS	NS

Table 9-24 Logistic Regression for Breastfeeding Duration, all Predictors plus Early Bottlefeeding

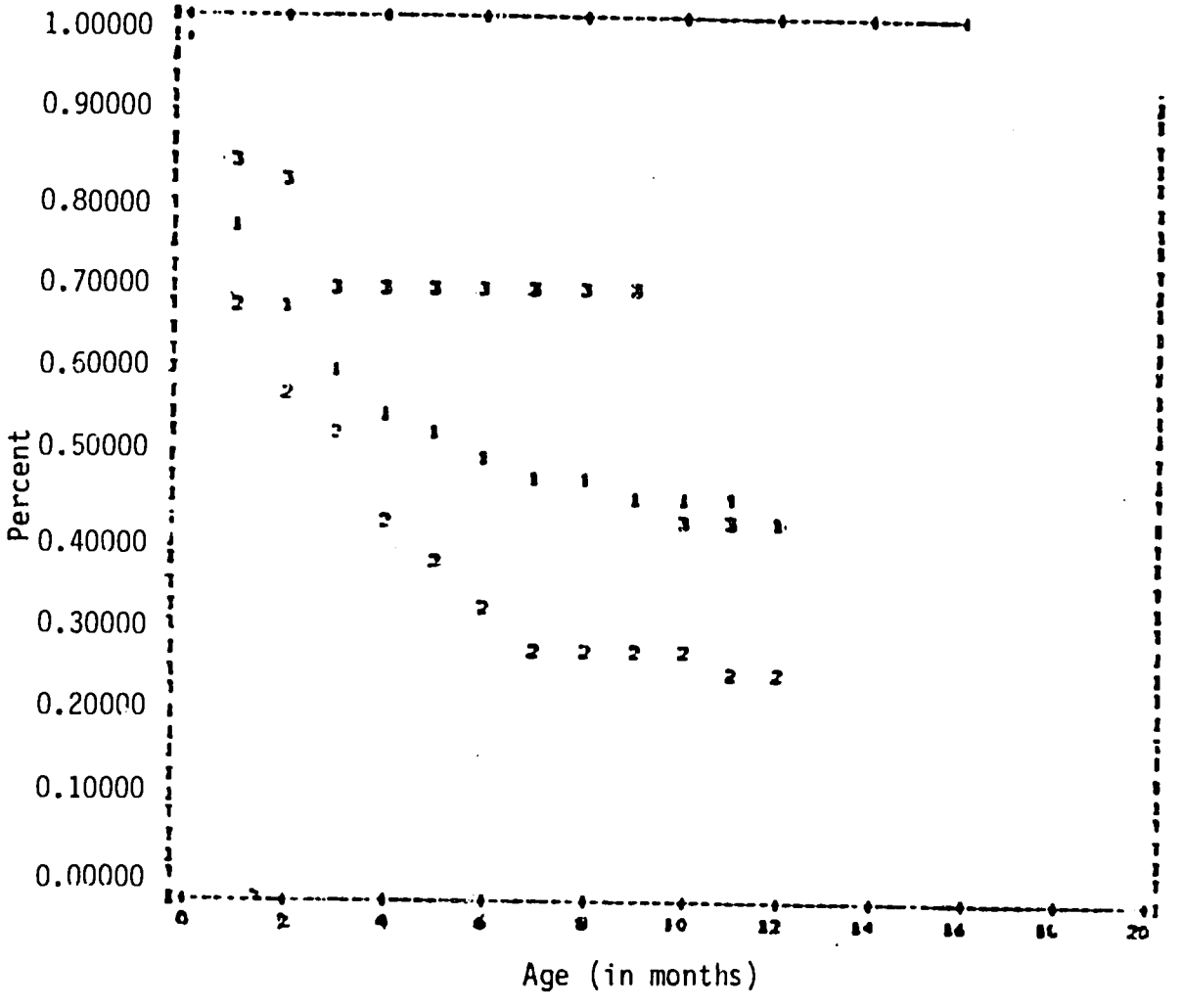
	Whole Sample		Women Working Out		Women Not Working Out	
	Breastfed 3 Months	Breastfed 6 Months	Breastfed 3 Months	Breastfed 6 Months	Breastfed 3 Months	Breastfed 6 Months
Parity	.094 (0.36)	.230 (3.07)	.507 (3.61)	.261 (0.76)	-.207 (1.03)	.316 (2.25)
Mother's Age	-.171 (3.15)	-.020 (0.04)	.034 (0.04)	.057 (0.09)	.280 (4.92)*	-.055 (0.18)
Mother's Education	-.073 (0.98)	-.067 (0.58)	.007 (0.00)	-.138 (0.80)	.128 (1.51)	-.056 (0.25)
Urban Mother	-.524 (7.65)**	-.515 (5.94)*	-.652 (4.63)*	-.554 (2.24)	-.398 (2.58)	-.478 (3.35)
Income Group	.127 (4.33)*	-.100 (2.09)	-.140 (2.01)	-.068 (0.27)	-.087 (1.24)	-.110 (1.73)
Hospital Sample	.107 (0.15)	-.317 (1.01)	.738 (2.92)	-.116 (0.04)	-.189 (0.24)	-.322 (0.75)
Contact	-.047 (0.72)	.040 (0.48)	-.111 (1.55)	-.011 (0.01)	-.039 (0.02)	.049 (0.50)
Early Bottle	-3.047*** (230.29)***	-2.235 (103.27)***	-2.310 (47.41)***	-1.497 (15.95)***	-3.508 (179.79)***	-2.581 (85.97)***
Workout	- .801 (15.46)***	- .753 (9.83)**	-	-	-	-

