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DANFA COMPREHENSIVE RURAL HEALTH & FAMILY PLANNING PROJECT: GHANA

UCLA  
ANNUAL PROGRESS REPORT  
January-December 1974

Alfred K. Neumann, M.D., M.P.H.  
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School of Public Health  
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Los Angeles, California 90024

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INTRODUCTION

With the Project now at the midpoint in its activities, it seems appropriate to briefly review its overall purpose, achievements to date, and plans for the future. Details will be found in the sections following this introduction.

Purpose

The purpose of the Danfa Project, as stated in the original proposal, is:

"...to assist Ghana in initiating a demonstration comprehensive rural family care program which will help improve the health and welfare of the people. It will emphasize maternal and child health, nutrition, health education, and family planning....The Project will test and demonstrate methods and techniques for providing a comprehensive family health program, including family planning services, to the rural population...."

Improved health and welfare for Ghanaians rests largely upon achieving population policy goals, which in turn require successful delivery of family planning services. Project staff and their co-workers recognize that there are no simple answers to the question of how family planning services should be delivered in rural West Africa, and are examining a spectrum of approaches in order to understand which factors serve to optimize delivery of such services in a variety of circumstances. With this type of basic understanding, agencies responsible for provision of family planning services can choose the type of delivery model which is most appropriate to local circumstances, priorities, available manpower, and budgets. The dynamic relationship between level of acceptance and method of service delivery is being investigated by providing family planning services in three different modes as outlined in the research design--family planning alone, with health education, and as part of comprehensive family health services--and analyzing data collected on a cohort of approximately 50,000 people over a five-year period.

Achievements

Significant achievements to date have occurred in terms of both carrying out the research as designed and having an immediate impact on Ghanaian health-related institutions.

It has been possible to adhere to the research design because of its realistic approach and flexibility, and because of the diligence of the

Project staff. The Project has been operationalized on schedule--service, delivery, field studies, and training of indigenous personnel are all proceeding according to the original time tables.

Elements tentatively considered vital to success of family planning programs are being focused upon. Four of these, forming a simple A B C D (Accessibility, Believability through health education, Comprehensiveness, and Dependability), are beginning to emerge as key elements of a successful family planning program. They may be applicable in whole or in part to many rural West African settings and perhaps other settings as well.

Research to date suggests the importance of each of these elements, but further studies are necessary to verify early impressions that these are indeed the most vital factors, to understand how each acts, and to determine how they interact with each other. For example, although accessibility is recognized as an important factor, to what extent does proximity of residents to the delivery station, availability of transportation and communication routes, family and village relationships, and geography enhance or decrease accessibility? Belief in family planning can be fostered in a number of ways (e.g., training of indigenous traditional birth attendants, use of middle-school youth as health educators, use of travelling teams of professional health educators), and it is important to determine the relative value of each approach in a particular rural West African situation. If providing family planning as part of comprehensive health services is particularly effective, it will be important to know how family planning acceptance is affected by location method, and personnel involved. Dependability itself should be analyzed to determine the qualities of service delivery which are deemed dependable by recipient populations.

The Project has already been of benefit in strengthening Ghanaian family planning and related institutional infrastructures. With the Project's emphasis on replicability, for example, traditional birth attendants are being trained in family planning and improved maternity service techniques. The cooperative style of the Project, which places great stress on information exchange, is making it possible for many Ghanaian institutions--such as the Ghana Medical School and the University of Ghana, the Ghana National Family Planning Project, the Institute for Statistical, Social and Economic Research (ISSER) of the University of Ghana, and the Ministry of Health--to profit by what is being learned in the Project through the development of prototypical training programs, new data handling methods, and new field procedures.

### The Future

Steps currently underway will promote achievement of the Project's goals. The most important of these activities are delivery of services as planned, information exchange, and strengthening of Ghanaian institutional infrastructures by training efforts and by increasing transformation of raw data into forms that can be utilized by Project staff, by the funding

agencies, by the Government of Ghana, and by other health workers in Africa and elsewhere. Through analysis of followup surveys scheduled to begin in 1975, the Project will begin to determine the differential results of the three basic family planning service delivery approaches under study in comparison with one another and with the control area, and to delineate the dynamic relationships between the components fundamental to optimal operation of each method of delivery.

## I. SUMMARY OF ACHIEVEMENTS AND PRESENT STATUS

### A. Activities in Ghana

#### 1. Family Health Services

The most important activities carried out by the family health group in 1974 were service delivery, program planning and review of evaluation methods in the areas of family planning, maternal health and child health services.

##### a. Family Planning Program

Service Delivery: All the family planning services in the three Project areas were delivered by one Family Planning team of three persons, with the exception of the limited pretest trial use of traditional birth attendants (see below), volunteers and health post nurses in motivating women and distributing and refilling devices. This team covered an area of 150 square miles serving a population of 46,000 persons, holding nine fortnightly clinics in static locations while at the same time visiting 52 other villages on a four monthly return visit schedule. During the first 11 months of 1974 they had provided 1935 family planning visits and registered 721 new acceptors, of whom 57% were males. Of the 312 female acceptors, 124 were from Area I, 60 from Area II and 42 from Area III.

Evaluation: Long and detailed preparations were made for the first F.P. follow-up (acceptors) questionnaire survey which was pre-tested for final implementation in January 1975. This is one of the most important surveys to be performed by the Project, as it will provide one of the first detailed studies of the practice of family planning in rural Africa. Included in the survey will be:

- the socio-economic characteristics of female acceptors and their spouses
- the reasons for acceptance
- continuation rates by method
- use-effectiveness of various methods
- complications and side effects of the methods
- reasons for discontinuation.

In addition, since half the acceptors are male, the questionnaire will be administered to a sample of male acceptors. Information will be obtained regarding with whom the men use these contraceptives.

By the end of the second year of the family planning program it was decided that the electronic processing of family planning data should be carried out in Ghana. Early in 1974 the UCLA F.P. advisor finished an extensive review of the literature on the latest methodologies for evaluating F.P. programs and prepared a report on strategies for evaluating the Danfa program. During 1974 the EDP capability at Legon, especially in the programming area, improved to the extent that by year's end all the required tables were being produced locally.

The Question of Accessibility: It is estimated that by January 1, 1975 at least 15% of the women and 22% of the couples in Area I will have accepted family planning. It is our feeling that over the past two and a half years there has been a significant change in the attitude of the people in the Project area towards family planning. More and more, family planning appears to be accepted as a good way to live. It is possible that by the Project's end, two and a half years from now, 50% of the women will have accepted family planning, with a prevalence of 25% of women actually practicing contraception in June 1977.

To achieve this goal, the question of accessibility must be addressed. The Danfa experience thus far has been that accessibility of services and education of the men and women are the two biggest factors in determining acceptance of family planning. In West Africa, with remote villages, poor roads and few health workers, accessibility looms as perhaps the number one problem.

A good deal of review, discussion and planning among Danfa senior staff has taken place over the last nine months to develop initiatives to overcome the accessibility problem using replicable and simple approaches. In October, a report was prepared outlining these new initiatives. Important among them are the following:

- (1) The use of volunteers in each village to motivate other women and to distribute pills, foam and condoms to those interested. The use of volunteers in various health programs, or "volunteerism" within the Danfa Project area, is now under review with the idea of presenting a coordinated plan for the use and supervision of volunteers. This aspect of the program may have great potential for the expansion of health and family planning services in Africa.
- (2) The use of health post nurses and midwives at Obom, Amasaman and Danfa to distribute and resupply family planning devices. Surprisingly, this is a new departure for Ghana since, up until now, only nurses who had undergone an intensive 8-to-12 week training program in family planning distributed family

planning devices. This approach should be readily applicable to Ministry of Health facilities elsewhere in the country. Two of the Ghanaian Project senior staff have already communicated this proposal to the NFPP via the Medical Advisory Board. This would greatly expand "overnight" the F.P. services in Ghana and greatly improve accessibility.

(3) The use of the pill in lactating mothers.

After much debate, the Project elected to allow women breast-feeding children over three months of age to take oral contraceptives. However, weights of these children will be monitored and compared with the weights of children of mothers using other methods.

The three new initiatives enumerated above will start in January 1975. Thus there will be two and a half years with and two and a half years without this volunteer effort for comparison. These new initiatives will require some further supervisory and evaluative work in 1975, but it should not be excessive. When these new initiatives are fully implemented the family planning program should be a comprehensive and solid one with many important implications for family planning in Africa.

Other Activities: The following were other 1974 developments in the family planning component:

- a one-week visit to NFPP and PPAG clinics in the Ashanti, Northern and Upper Regions by Mrs. Botchway, the Project's nurse-midwife. In return, an NFPP nurse filled in at Danfa during Mrs. Botchway's six-week leave of absence. It is hoped that the experience gained from such cooperative exchanges can be used in national training or supervisory programs.

- lectures on family planning given to medical students by the UCLA F.P. advisor.

- implementation of the I.U.D. follow-up program.

- observation of significant change in attitudes of villagers towards F.P. as a result of health education and the establishment of good rapport. This suggests that F.P. may be accepted by more and more villagers as a "good way of life."

b. Maternal Health Program

Training was begun for the last three (of four) clusters of T.B.A.'s, and post-training evaluation was intensified. Special birth questionnaires are being filled out by vital registration assistants eliciting information about the delivery, who performed it, and the outcome. In addition, the T.B.A. program supervisor received a regular monthly return form for each T.B.A. and submits a monthly report to the Project as well.

c. Child Health Program

Immunization Program: The mass immunization program in Area I has been the most important child health program undertaken this year. With the active cooperation of the epidemiology unit of the Ministry of Health a mass program was carried out in Area I during the month of October. In three and a half days, 10,000 persons were vaccinated with the use of Ped-o-Jet guns. Ten vaccines protecting against nine different diseases were used.

Early in the year the UCLA MCH-FP advisor prepared a discussion paper, program plan and a draft of a budget for a national mass immunization program. This program has already had an impact on national and international planning for immunization programs. There was an international seminar in Kumasi for English-speaking Africa sponsored by W.H.P. two weeks after the Area I program was completed, and many of the Danfa strategies and results were discussed at the seminar. Furthermore, W.H.O. and the M.O.H. are planning a pilot mass immunization to be carried out in Ghana starting in April 1975.

Malaria Program: A second major child health program expected to have a significant impact on preschool mortality, the malaria chemoprophylaxis program, was carried into its second year. This program employs village volunteers to distribute malaria tablets once a month to children under ten years of age. Periodic malaria surveys continued during 1974 to monitor the program's impact. Results of these surveys are now under analysis.

Polio Study: One of the most significant studies carried out in the area of child health by the Project thus far has been a study of lameness due to poliomyelitis. A good deal of the field work in this study was carried out by a University of California/San Diego medical student under the supervision of Drs. Nicholas and Ofosu-Amaah.

This is the first study to really determine the extent of endemic paralytic poliomyelitis which, up until this time, has been thought not to be a significant problem in tropical developing countries. Preliminary analysis of the data indicates that the incidence rates of paralytic polio are very high, even higher than the worst polio epidemic years in the U.S.A. in the late 40's and early 50's. W.H.O. was extremely interested in this study's findings and will probably encourage its repetition in other countries. Presentation of these findings was important in asserting a high priority for polio immunization at the Kumasi seminar, and they should occasion a serious reconsideration of the importance of paralytic polio in developing countries.

Young Child Clinics: The Project simplified child health records by instituting the Morley "Road to Health" Chart and training the health center staff in its use. The MCH teams are now better coordinated, resulting in improved health care and staff morale. There are plans to train a pediatric nurse practitioner to staff the young child clinics.

d. Family Health Program Plans for 1975

A major program emphasis will be in the full implementation of the new F.P. initiatives described above. The coordination of volunteer activities will be important in this regard. In the MCH area the emphasis will be on institutionalizing certain high impact programs such as malaria prophylaxis and mass immunization by having them more directly supervised or coordinated by health center staff. Special attention will be devoted this year to restructuring MCH team roles, retraining team members, and developing a model MCH service program emanating from the Health Center. Finally, there will be more intensive evaluation of the work of the trained T.B.A.'s with program modifications made accordingly.

A priority activity for 1975 will be the analysis and publication of results of the first two and a half years of MCH-FP program activities. Examples of these activities are:

- a description of the family planning program and major results of the first two years;
- a discussion of experience with the I.U.D. and the pill: side effects, continuation rates, use effectiveness rates and reasons for discontinuation;
- an analysis of KAP results, program description, acceptor rates, continuation rates, use-effectiveness rates, reasons for acceptance, complications, side-effects, impact of male contraception, impact on fertility, socio-economic characteristics of acceptors, and reasons for discontinuation for the entire Project area to date.

2. Health Education Program

a. Administration and Planning

The health education field program is now two and a half years old. The first year focused on the possibilities of basing health workers in rural communities, the second year upon revising the research framework and developing it in more detail as well as firming up administrative procedures and improving the model for supervision. The third year (1974) was concerned with improving the level of field activities of the health education assistants as well as providing them with support through clinic and school health education.

A standard format for the monthly health education report was developed which described staff information and progress made in the various educational areas--family planning, nutrition, maternal and child health, school health, and clinic education. Through the Research Component at Legon,

analysis of time spent by health education assistants on various health education subjects is being carried out by location of health education activity, by target group, and by village. Summaries are also provided for workers in each of Areas I and II. Comparisons will be made between these data and the type and number of health education activities completed.

It has been noticed that when new health education programmes are introduced into the communities, there is a tendency on the part of the health education assistants to neglect those programs which they had been focusing on previously. Two steps will be taken to circumvent this in the future. First, the HEA's will begin planning activities on a monthly basis. Second, the Health Education group in cooperation with the Maternal and Child Health and Family Planning groups have developed an annual month-by-month schedule for major health education activities.

As the number of health education team meetings in one month has been reduced from five to three to two, more time is spent in the field, thus reducing the cost of transporting the team back and forth from the field to Accra. Administrative reports will be studied to see if this is reflected in an increase in time spent in actual health education activities.

Corresponding to the reduced number and increased organization of health education meetings has been a reduction in the days required for in-field supervision. At the beginning of the year, two health education supervisors were involved full time in the program. For the last two-thirds of the year, one supervisor alone has been assigned both to the two field teams and to developmental aspects of the health education program. A decision has been made to have a Public Health Nurse assume the position of supervisor beginning in January 1975 since she has been trained for just such a role.

The use of the vehicle for health education has been limited to three days per week--two days for supervision and one day for use in transporting HEA's to distant communities. This has been possible because health education meetings are held following HEA weekends off, thereby eliminating the need to pick them up from the field. Health education expenditures per capita have now decreased to 70-75% of what they had been previously. Further ways of reducing program costs are now being studied.

Job descriptions have now been completed for four program positions--Health Education Supervisor (revised), Health Education Assistant, Principal Health Education Research Analyst, and Health Education Research Assistant, Grade Two. Recruitment for these positions and orientation of successful candidates was a major activity in 1974. Positions filled were:

(1) Health Education Supervisor (revised) - Mrs. E. Gyebi-Oforu, Health Educator for the Health Education Division, Ministry of Health, has specialized in school health education. She will serve as coordinator of the Danfa Project School Health Education program and is also developing a training program for multipurpose health education workers much like the one for health education assistants.

(2) Principal Health Education Research Analyst - Miss Edith Fordjor is a recent graduate of the University of Ghana in sociology. She is a National Service Student this year, joining us in November after having been assigned to another agency by mistake. Miss Fordjor will be responsible for carrying out all data analysis and supervision of research efforts in addition to other non-research tasks.

An office has been secured at the Administration Block and has been equipped for use by the UCLA team. Miss Fordjor is located in this office. Another part of the space will be used in developing a health education library of books and audio visual materials to be utilized in program planning and development.

#### b. Evaluation

The second round of the Health Practices Survey (formerly Household Health-Related Behaviour Survey) was completed in August and early September of 1974, and keypunching of data was completed during September. Additions to the data collected were percentage of under-fives with Morlow cards, percentage of two-to-fives having inoculations recorded on a card, average number of infant and prenatal visits to a health center or other health facility, percentage having access to private latrines. KAP data requested from UCLA were received and a sociology M.A. candidate was hired on a temporary basis to develop graphs depicting patterns of response by health education sub-area. Analysis and interpretation of the data was completed by the end of the Christmas break so that the HEA's could utilize the data results in planning their programs.

Discussions are now underway regarding the possibility of training middle school students in the Project area, under the supervision of their teachers, to carry out the survey in 1975. While it has been demonstrated that middle level health workers can carry out such a survey, the use of students would greatly expand the possibilities of regularizing the carrying out of surveys of this nature.

Work has begun on a comparison of health behavior change taking place between the 1973 and 1974 Health Practices Surveys with Health Education Assistant effort as summarized by the administrative and village activity report forms. This will provide us with some idea of the relationship between program inputs and outcomes and will be, in effect, a dry-run of later evaluation efforts to see if the system is working. It is not anticipated that major changes in reported behavior will have occurred in the period of one short year. The relationship between referrals, followups, and HEA effort will also be examined.