[1] Numbers in parentheses are MLE chi squares (Wald Statistic)

*P .05, **P .01, ***P .001

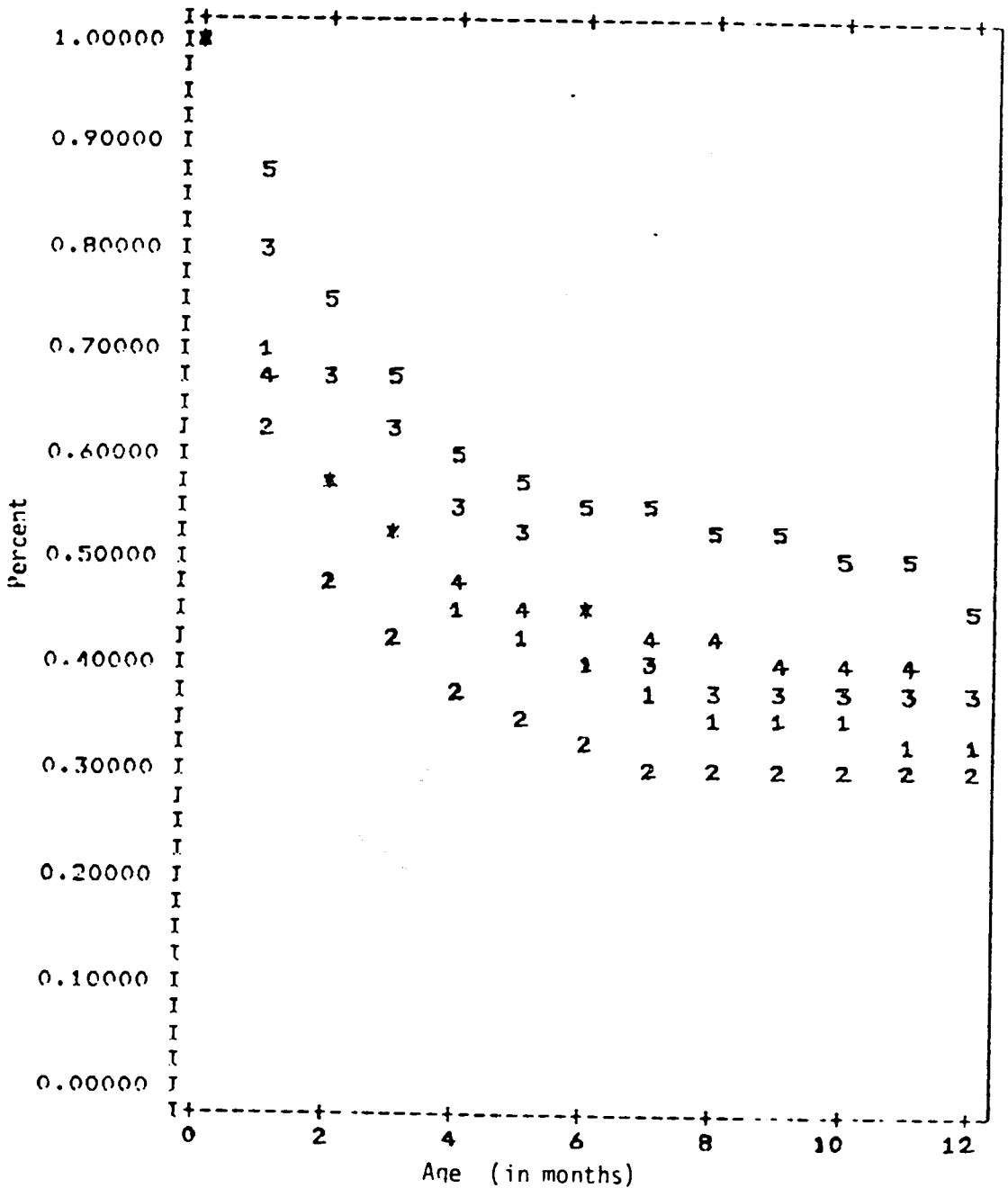
Figure 9-1

Breastfeeding Duration by Location of Infant's Birth



Key:	N	Median Survival
1 Public Hospital	1112	5.96
2 Private Hospital	243	3.18
3 Home birth	28	9.71.

Figure 9-2
Duration of Breastfeeding by Hospital Experiences