#### c. Program Development and Implementation

School Health Education: After meetings with headmasters of schools in Area I with the cooperation of the District Education Office,

teachers provided written responses to the question of which health education topic areas should be given priority in the development of a school health education program. A meeting was held in Area I of those teachers who had volunteered to serve as members of a District School Health Education Planning Committee. Sub-committees with chairmen were formed with each sub-committee located in a single geographical area. The sub-committees formed were:

- health of the teacher
- ~~health status~~ of the student
- ~~school~~, community, and home relations
- nutrition education
- healthful school living
- school health services

A round of sub-committee meetings was held and problem areas defined. Several sub-committees submitted reports before activity was suspended temporarily. Mrs. Gyebi-Ofosu agreed to act as a resource person for this project. Current plans include reinforcing each sub-committee with an experienced advisor and having each sub-committee work toward the implementation of a single new approach to school health and health education. Teachers at each school will be trained and a brief syllabus will be developed as a result of this training. Suggested projects at the moment include training teachers to carry out simple vision, hearing, height, weight, and arm circumference testing on a regular basis.

Although not yet operational, discussions have been held on rotating health education materials through the schools by means of the HEA's. The Project is now in possession of an excellent filmstrip on Food for School.

Nutrition Education: During the last quarter of 1974 three Health Education Assistants held weighing sessions for under-fives. They notified village leaders, held group meetings, and carried out home visits to motivate mothers to attend with their children. Village-based weighing was instituted because few under-fives in Project Area I are regularly weighed. Between 30 and 50 under-fives were weighed at each session. Salter scales of spring balance construction were used; they are included in a carry bag with an 18-foot chain and shackle so that the scale can be hung from a roof beam or a tree limb. Once additional scales arrive, the HEA's will establish a regular schedule of visiting villages in their sub-areas on a monthly basis. This should increase the coverage HEA's make of their sub-areas. HEA's are provided with Morley cards and are instructed to complete them for any under-fives in the households without them. From results of participation of mothers during the trial period, it is evident that the sessions have tremendous education potential, as the relatively quiet healthy children permit mothers to participate in the health education discussions.

In coordination with agricultural extension, backyard garden efforts were begun in Dome village and in a short while about 20 such fenced

gardens were completed. The emphasis was on the growing of low cost, high protein foods such as beans and ground nuts.

A referral link has been developed with the child welfare center at the Amasaman Health Post. Malnourished children are referred and receive food supplements. Mothers are involved in an educational presentation by one of the HEA's at the Health Post. The HEA's follow up the progress of their referred patients in the field and explain to families how to prepare the supplementary foodstuffs.

Family Planning Education: Meetings held between the family planning and health education teams resulted in the designation of June 1975 as Family Planning Month in the Project. Intensive efforts were made to lay a foundation for the success of this effort. These included planning for recruitment of village level family planning volunteers (cf. family planning section of this report), taped interviews with those acceptors willing to share their experiences in this way, and family planning rallies in villages with low acceptance rates.

In September, October, and November Mrs. Botchway issued a memo summarizing whether or not the HEA notified the chief of the village before an extended visit and whether the HEA attended the clinic him/herself. Starting in January the total number of referrals received at each clinic will be added to the memo.

Plans have been made for the development of a family planning audio-visual series aimed at men since results of the family planning KAP surveys have shown a wide disparity between attitudes of men and women toward limiting family size. Further, analysis of administrative report forms has shown that HEA's are in large part failing to reach adult males at all

Environmental Sanitation Education: Environmental sanitation education was firmly founded in Ghana prior to the beginnings of the Danfa Project due to the existence of the strongly motivated School of Hygiene and to the precedence for rural sanitation programs. As a result, this aspect of the Project's health education program has required no major efforts until recently. It has become apparent, however, that there is a need for increased effort in the prevention of communicable diseases. The village health survey demonstrated high levels of hookworm and ascaris among the village population, primarily among men involved in farming. Three excellent audio-visual series have been obtained dealing with hookworm prevention, ascaris prevention, and how to construct a pit latrine (for a private house). While emphasis in the past has focused primarily on communal labor projects to improve village hygiene including the construction of public pit latrines, improving of village water sources, and clearing of the village proper and the disposal of refuse, in the future sanitation education will be directed more at the individual household. Improvement of drinking water will be a major concern.

In cooperation with the Social Advance Institute, the UCLA health education advisor completed a flip chart and discussion series on guinea worm prevention and treatment. It is now ready for pretesting in the villages. Each HEA prepared a set of flannelgraph cutouts on guinea worm and on schistosomiasis. After inservice training on how to use them, these were incorporated into their education programs. Two education series were obtained on malaria prevention and the staff was trained to use them also.

Maternal and Child Health Education: The first annual Danfa Project immunization campaign was preceded by health education efforts, which included contacting village leaders, finding volunteers to canvas villages and assist on immunization day, and encouraging householders to attend at inoculation time. Efforts to reach the prime high-risk group, those under one year of age, were disappointing, primarily because the time between the decision to hold such a campaign and the campaign itself was so short--less than one month. The health education assistants also distributed immunization cards to teachers so that they could complete them before the date of the immunizations, permitting a faster flow of students during the inoculations.

As a result of the low participation by under-ones, effort will begin now to plan for the health education input in next year's campaign. Miss Martha Nkansah of the Health Education Division, Ministry of Health, will spend the next several months in assisting to analyze data from the post-campaign survey, carrying out in-depth interviews with participants and non-participants as well as volunteers, developing and testing audio-visual materials related to communicable disease control, and planning strategies for the 1975 campaign. The health education assistants will begin educational efforts several months prior to the campaign in 1975.

Discussions in 1974 continued on ways to strengthen the weakest of the health education subject areas--maternal health. Visits to the households of pregnant women continued with dubious effect. One suggestion under consideration is the development of a prenatal card or mother's card which can be kept in the home. The existence of such a card would help to point to problems for HEA's to focus on in their home visits. It would also provide an effective vehicle in establishing criteria for referrals and followup visit requests.

The training of villagers to practice simple first aid procedures is also being discussed. Certain individuals could be approved by the community and after training could be supplied with simple first aid equipment so that they might render assistance to those with simple trauma, reducing the number of cases which would eventually wind up in hospital

Clinic Education: Audio visual materials in the form of a Honda electric generator, a Kodak Carousel slide projector, and a synchronized

cassette tape recorder were installed at the Danfa Rural Health Centre. They have already been used in a workshop for immunization campaign volunteers, for inservice training of Health Centre Staff, and during a program for the Director General of W.H.O. The Centre was also provided with a wide variety of audio-visual slide sets, a flannelgraph Morley card teaching aid, and other health education materials. The staff was given two sessions of inservice training in the presentation of audio-visual materials, and the Health Inspector and one of the cleaners were taught to operate and maintain the necessary equipment.

A research framework was developed for testing the effectiveness of recorded messages in a clinic session and will be integrated into the normal educational schedule.

### 3. Data Processing, Field Operations, Cost & Systems Analysis

#### a. Longitudinal Survey

Preparations for the second (middle) element of the longitudinal survey began early in the year with a series of meetings to review and revise the instruments employed in the first (1972) survey. Extensive changes were made as a result of these discussions, the major ones being the dropping of large sections of questions on food fads and aversions in the care of sick children and the addition of more probing questions in the family planning area. In reviewing the results of the first survey, it was felt that the former were inconclusive and nonproductive, and that the latter could provide more illumination concerning the family planning decision. In addition, a whole new area of study was opened up: the role of socioeconomic factors in health and family planning activities in the study population; this will be reported in a separate section.

Following two weeks of training of interviewers, the longitudinal survey was taken into the field in mid-October. The exercise started with 16 interviewers, two field supervisors, and four editor/coders. Due to the press of overlapping field activities, after six weeks of operation the participating staff was cut down to twelve interviewers, two supervisors, and three editor/coders. It is now expected that the field work will be completed in March 1975.

One of the major questions concerning the longitudinal survey is the attrition rate over the five-year period. The survey began in 1972 with 500 households in each area with the expectation, based on some early re-censusing, that perhaps 60-70% would be lost to the survey by 1977. Preliminary indications are that the attrition rate may prove less drastic than that; the rate in Area I so far is about 20%. Processing and analyzing the data will occupy all of 1975 and part of 1976. In contrast to the first element of the survey which was edited, coded, and processed exclusively at UCLA, this work will be handled totally in Ghana.

b. Census

The results of the 1973 census became available this year. The Project area population late in 1973 stood at 59,258 (comprehensive method), up 18.2% from the 1971 baseline. The rates of growth of the four areas are markedly different: 32.8%, 8.8%, 23.1%, and 7.9% respectively. A study is underway to investigate the age, sex, geographic, and natural increase/migration components of these factors.

The field phase of the 1974 recensus covered the period March to August, requiring approximately (as last year) 120 man-months. A 10% sample re-check revealed a tendency toward underenumeration of approximately 1%. This result is very similar to that of previous years and is considered satisfactory. As usual, there arose the problem of assignment of more than one identification number to newcomers to the Project area who were registered almost simultaneously by both the census team and the Danfa Rural Health Centre or the family planning team or, in the case of newborns, by the vital events registration assistants. This year, however, the problem was held in a more manageable range and it was not necessary to temporarily shut down number assignment as was the case last year. Field checking of a number of these double assignment cases was cleared up by the end of December, at which time the 1974 population data became available for analysis.

c. Vital Events Registration

Analysis of the first 24 months of the vital events registration system, which used village volunteers as reporters, had previously shown that the ongoing registration scheme consistently lagged behind the census/survey method in capturing vital events. Therefore, a meeting of Danfa Project staff, Ghanaian demographers with experience in vital events collection, and officials of the Central Bureau of Statistics Registry Office was convened to review the situation. A long list was drawn of factors which were suspected of contributing to the lackluster results displayed by the registration assistants. The major ones seemed to be high turnover among the "volunteer" registration assistants (who were actually paid a £5 monthly honorarium), a lack of seriousness on the part of the registration assistants, lack of authoritative leverage on the registration assistants by the field supervisors, and minimal incentive for the target population to participate. Ultimately, a scheme was devised which replaced the 57 volunteers with 18 full-time registration assistants, each of whom was assigned a cluster of villages to cover. It was felt that the full-time employment of these people would address most of the problems raised. (Replicability was not a factor, as the system is considered part of the research aspect of the Project rather than service.) In addition, supervision of the registration assistant system was tightened. The new scheme went into effect in Area I in June and in the other areas in July. The first evaluation of this new approach will be made at the close of the present vital events survey, expected to be in March 1975.

One noticeable improvement in vital events registration has already been shown, the timeliness of collecting events. In the first six months of 1974, 74% of births and 87% of deaths were reported to the Legon vital events unit within four weeks of their occurrence. In the next four months, these figures moved up to 87% and 94% respectively. Moreover, the absolute number of events recorded for the first ten months of 1974, when extrapolated to twelve months, will exceed the number for 1973 by more than 50% in the case of births and 38% in the case of deaths. Thus, even allowing for an expected year-to-year variation in these data, there are indications that the new registration system is an improvement over the old. The best test, of course, will be the matching made against the survey data.

d. Cost Analysis

The 1974 cost analysis is as yet incomplete, as one major item, drug and supply utilization rates at the Health Centre, plus the costs of these items (provided by the Ministry of Health), is not yet available. 1974 operating costs, however, are certain to be appreciably higher than in 1973, since increased costs are already known in all major cost components. Significant pay increases (averaging 15-20%) have already been granted to government employees and another increase, retroactive to July, is in the offing. Given the world-wide rise in costs of materials, it is expected that prices paid by the Ministry of Health for various commodities in 1974 will be considerably higher than those of 1973.

One cost which will be lower in 1974 is that for repair of vehicles. To date, local repair costs are running about half of what they did in 1973 (£6,000 vs. £12,000); this is attributable to the greater use of the Project's own mechanic for minor maintenance and repair. On the other hand, expenditure for petrol is up approximately 82%. Most of this is accounted for by a 71% increase in the pump price of petrol early in the year. The balance is due to greater use of vehicles, and part of this is due to a greater availability of vehicles following from reduced vehicle down-time because Project vehicles are being serviced and repaired more by our own mechanic and less by commercial repair shops.

Final operational cost figures for each program component will be presented at the annual review meeting in March. However, given the known increases in staff salaries and petrol costs plus the yet-unknown but assumed increases in Ministry of Health commodity costs, rises of between 15% and 30%, depending upon the mix of these items in each component, are expected. This would send the operational costs for comprehensive health care in Area I up from just under £3.00 per capita last year to the neighborhood of £3.75 per capita this year. At the review meeting, the actual operating cost figure obtained will be related to the 1974/75 Ministry of Health budget which provides about £6.75 per capita for operating costs, though this includes all administrative costs and does not take into account traditional rural/urban disparities, as well.

e. Socioeconomic Studies

In 1974, plans crystallized for the addition of studies to ascertain the impact of socioeconomic factors on attitudes, acceptance, and use of family planning and general health services. In conjunction with staff from the Institute for Statistical, Social, and Economic Research (ISSER) of the University of Ghana, a completely new component was added to the Longitudinal Survey to obtain data on these factors. An instrument was designed, pre-tested, and evaluated which will provide basic socioeconomic data for a number of Project studies. In addition, the family planning followup and Village Health Surveys will have special socioeconomic components added to them.

f. Data Processing

1974 marked a definite transition point in data processing in that no data was sent from Ghana to UCLA for processing (although material which had been sent earlier continued to be processed in California). This was made possible in large measure by the strengthening of the Project's programmer staff from one full-time programmer to two full-time plus one part-time programmer. Early in the year, arrangements were made with the United States Peace Corps to provide the Ghana Medical School with a programmer volunteer who would be assigned to the Danfa Project. The volunteer (who was renewing his service after a two-year term in another part of Ghana) joined the Project in August and has spent most of his time working on special projects, particularly the reorganization of the vast and still-growing demographic file (now numbering 130,000 records) and attendant programs for retrieving the wealth of information it contains. He is also working on several packaged programs which will ultimately shorten the reaction time of the data processing unit to user requests for tabulations of various kinds. The Project's other full-time programmer is at present assigned to the Medical School by the National Service Secretariat; his "voluntary" status will end next year, at which time he will become a regular Medical School/Danfa Project employee. Although he came to the Project fresh from a diploma course in computer science and little programming experience, he is blossoming very rapidly into a first-class programmer. He concentrates on the regular requests which come in from senior staff for data and provides the EDP inputs which are required to service such ongoing programs as health center operations, family planning fieldwork, vital events registration, and nearly all survey work. These two full-time people are supplemented by the half-time services of a third programmer who picks up the omnipresent overload on the time of the others.

In discussing personnel, it should be pointed out that the Project's original programmer, an ISSER employee, in April obtained a job with a local commercial organization and left very abruptly for a training course in the U.K., using his accumulated leave time as his period of notice (not an uncommon practice in Ghana). The Project then went through a period of four months in which it had only the services of a part-time programmer, a very

unsatisfactory arrangement which created a great backlog of work. This was finally cleared and the data processing unit is now responding to requests in a time period of days to weeks, rather than weeks to months as had been the case when there was only one local programmer and some of the data was handled at UCLA (in the case of the latter, ordinary problems were exacerbated by a 10-to-14 day lag period in the mails each time requester and programmer had to communicate with one another).

The greatly improved staff picture has caused a shift in the major data processing bottleneck from one of programmer time to one of machine time. In general, the three to five hours daily allotted to the Project on the 1130 at Legon (for jobs which can be run on the 1130) is adequate. Due to the size of the files, however, many jobs must be run from tape and on machines with larger capacity than the 1130. For these the Project uses the two IBM 360/30's owned by State Insurance Corporation and the Central Bureau of Statistics. While time on these used to be readily available and reasonable in cost, both of these organizations now are making more use of their machines and time is available now only on Sundays. Moreover, charges are now £110-£150 per hour, and given that there is no time-sharing, i.e., each job ties up the entire system, the expense attached to using these machines is very high. Certain jobs dealing with the population file, for example, can run £600. By contrast, the Project is not charged at all for the use of the Legon 1130; this is considered part of the University's contribution to the Project.

As a consequence of the above problems, the Project approached USAID for permission to rent or buy a tape drive unit for the 1130. Since the purchase/maintenance-contract cost of the unit could be shown to be only about \$7,000 more than rental in the time-frame of the Project, AID chose to make the unit a gift to the University of Ghana to help strengthen its teaching and research program. The tape drive has been ordered and is expected to arrive in Ghana late in December 1974 and to be on-line in January 1975.

Given the great volume of the Project's data processing demands, it has long been felt that our work could be expedited if we had the advantage of a set of packaged programs for the 1130. During the summer, a UCLA consultant was sent to work on the problem. Before leaving in September she completed the first phase of this work, a usable package incorporating editing, cross-tabulation, and correlation subroutines. This package now has been made available University-wide as part of the service programs of the University Computer Center. Further refinements in the package have been made by our Peace Corps programmer and this work is continuing. The package constitutes a valuable addition not only to Danfa Project resources, but also to the University of Ghana in general.