1. Rooming-in no. Baby not brought to mother.
2. Rooming-in no, Baby brought to mother, no breastfeeding.
3. Rooming-in no, Baby brought to mother, Yes breastfeeding.
4. Rooming-in yes, Baby brought to to mother yes, No breastfeeding.
5. Rooming-in yes, Baby brought to mother, Yes breastfeeding.

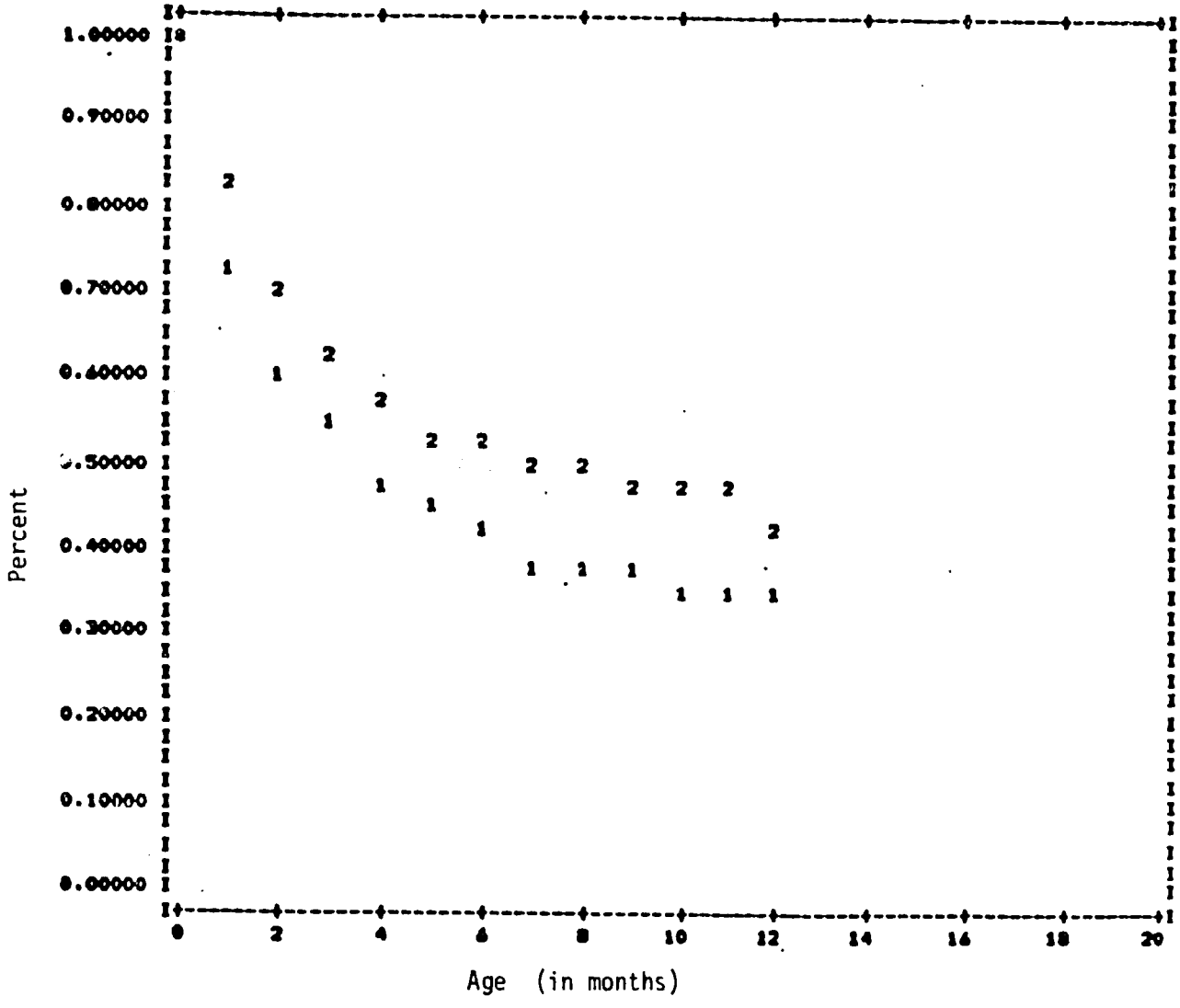
Key:

	N	Median Survival
1	320	3.41
2	98	1.86
3	207	5.24
4	209	3.45
5	481	11.05

* = more than one group

Figure 9-3

Breastfeeding Duration by Rooming In

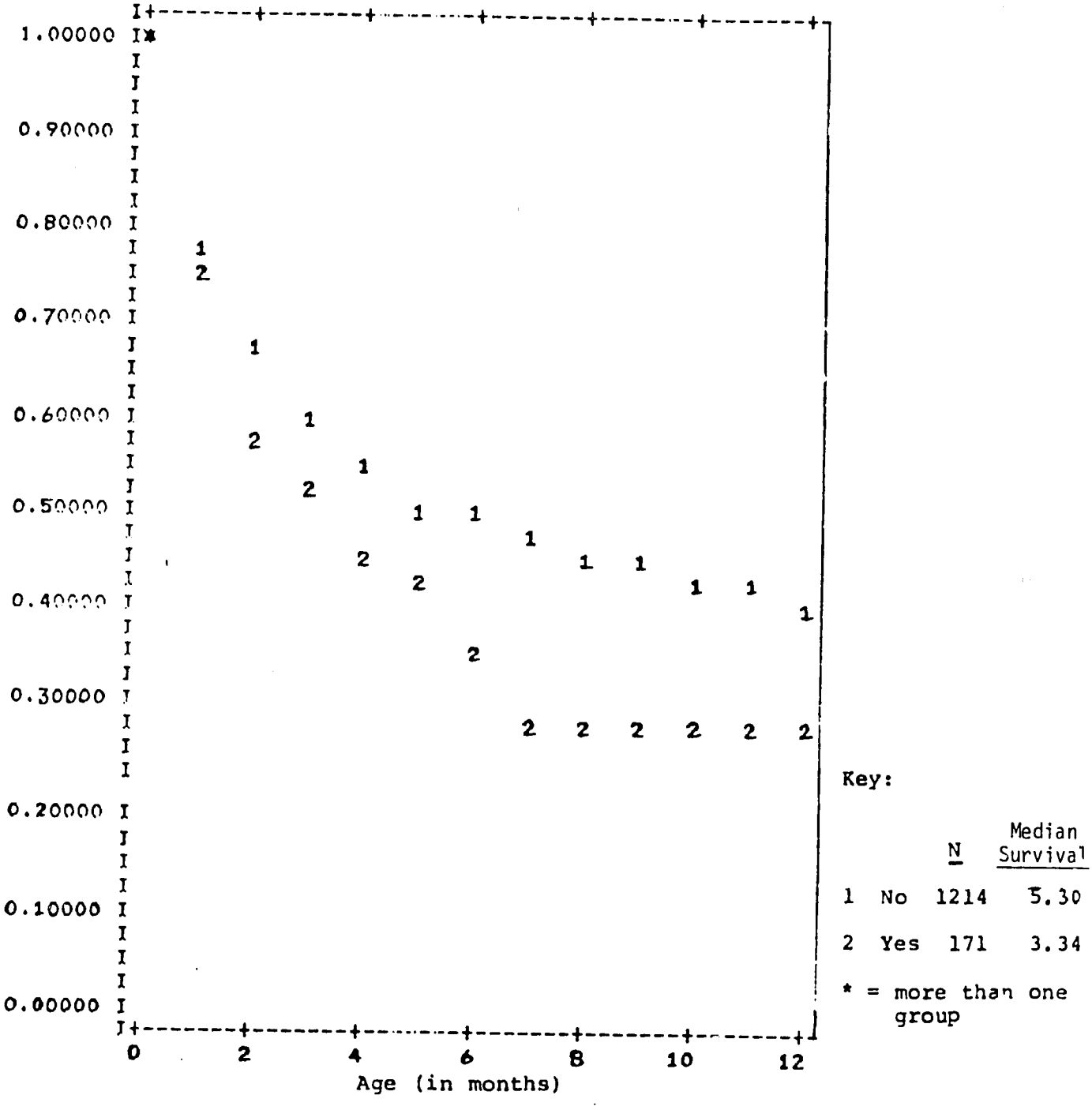


Key:

		N	Median Survival
1	No	653	3.71
2	Yes	702	7.56

Figure 9-4

Duration of Breastfeeding by Formula Sample



X SUMMARY OF FINDINGS AND RECOMMENDATIONS

Breastfeeding and Supplementation Patterns

One of the distinctive features in Bangkok is the high rate of initiation of breastfeeding despite the rapid modernization and shifts in lifestyle of the past decades. Only 10% of mothers reported that their child was never breastfed. Older mothers and mothers born in Bangkok are less likely to initiate breastfeeding. Bangkok born mothers are also likely to stop breastfeeding earlier as are mothers from higher income families and mothers of lower parity. Maternal education is not independently related to breastfeeding initiation or duration. The medium duration from the sample is just over six months.

Exclusive breastfeeding is widespread only during the first month and declines rapidly after that time. Breastmilk substitutes are introduced early, with most children receiving some form of supplementation by the fourth month. Food supplements are introduced even earlier, with almost all children receiving foods by three months of age. The most common infant feeding patterns are breastmilk and foods, or other milks and foods. Combined breast and bottle feeding is relatively uncommon and, when it does occur, it appears to be only of short duration.

The different infant feeding patterns have different significance for the duration of breastfeeding in Bangkok. Those children who combine breastfeeding with other foods but no bottlefeeding tend to exhibit longer breastfeeding duration. Those who mix breastfeeding and bottlefeeding appear to convert rapidly to exclusive bottle feeding. In this regard, it is not surprising that early bottle feeding appears independently associated with truncated breastfeeding, both in the survey results and in the ethnographic observations.

Initiation of breastfeeding is not a matter of serious concern in Bangkok; the more pressing issue seems to be breastfeeding duration and the very early supplementation so often found in this sample of Bangkok mothers and children.

Infant Foods Marketing