Summarizing the data processing picture, the Project is now independent of California resources for routine work and with the installation of the

tape unit on the 1130, will be less dependent on off-campus hardware to which access is quite limited. However, for certain jobs which require core-space exceeding the 1130 capacity, the Project will still need to use the 360/30's. Also, as data processing moves into higher level analyses requiring much larger machines, data will be sent back to UCLA to be done at the Center for Health Sciences Computing Facility. This trend will accelerate toward the end of the Project.

#### 4. Epidemiological Studies

Major activities during this year have been analysis and writing up of Project data. An intensive two-month effort was made to prepare reports on the Village Health Survey (V.H.S.), health center operations, and preliminary family planning KAP data for the 1974 annual review meeting in March. Other projects for the year included conducting training programs, setting up the 1975 Village Health Survey, and helping in evaluation of MCH programs.

##### a. Epidemiology

During March and April, a large number of Village Health Survey program requests for cross-tabulations were prepared in these areas: intestinal helminthiases, malaria, hematology, blood pressure, biochemistry, and tuberculin skin reactions. Preliminary anthropometric tables and selected bibliographies were also prepared for several of these topics, and Dr. Wurapa convened work groups to write up reports.

The analysis of data from the baseline Household Survey morbidity questionnaire led to the preparation of two papers (see #4 and #21 in the Publications section below) describing illness rates, disability rates, and the pattern of symptoms. The choice of health services (modern, traditional or drug seller) was related to Project area, individual characteristics, and the disease producing symptoms. A presentation prepared for the African Population Association's inaugural conference (#8 in the Publications list) stressed the need to coordinate census or demographic surveys with morbidity interviews to increase information about unmet health needs and to determine the extent various population subgroups make use of health services.

Research was conducted into survey methodology to ascertain why some villagers do not attend a health clinic even when it is brought to the village (#15). Based on follow-up visits to non-participants in the 1973 Village Health Survey, the study showed that residents in larger towns, particularly middle-aged males with salaried work, were least likely to attend. The survey's procedures for advance information and the clinic services themselves were most successful in attracting women and their children, so that about 99% of this target group was examined.

Another study (#14) was done to learn if information derived from household morbidity interviews agreed reasonably well with clinical findings in the same persons when they were examined within three to four days of the interview. It was concluded that even though the examination costs about eight times as much as the interview, it is far more useful for determining disease prevalence and planning health programs.

A monograph (#20) describes the planning and operations of the V.H.S. and is illustrated with pictures and diagrams to show the clinic set-up and procedures. It should be valuable for training medical students and public health workers in methods of conducting rural health surveys, and could be used to orient district medical officers and perhaps guide returning physicians (trained overseas where survey experience is unavailable) in gathering information.

Revisions of forms for the second cycle of the Village Health Survey (1975) were completed in 1974. It is hoped that at least some of the V.H.S. forms, procedures and planning methods can be adapted and used for small-scale health surveys elsewhere in Ghana in the near future.

An analysis of the Household Survey's Family Planning KAP pointed out the differences between medical and health care systems, and suggested family health programs as a feasible solution to the illness pattern encountered in Africa.

In the baseline Village Health Survey studies were conducted to determine possible relationships between high parity and maternal health. No clear effect of parity on either mean hemoglobin level or blood pressure distribution was found. These results are in agreement with those obtained in a W.H.O.-sponsored study directed by Dr. Abdul Omran, population epidemiologist at the University of North Carolina, which failed to show clear interaction between high parity and hypertension and anemia, possibly because other non-obstetric diseases can cause these problems in less developed countries. Dr. Omran has made suggestions for the analysis of the 1975 Village Health Survey to study relationships between birth order, birth interval and parity and maternal-child health.

In 1973 studies were initiated to learn about the clinical manifestation, epidemiology, and management of guinea worm disease in the Project area (#6, #7). They have unusual potential for involving a wide base of investigators with interests in health education, agricultural economics, and rural development as well as the Accra Regional Medical Officer.

#### b. Health Services Research

These studies are critical for improvement of health services being channelled through the Danfa Health Center in Area I. While previous studies have described the patient and disease characteristics, and the service area covered, relatively little emphasis has been placed on individual patient management. In the past twenty months a tremendous improvement in program activities has been accomplished with the MCH efforts in the malaria prophylaxis and mass immunization activities.

Background studies done at the Health Centre and satellite clinics include:

- job descriptions and task analysis using work sampling methods
- timed patient flow study to obtain patient waiting and service times
- drug dispensing patterns
- health service utilization patterns (age/sex and geographic groups)
- disease patterns.

These studies were the basis for the reorganization of the clinics, the expansion of service roles for the community health nurse and midwife, in-service training content, and the site chosen for the weekly satellite clinics.

A subcommittee prepared a session on the current Danfa Health Centre operations (Wurapa, Belcher, Blumenfeld, Asante) for the 1974 annual review meeting, showing that distance was clearly related to access and use of clinical services and that the introduction of three satellite weekly clinics increased "easy access" (roughly defined as residence located within four miles of a clinic) almost threefold over pre-satellite services. The patient population and disease patterns were similar to the 1972 study, with the increasing volume (12,000 to about 30,000) of patients lowering the cost per encounter to \$1.08. The patient disposition reflected the acute nature of illness: only about one-third of the 30% asked to return did so, and under 1% were referred for further consultation. This review also established the seasonal occurrence for several common problems so that intervention efforts (chiefly education and immunization) can be more effectively scheduled.

Danfa is implementing and evaluating the "take home" card system (weight cards for children used in the Young Children Clinics). These seem more accessible and educational than static clinic-based records. A home visit form is being devised with the help of Mrs. Asante, Department of Community Health public health nurse. The form should provide the basis for a more systematic visit instead of a "pastoral call." Such activities are aimed at making the record system more helpful in ambulatory patient management and programs outside of the Health Centre.

The epidemiological component of the Project also helped the MCH group to plan and evaluate the malaria and immunization programs in 1974. The malaria program (#13) reached 87% of its target group in the Danfa district, with about half the households attending the majority of distribution sessions. Younger mothers were more likely to miss the program and they will be singled out for special motivational efforts in current activities. Of particular interest was the effective use of village volunteers to expand the coverage of the program, to maintain communications about it, and to achieve a high continuation rate. Other studies have clarified the epidemiology of malaria in the Project area and confirmed the efficacy of pyrimethamine in clearing parasites within three to seven days in school children who had been taking monthly pyrimethamine prophylaxis.

A post-campaign household sample survey was initiated after the first annual immunization project to determine coverage, factors related to attendance, vaccination side-effects, and maternal attitudes about the campaign and future participation.

A small-scale pilot study of mass piperazine treatment to lower ascaris loads in preschool children, with most of the field work supervised by two seconded Ministry of Health medical officers, was planned in 1974, for implementation in 1975.

#### c. Ministry of Health

The Project epidemiologist served as a consultant to the Ministry of Health's ZONTA Project, which is developing basic MCH services to three coastal communities, Ada Foah, Prampram, and Bortianor. This involved the preliminary planning session with Drs. Aboagye-Atta and Asante and the Accra Region Public Health Nurse, and assistance to Dr. Asante in the survey design to study health needs and in his present analysis of the baseline household survey data. Program evaluation criteria are now being selected. Hopefully, the ZONTA Project will be the first of several Ministry service areas where Danfa Project methodology can be field tested in various settings.

A two-day session was held at the annual Kintampo Health Education Seminar on "Program Planning and Evaluation," using health information from the Kintampo Health Centre as an example, and including setting up topics for the students' field survey practice.

#### d. Project Training

Health Education Assistants were taught about the relationship of behavior patterns to common diseases in the Project area as part of their training for the Health Behavior Related Survey, and Danfa district teachers received a talk on health of school-age children at a school health education seminar held at Madina. Other efforts included help in training current vital events registrars with discussions on common causes of death and reporting of mortality, and training and case study practice on the morbidity questionnaire for Household Survey interviewers.

#### e. Department of Community Health, Ghana Medical School

Guest lectures are routinely given by the Project epidemiologist in the communicable diseases and epidemiology courses of final and third-year medical students. These include presentations on meningitis, malaria, yaws, guinea worm, leprosy, and typhoid--the last jointly with the departments of medicine and surgery during a Saturday seminar. The Department also used one quarter's "Report of Research in Progress" to review several studies. Both the epidemiology and MCH Project advisors act as tutors to a group of final year students in community health and review and grade their final term reports.

Recently Project staff contributed to the orientation of two physicians who will be sent by the Ministry of Health for postgraduate training in public health overseas.

Project staff also helped organize the 1974 field survey for second year medical students. A baseline household interview survey was carried out in Mamprobi to survey conditions before a new health center is put into operation. Preparations for the survey included a feasibility study of the area, preparation of maps, and assignment of interview sections to students. A two-day orientation on principles of interviewing was held before the survey.

f. University of Ghana

A preliminary report of efforts to develop social indicators to guide and assess rural development was presented at the University in May. Household construction materials and furnishings were recorded in this study and were used to develop a Guttman scale, and differentiation within each area was clarified. The resultant Household Classification Scale will be practical and useful for stratifying households in rural areas, and will be validated during the current socio-economic study.

Project staff reviewed and attended numerous planning sessions for the current socio-economic study with Dr. Roger Selley and ISSER. Efforts to measure non-Project variables' influence on health status and fertility have had a long history, from research stages with Dr. Vickery and Mr. Burruss (who have just published their results in fertility determinants for the Biriwa area), through the cost-benefit approach of Drs. Selley and Brooks, to the present approach with Dr. Selley and Mr. Felder. An immense interview input is now being made to provide the required data.

5. Training and Teaching Programs

In 1974, as in previous years, training and teaching at the Danfa Health Centre continued. Fifth year medical students were in residence in July-August for training and guidance in rural health. Approximately sixty or more paramedicals were given a half to one day's training. In-service training for the Danfa staff was not maintained as well as it should have been.

The entire UCLA staff continued to participate in teaching and seminars at the G.M.S.--principally in the D.C.H. (see individual reports) where help in curriculum planning has also been provided. They are doing their share in addition to carrying out a full time job in field work and supervision.

Training was instituted for the last three (of four in Area I) clusters of T.B.A.'s. The training for one of these clusters was completed and the

group "graduated." The second and third clusters are still being trained and will complete their training in February 1975.

Most of the Ghanaian/UCLA Project Senior Staff gave lectures and/or conducted seminars at the annual Kintampo course for health workers in September-October.

Supervision of a second-year University of California/San Diego medical student (principally by the MCH Senior Ghanaian and UCLA staff) was carried out. This student cooperated fully in the lameness due to polio study conducted among school children. Supervision was also provided by the UCLA MCH/FP advisor, with Ghanaian colleagues, of a British medical student in a study of the relationship of birth interval to nutritional status.

As mentioned above (Epidemiological Studies), orientation was provided for two physicians in public health who will be later sent overseas by the Ministry of Health for post-graduate training in public health, and help was provided in organizing the field survey work for second-year medical students.

Lectures and seminars were given at UCLA by some of the UCLA Ghana-based staff while assigned to short periods of duty at UCLA.

Assistance and advisory services are being provided to two M.A. candidates at the University of Ghana in developing their thesis topics in areas which have a health education/behavioral science/anthropological basis.

## 6. Public Relations

### a. Relationships with Ghanaian Institutions

In addition to the continued excellent cooperation in this respect of the Ghanaian Field Coordinator (F.C.) of the Project, relationships within the G.M.S. and with the G.N.F.P.P. were also enhanced by the appointment of a Ghanaian Deputy Co-director (D.C.D.). The relationships with the Department of Community Health will now also improve as a result of the D.C.D. now having been appointed by the G.M.S. Dean as the new Ag. Head of the Department.

Department of Community Health (D.C.H.) of the G.M.S.: For the reasons given above, these relationships should improve greatly, as the new D.C.D. is also Ag. Head of the D.C.H. He now chairs almost all meetings relating to the Project and helps to provide a more closely knit organization.

Ministry of Health: The Ministry's epidemiology unit actively cooperated in carrying out the mass immunization program in Area I--

with its subsequent impact on national and international planning for immunization programs, involving a WHO/Ministry of Health seminar at Kumasi on the subject (see Family Health Program above).

Also, one UCLA team member cooperated with the Ministry's ZONTA Project, concerned with the development of basic health services in three coastal communities. Hopefully, the ZONTA Project will help open the way at the Ministry for the field testing of Danfa Project methodologies.

A relationship has been established with the Health Education Division of the Ministry to permit one of their staff, a health education specialist in school health education, to serve as coordinator of the Danfa Project School Health Education Program.

Taken as a whole, it is still considered (by USAID/G as well as our Project senior staff) that the establishment of a planning/management unit within the Ministry is important to the future implementation of the Danfa Project findings.

Ghana National Family Planning Program (G.N.F.P.P.): As a result of two of the senior Ghanaian Project staff also being members of the Medical Advisory Board of the G.N.F.P.P., a channel is now more readily available for communicating Danfa Project strategies and results to the National Program. Again in 1974 it was possible to arrange, with the cooperation of the G.N.F.P.P., for a G.N.F.P.P. nurse-midwife to substitute for the Danfa Project F.P. nurse-midwife while the latter was on leave.

Institute of Statistical, Social and Economic Research: Unfortunately, the relationships with I.S.S.E.R. from the standpoint of the sub-contract for the development and performance of the required socio-economic study did not go as well as had been hoped. Useful help was fortunately provided by the assignment on TDY of a consultant from UCLA who has now received an appointment to the staff of I.S.S.E.R., and who may go to Ghana in 1975. The D.C.D. (Ghana) will continue to negotiate the agreement between the G.M.S. (Danfa Project) and the I.S.S.E.R. regarding the socio-economic study sub-contract.

The Ghana Medical School (G.M.S.): Good relationships continue to exist between the administration of the G.M.S. and the Project. Executive Committee meetings (attended by the Executive Secretary of the G.M.S., the F.C., C.O.P., and D.C.O.P.) are held at monthly intervals to resolve various Ghanaian staff or activity administrative issues relative to the Project.

University of Ghana Department of Physics: The Computer Science Center continues to operate within this department. A good relationship between the Physics Department and the Project continues to exist. Our two computer programmers (U.S. Peace Corps and the National Service Secretariat "volunteers") operate at the Computer Science Center. During

July, August and early September a UCLA consultant on TDY received good cooperation within this department in developing a package program for the IBM 1130. A tape drive attachment to the 1130 arrived in Ghana in early January, 1975.

U.S.A.I.D./G.: As in previous years, the cooperation here continues to be excellent and close. With the dissolution of the Regional Population Office, its former head has been assigned as the Director of the Health, Population and Nutrition Program of the U.S.A.I.D./G. Close working relationships are maintained with him and his staff through regular fortnightly meetings attended usually by the C.O.P. and D.C.O.P. From time to time one or two of the Ghanaian senior staff also participate as well as other UCLA staff.

The Systems Analyst (D.C.O.P.) played a major role in cooperating with the team from the Office of the Inspector General for Foreign Assistance (U.S. State Department) which had gone to Ghana to conduct an inspection of various U.S. funded projects, including the Danfa Project.

Of great concern to the U.S.A.I.D./G. is the need to see the Management-Planning Project activated at the Ministry of Health. This project has run into various difficulties and delays, and there is some difficulty at this time as to its actual implementation--or at least its implementation in the manner in which it was originally conceived.

World Health Organization (W.H.O.): A great leap forward in interest on the part of W.H.O. in the Danfa Project was exhibited in 1974. At least three different W.H.O. Headquarter's groups visited the Project and discussed its implications; and at the end of the year the Director General himself, Dr. H. Mahler, visited the Project. It was a stimulating experience. (See also above under Ministry of Health regarding W.H.O.'s interest in, concern for, and the implications of the Mass Immunization Program which the Project introduced in Area I.)

University of Ghana - Agricultural Department, Extension Division: The demonstration garden at the Danfa Center is still maintained with this department's guidance, help and cooperation. Recently a water line was extended to the garden from the water storage tanks which should improve the garden yields. Also, the health education teams in coordination with the Extension Division have begun to introduce backyard gardens, where emphasis is being placed on the growth of beans and groundnuts as low-cost high protein foods.

b. Project Historian and Public Relations

The Ghanaian Project Historian/Public Relations Officer continues to produce "historical" reports concerned with important events in the history of the Project. These are widely circulated to the Project staff, UCLA and U.S.A.I.D./G./W.

This staff member worked well in handling the details (under the direction of the F.C. and C.O.P.) of planning for the 1974 Project review meeting. She prepared most of the invitations for signature by the Ag.C.D., helped to organize the necessary arrangements at the G.M.S. for the meeting itself, and handled the exhibition of various displays and the actual registration of participants to the meeting.

c. Project Visitors

As in previous years these continue to increase in number, with a consequent drain upon the time of various senior staff, especially the F.C., C.O.P. and D.C.O.P. Nevertheless, because of the increasing interest shown in the Danfa Project by numerous individuals and agencies the time spent in providing information and in building up good will would seem to be well spent.