Infant foods Marketing in Bangkok is both competitive and vibrant, characterized by a large number of outlets, brands, sizes and promotional activities. Breastmilk substitutes, particularly infant formula, are widely available in Bangkok. Sixty percent of provision stores carry formula. All retail outlets carry multiple brands, and humanized formula accounts for the largest market share in Bangkok.

Retailers, manufacturers/distributors, and advertising agency personnel display a general awareness of government regulations and the WHO code, but a limited knowledge of specific regulations regarding marketing of infant formula. A number of Bangkok hospitals have retail store operations that sell formula products. It is claimed that these are a convenience for the mothers, however, it is noted that this is a source of revenue for hospitals and represents a new marketing innovation on the part of the formula companies.

Since 1980, there has been a large reduction in mass media promotion of infant foods in Bangkok. No radio or T.V. advertisements were observed by the research staff and only occasional print ads were observed. The government ban on advertising of infant formulas is responsible for the reduction of mass media promotion. Large numbers of Bangkok mothers, however, continue to recall mass market advertising of infant foods, and brand awareness is high.

Maternal Employment

Maternal income generation, when it takes place in the home, does not appear to influence infant feeding behavior. Work outside the home, however, was found to have a very important influence on infant feeding practices for the subgroup of women who are so employed. The overall effect is to increase the probability of introduction of early bottlefeeding and decrease the duration of breastfeeding. Probability of initiation of breastfeeding is little affected. At the time of the survey, slightly over one quarter of the mothers reported being employed outside the home; 9% reporting that they earned income at home. Partly due to maternity leave patterns, far fewer of the mothers of 0 to 2 month old children were employed outside the home than mothers of older infants. Mothers who do work outside the home tend to come from higher educational and socioeconomic strata and, perhaps, are more able to afford suitable supplementary foods for their young infants.

Although the effect of work appears strong for mothers who work outside the home, most mothers do not work. Most babies who are weaned early and supplemented early do not have working mothers. It thus seemed important to differentiate the set of factors which influence the feeding choices of mothers who do not work from the influences on those who do.

When the sample is divided and logistic regression performed with each group of mothers separately, it is clear that women who do not work outside the home respond to influences which do not affect women who work out. The strongest, most consistent relationships are with Bangkok birth of the mother and higher income, both of which depress the duration of breastfeeding.

Higher parity is associated with breastfeeding for at least six months (but not 3 months).

For working women, virtually none of the standard set of factors explain differentials in duration of breastfeeding. Urban birth and income as well as education are not related to duration. This is, perhaps, a further demonstration of the extent to which working outside the home is a determinant of feeding patterns: if a woman works outside the home, her feeding patterns are so influenced by that fact that virtually nothing else matters.

Health Services

With almost all births occurring in hospitals, these institutions and their associated health care practices become an important focus of this study. The hospitals in Bangkok tend to have very different patient profiles and mix of practices. In almost all cases, mothers received prenatal care. They received little information on breastfeeding, however, either during the prenatal care itself or in the immediate postpartum period. Hospital practices regarding prelacteal feeds, encouragement of breastfeeding, early contact of mother and child, and rooming-in appeared to vary enormously and inconsistently, even within the same institution. As a result, a tremendous mix of experiences was reported by the sample mothers.

A number of health care practices were found to be associated with infant feeding behavior in Bangkok. Contact between mother and infant during the hospital stay appears to have a positive effect on breastfeeding initiation and a negative effect on the probability of early supplementation. Another hospital practice of potential importance is the distribution of free samples of infant formula to mothers during their stay in the hospital. Although the number of women reporting this practice is not large (12% of the sample), it can have a potentially negative effect on breastfeeding initiation and duration, and is therefore a matter of concern. The effects appear to vary in different groups of women.

Since women not working outside the home appear to be influenced by factors which do not affect women who work out, the health service variables were examined for effects on these two groups separately (Tables 10-2 and 10-3.) Contact between mother and baby appears to affect both groups the same way (increasing probability of breastfeeding initiation and decreasing probability of early supplementation), but the association is stronger for women who do not work away from home. For neither group does contact appear to affect breastfeeding duration.

For women who are at home, however, receipt of a formula sample in the hospital is significantly related to shorter breastfeeding duration, decreasing the odds of breastfeeding for three months. Thus, these women, the majority of Bangkok mothers, are more susceptible to the effects of health care practices and presumably could be influenced to adopt more appropriate feeding patterns if health care practices were to change.

When early bottlefeeding is added to the regressions as an independent variable, the independent effects of income, Bangkok birth, and receipt of formula samples in the hospital all disappear. This suggests that these factors may operate on breastfeeding duration largely through their tendency to increase early bottlefeeding. On the other hand, for women who do work out, addition of early bottlefeeding to the model allows a significant independent effect of Bangkok birth to reappear. Apparently, working women are all so predisposed to introduce early bottles that the propensity of women born outside Bangkok not to do so is overridden. When the early supplementation behavior is controlled in the model, the underlying tendency for women born outside Bangkok to breastfeed longer reappears.

Recommendations

The key feeding problems uncovered by this study are early supplementation and shortened breastfeeding. Many of the factors associated with these practices appear to be immutable--or at least difficult to modify by nutrition or health policy. Urban birth, family income, and whether mothers work for income are unlikely to be changed by those interested in improving early infant nutrition.

On the other hand, a sensitive and much more easily accessible avenue for influence may be available in Bangkok: the health care system itself. Health care practices surrounding birth do appear to affect feeding practices among Bangkok mothers, particularly those who do not work--i.e., the majority.

In addition, the current practices in health care institutions seem inconsistent and ready for thoughtful reexamination. Certainly, the promotion of early contact, early exclusive breastfeeding, rooming-in and discontinuation of formula samples on discharge are neither radical nor difficult recommendations. Fortunately, the very professionals who are most concerned about maternal and child health do have some ability to influence hospital and health care service policy.

The information gathered by this study suggests that, of all interventions, those which change hospital practices may also have the greatest potential for affecting the practices of women

who do work outside the home. While almost no factors can be identified which affect the feeding practices of these women, certain hospital policies which promote early contact appear to have some effect.