Among the important visitors to the Project were the following:

- an inspection team from the Office of the Inspector General for Foreign Assistance of the U.S. State Department
- the Director General of W.H.O., Dr. H. Mahler, accompanied by the W.H.O. Regional Director, Dr. Quenum, and by various persons from the Ministry of Health
- the newly arrived U.S. Ambassador to Ghana, Mrs. Shirley Temple Black (Mrs. Black was accompanied by a television camera and recording crew from CBS, which advised that the Danfa Project would provide the only rural scenes in the activities of the newly arrived Ambassador and would be included, possibly as a "centerpiece," in the regularly televised program "60 Minutes" to be shown sometime in 1975.)
- Dr. Margaret E. Grigsby, Prof. of Medicine, Howard University, Washington, D.C., on a W.H.O. travel-study grant
- Dr. James Lea of the University of North Carolina, who is concerned with the production and utilization of mechanisms involved in self-instructional materials
- approximately a dozen members of the Royal Society of Health, West Africa Examination Board, who were briefed by the F.C. and C.O.P. and visited some of the Project area villages to view different environmental health problems
- Dr. B.E.C. Hopwood of the Wellcome Trust, London, in Ghana to cooperate with the Ministry in drafting a short course on planning/management in health given at G.I.M.P.A.

It is noteworthy to observe that a distinguished group who visited the Project in 1973, namely a study/tour group of the British Paediatric Association, published their experiences in the B.M.J. in 1974, paying special note to their Danfa experience.

## 7. Communications and Commodities

Delays in receipt and garbling of important cablegrams and the occasional telex do not help operations in Ghana. Also, there have been delays with the pouch mail, causing UCLA to resort more frequently to international mail, with consequent increase in costs.

It has not been possible to reestablish radio communications between UCLA and Ghana with the cooperation of the Communications Officer of the U.S. Embassy in Accra, as that individual has still not been able to get the authorities here to reconfirm to the U.S./F.C.C. officials that Ghana has no objection to "third party conversation."

Pouch packages have arrived in Ghana thus far with no loss in 1974, although a few have been badly delayed when sent by surface route. The staff is still encountering a problem of some damage (although much less than in 1973) to the contents of packages containing heavy items.

One major problem remains in connection with routing of air freight packages. On only one occasion in 1974 did Danfa staff receive the package on the actual flight cabled by UCLA, leading to a considerable waste of time and effort by the administrative assistant. A need exists for UCLA to obtain confirmed space on specific flights before cabling the routing.

Also, a need exists for a tighter control and need to have an "expeditor" at UCLA to record, order, follow-up on and continue to follow-up on various requests from Ghana for supplies and equipment so that certain items do "not get lost in the cracks" as has happened on a few occasions in 1974. In general, requests from Ghana have been handled well by the UCLA staff.

## 8. Project Vehicles

Maintenance cost was lower than in 1973 for Project vehicles, due in part to use of the Project's own mechanic for minor maintenance and repairs. Fuel costs are up about 82%, due principally to a 71% fuel increase per gallon introduced earlier in the year (£.705 to £1.20 per gallon) and greater use of vehicles for field work; the latter was in part made

possible by the reduced down-time due to greater degree of servicing by the Project mechanic and less by commercial repair shops. Fortunately, the Project did not encounter any fuel shortage in 1974.

Operating relationships with the car rental company from which two UCLA administrative vehicles were rented through the G.M.S. (local currency budget) deteriorated month by month, leading to much waste of time and frustration by the administrative assistant to have the cars maintained in operation. Although months late, two Valiants arrived for use as UCLA administrative cars, thus permitting the Project to conclude the unsatisfactory arrangements prevailing with the car rental company. The new cars were put into use at the very end of October. Unfortunately, one of them arrived with the battery having been removed somewhere en route. One gas locking cap and a number of interior door knobs were also missing. There were also some difficulties with the shift mechanisms which have since been corrected. Thus far, only one satisfactory driver has been hired.

Three new Chevrolet Suburban Carryalls (C-10's) and two Blazers have also arrived in Ghana, permitting the release of some of the older vehicles to the G.M.S.

## B. UCLA Activities

### 1. Data Processing

Data processing mechanisms for the Danfa Project underwent significant change in 1974. The decision to transfer a large percentage of electronic data processing to Ghana, where the staff can interact directly with the EDP system, was implemented during the course of the year. UCLA was handling all types of requests during the early part of the year, but by year's end it was processing only the more specialized requests--those depending upon large computer memory core, record linkage mechanisms, or sophisticated computer programming. UCLA will retain this role of handling the more complex data processing procedures.

A total of 985 tables and a number of special lists were produced at UCLA this year. Categorical requests for data handling included the following:

KAP Studies: Four hundred and ninety tables were produced using KAP surveys. Some of these tables required linking of male and female KAPs with fertility surveys and with original demographic baseline information.

Fertility Studies: Twenty tables were produced from fertility survey information.

Morbidity Studies: Comparisons among study areas and baseline information on maternal and child health resulted in 110 tables.

Village Health Survey: This data was used in 25 tables.

Special subject areas to which data processing was applied were:

Health Education Studies: Studies by village subgroups resulted in 315 tables, including 45 Female KAPs, 9 Fertility tables, 72 tables from the Maternal Practice Survey, and 189 from the Child Health Practices Survey.

Socio-Economic Studies: The Fertility study was used to produce five tables, calculating birth rates by age cohort.

Special lists included printouts by individual number and by household number of all people who responded to the following survey instruments during the first round of the longitudinal survey:

Morbidity Survey  
Child Health Practices Survey  
Fertility Survey  
Male KAP  
Female KAP  
Maternal Practices Survey

Each list was compiled by each area and for all areas in the Project. These lists were made in preparation for the second cycle of the longitudinal survey, in order to assure the identity of those being interviewed in 1975.

Other activities included cleaning up data, preparation of a master tape of fertile females through the KAP studies and linkage of the information on this tape with data from the Fertility, Maternal Health Practices, and Child Health Practices surveys. Statistical activities included a preliminary multiple regression analysis of age at first pregnancy.

## 2. Bibliographic Research

Support function of bibliographic research has been continued on an expanded basis. On-going citation and library searches have been continued, both for Ghanaian and UCLA staff. Use of the MEDLARS system consistently adds information useful to the Project, in order to ascertain details of investigative research being done in similar areas of endeavor

In addition, there has been a steady flow of resource material in book, journal and pamphlet form to Ghana. During 1974, some 80 books, as well as 14 journal subscriptions, various pamphlets and visual education materials have been ordered at UCLA and sent on to Ghana. This is in addition to maintenance of the UCLA Project library, and other resource materials at UCLA.

### 3. Participant Training Program

#### a. Training Completed in 1974

One physician supported by the contract completed a one-year MPH program at UCLA in nutrition, MCH and F.P. Following his academic training, he visited seven tropical countries to observe and analyze integrated MCH/FP/nutrition programs having possible relevance for application in Ghana. He returned to Ghana in November, where it is hoped he will occupy a position at the Ministry of Health as an advisor in these areas of study and thus be of direct assistance to the Danfa Project.

#### b. Training Continuing or Begun in 1974

The Project's community organization specialist is about to complete an extended period of training in the U.S. and will be returning to Ghana in March of 1975 to assume new duties with the Department of Community Health. His training has included a bachelor's degree in Health Science, a master's degree in Community Organization, and a planned internship of approximately five to six weeks in January and February, 1975 as a community organization consultant with the Poor People's Health Center in Rossville, Tennessee.

Two physicians are currently enrolled in one-year MPH programs at UCLA, one in MCH/FP/nutrition and one in Epidemiology. Before leaving Ghana in September to begin their training, they were assigned by the Ministry of Health to the G.M.S./D.C.H. for orientation on the Danfa Project. After completing their studies and a period of field training, both are expected to return to the D.C.H., seconded by the Ministry of Health. Assuming their work with the D.C.H. and the Project is satisfactory, they will then be permanently transferred to the D.C.H. and will no longer be considered Ministry of Health staff.

Table I summarizes the Project-sponsored training programs conducted in the U.S. to date.

### 4. Public Relations

The UCLA Project staff continue to host a steady stream of visitors interested in the Project in general and in specific aspects of its administration. We estimate a total of 40 visitors have met with the Co-Director, Deputy Co-Director, and other staff members during 1974 to discuss the Project.