Women who do work away from home appear to come from two distinct socioeconomic strata. Some women have few labor benefits or protections (e.g. maternity leave), work in more menial occupations and come from more impoverished backgrounds. Other women who work away from home receive maternity benefits, have higher status occupations and tend to have both higher educational attainment and family income. Because the women who receive maternity leave are also women with the background characteristics associated with earlier supplementation and shorter duration of breastfeeding, the effect of leave policy in promoting breastfeeding cannot be assessed in this sample.

Nonetheless, it is clear that maternity leave as used by Bangkok mothers, will not be sufficient to ensure better feeding patterns. Bangkok mothers begin supplementation before the end of maternity leave and some mothers who do receive maternity leave never breastfeed at all. In fact, it appears that the benefits and the possibility of exclusive breastfeeding during maternity leave are not clear enough to this population. As in many other places, mothers and their medical advisers seem to discount the importance of, for example, one month of exclusive breastfeeding if supplements will need to be given in the second month. Similarly, the idea and techniques of maintenance of mixed feeding (breast and bottlemilks) for mothers who must be away from home, do not appear to be part of the common wisdom available to mothers or medical professionals.

These findings suggest several possible areas of intervention to improve current infant feeding patterns in Bangkok. The hospitals in Bangkok could make a more concerted effort to provide an atmosphere conducive to breastfeeding initiation and continuation and diminish the incentives for early supplementation. Policies that would promote these ends include:

1. rooming-in for all mothers when not medically contraindicated.
2. early contact between mother and baby after birth.
3. improved education of health professionals in regard to breastfeeding so they can better transmit information and support to mothers.
4. improved information on early infant care to mothers.
5. discontinuation of free formula samples in maternity hospitals
6. discontinuation of low-price formula outlets in hospitals.

7. development of specific instructional materials on how to manage breastfeeding for working women. In addition, policies specific to the needs of working women need to be studied.

Some assessment is needed of which policies would be most likely to facilitate improved infant feeding practices among Bangkok mothers who work. Certain policies might be more appropriate and effective for some groups of working mothers than for others. Options which need exploration for their potential feasibility and impact include:

1) more flexible leave policies, including the possibility of part-time work
2) leave policy for classes of workers not covered
3) nursing breaks during the day
4) day care near worksites
5) child care information through the workplace

Any organizations--public or private--which provide information and help to breastfeeding women should receive official support and, if possible, financial assistance. Such organizations could include women's clubs, breastfeeding mothers' groups, or private women's health organizations. Opportunities to educate or re-educate health care workers at all levels, including pharmacists, midwives, nurses, and physicians, should be sought actively. The positive aspects of Bangkok mothers' attitudes towards breastfeeding should be cultivated. These attitudes, along with the clear independent spirit of Bangkok women, suggests that, when given appropriate information and the opportunity to act upon it, they will be able to choose the most reasonable pattern of infant feeding, with longer durations of breastfeeding and less discretionary use of early supplementation.

Table 10-1 Factors Associated with Infant Feeding Outcomes: Women Who Work Out

	Ever Breastfed	Breastfed 3 months	Breastfed 6 months	Bottle By 2 months
PARITY	0	+	0	0
AGE	0	0	0	0
INCOME	0	0	0	0
EDUCATION	0	0	0	+
URBAN	-	0	0	0
CONTACT	+	0	0	-
SAMPLE	0	0	0	0
[EARLY BOTTLE		-	-	]

Table 10-2 Factors Associated with Infant Feeding Outcomes: Women Who Do Not Work Out

	Ever Breastfed	Breastfed 3 months	Breastfed 6 months	Bottle By 2 months
PARITY	0	0	+	0
AGE	0	0	0	+
INCOME	0	-	-	+
EDUCATION	0	0	0	0
URBAN	-	-	-	+
CONTACT	+	0	0	-
SAMPLE	0	-	0	0
[EARLY BOTTLE		-	-	]

Table 10-3 Factors Associated with Infant Feeding Outcomes: All Women

	Ever Breastfed	Breastfed 3 months	Breastfed 6 months	Bottle By 2 months
PARITY	0	+	+	-
AGE	-	0	0	+
INCOME	0	-	-	-
EDUCATION	0	0	0	0
URBAN	-	-	-	0
CONTACT	+	0	0	-
SAMPLE	0	0	0	0
WORK OUT	0	-	-	+
EARLY BOTTLE	[	-	-	]