Incoming and outgoing written communications on Project related matters have increased to an average of 100 each month.

## 5. General Administration

Administration of the UCLA portion of the Danfa contract involves a great deal of fiscal, personnel, logistical, communication, and organizational activity. The smooth operation of such an extensive, complex and long-term project is dependent upon a cooperative effort on the parts of everyone in the Los Angeles group in order to provide the joint Ghanaian-UCLA team in Ghana the support needed. A high degree of cooperation has been achieved and continues to be a very positive force for the production of good work, both scientifically and in terms of backup to those in the field in Ghana. Relationships with other parts of the University, as well as within the School of Public Health and the Division, continue to be not only cooperative but cordial, and staff members of the Danfa Project are often sought as consultants by others in the University in matters pertaining to international health, population programs, and family health programs. The very low rate of personnel turnover within the Danfa Project, both in Ghana and at UCLA, continues.

### C. Joint Activities

#### 1. Publications

The production of Project publications steadily increased during 1974 and is a joint activity of growing importance for Project staff in Ghana and at UCLA. In addition to the seven papers published in previous years, four papers have been published in 1974; seven are in press; and twenty-one have been prepared or submitted, presented, or are in progress.

These Project Publications and Papers in Progress are summarized in Table II.

#### 2. Annual Review Meeting

The Fifth Annual Review Meeting was held in Accra at the Ghana Medical School on February 26-28, followed on March 1 by an extended field visit for the interested participants. On the first day more than 120 participants attended and 60 to 80 persons in the succeeding days. The meeting was divided into ten plenary sessions preceded by an official opening ceremony and followed by an official closing exercise. All plenary sessions were chaired by different individuals acquainted with the subject under consideration and in all instances except one the chairman was Ghanaian.

Once again, as in 1973, the Vice-Chancellor of the University during the Opening Ceremony specially cited the Danfa Project as "a shining illustration of international cooperation." He also paid tribute to the Project for its multidisciplinary character and for its role as a place for the training of doctors, nurses and other health workers.

Almost 150 persons officially registered as participants but many more attended without registering. Particularly noticeable was the high attendance of international participants from outside Ghana. They came from such agencies as USAID/W, W.H.O., International Fertility Research Program (Switzerland), Ford Foundation, Population Council, USPHS (Office of International Health), U.C.S.F. (two medical students).

The reports and papers presented by the Ghanaian and UCLA staff indicated the great extent of the work carried out by the Project and its multi-faceted character. Much lively discussion ensued after each plenary session. In general very favorable comments were received regarding the review meeting. It also provided an opportunity for many more Ghanaians and the expatriate visitors to acquaint themselves with the scope and purposes of the Danfa Project.

## II. Problems and Future Plans

### A. Problems

Most aspects of life are accompanied by some problems. The Danfa Project is no exception. These range from fairly minor problems occasioned by gasoline, paper and car parts shortages through personnel problems, inherent in any organization, to that class of problems generated by the very success of a demonstration project. The first two categories of problems remain relatively minor and are being dealt with effectively as they occur. Project staff are grateful for the courteous efforts of a wide range of government officials, University employees, private businessmen and ordinary citizens who in many ways have and continue to extend assistance to the Project and its staff.

Problems generated by the success of the Project are of particular interest. Foremost among these is the challenge posed by the sheer volume of data emerging from the Project. All of this is according to plan. Resolution of these problems must occur in several stages. The first stage is to build up the facilities to effectively analyze the data in Ghana, to interpret it, and to write up the results. The next stage is to effectively share the Project findings with relevant persons in Ghana and also with those in other countries who can potentially benefit from the Danfa Project experience. The final stage has to do with determination of the practicality and acceptability of the various suggestions emerging from the Project and a setting up of priorities. This is followed by measures to implement the acceptable suggestions in other parts of the country.

A very serious problem is the high rate of world inflation beyond that originally anticipated. This is reflected in very steeply increased costs

of running the Project. Since the Project is operating under a budget ceiling, it may be that some of the operations will have to be modified or curtailed.

### B. Solutions

Those responsible for a project should clearly distinguish between those solutions which are under their control and must be their responsibility, those which are completely beyond their control, and an intermediate group which they can perhaps affect by working cooperatively with others.

Ghana has a number of highly qualified specialists and is training more. The demand for the services of these specialists, however, appears to be outstripping the capacity of the training programs, so that the relative few are expected to do more and more. It thus becomes necessary to provide as much support as possible for senior staff, so that they may function at their highest level of competency. In order to do this, specialized supportive staff have been recruited including such disciplines as historian/public relations specialist, editor/bibliographer, writer/editor, manuscript typist, statisticians and programmers.

The work of the technical specialists, as well as senior staff, is further simplified by endeavoring to substitute machine processing for tasks which either cannot be performed by hand or only with a relatively high degree of error by hand. The foremost example of this, of course, is automated data processing using the computer. An effort is now being made to reduce demands on the scarce Ghanaian programmers by adapting the packaged programs developed for larger computers in operation in other countries to the computer available in Legon.

Most important is the building up of a skilled manpower pool in Ghana. This is being done primarily through training programs in Ghana supplemented by specialized training programs outside of Ghana when they are not available in the country.

Concomitant to the increased demand for trained individuals and the broadening of training programs is the importance of assuring that new positions will be established so that newly trained specialists will have jobs waiting for them in Ghana and will not be tempted by opportunities in the international labor market. Parenthetically it should be noted that no individual project such as the Danfa Project can undertake to meet all of the manpower training needs in a specific area such as computer programming for the entire country. It is essential for Project staff to cooperate with other projects and institutions in the country toward solution of common problems.

Project staff also seek to link hands with other groups with similar interests in improving health and welfare services for the rural people.

Included in this is the improvement of management services. Foremost among these endeavors is support of the Ghana Ministry of Health to increase its planning and management competencies. There is also a strong and growing link between the Danfa Project and the G.N.F.P.P., and each is helping the other attain its goals.

C. Specific Activities Planned for 1975

1. Implementation of new initiatives in F.P. to overcome accessibility problems of villagers
2. F.P. acceptor follow-up study
3. Completion of training for last two (of four) clusters of T.B.A.'s in Area I
4. Institutionalization of the malaria chemoprophylaxis and mass immunization programs.
5. Evaluation of the work and impact of T.B.A.'s
6. Round II of the Village Health Survey, including editing and coding and analysis of data
7. Analysis of role and function of health education assistants
8. Pilot efforts to train middle school students to carry out the Health Practices Survey (formerly Household Health-Related Behavioral Survey)
9. Introduction of regular weighing sessions for village children under five, to be conducted by health education assistants using Salter spring balance scales
10. Designation of a Family Planning Month to give additional impetus to the F.P. program
11. Establishment of a regular schedule of in-service health education sessions
12. Completion of an analysis of present rural health center costs as reflected in the Ministry of Health budget
13. Installation and use of the IBM 1130 tape drive
14. Processing of the 1974-75 Longitudinal Questionnaire Survey (round II)
15. Analysis of demographic trends in the Project area
16. Analysis of the new vital registration scheme which employs full time workers, and comparison with the volunteer scheme in use in 1974

### III. Personnel

#### A. Project Staff

Staffing of the Project remains essentially unchanged from that described in previous progress reports. The exceptions are strengthening in computer programming and data processing, and data analysis capacity in Ghana.

#### B. Consultant Visits

1. Dr. Alfred K. Neumann, UCLA Co-director (C.D.) of Danfa Project, made two visits to Ghana in 1974:
  - a. February 15 - March 5, 1974 - in connection with preparation for and attendance at the annual Project Review Meeting.
  - b. June 27 - July 31, 1974 - relative to general Project supervision, numerous consultations with Ghanaian staff and interested persons as well as with those UCLA staff available. While in Ghana, he went to Nigeria on 13-15 July for consultations with the Ford Foundation Office.
2. Mr. Joseph Felder, economist from UCLA - assigned to work with the I.S.S.E.R. economist in developing the material for the socio-economic studies. He also met with and advised the Ghanaian/UCLA Project senior staff as to his views on the development of the socio-economic studies. TDY - April 30-July 19, 1974.
3. Miss Lili Sohrab, computer programming specialist from UCLA assigned to develop a package program for use by the Danfa Project utilizing the IBM 1130 at the University of Ghana. Before leaving in September she produced a usable package incorporating editing, cross-tabulation, and correlation sub-routines. This package is now available on a University-wide basis as part of the service programs offered by the University Computer Science Center. TDY - July 1-September 17, 1974.
4. Dr. Lester Breslow, Dean of the UCLA School of Public Health and noted epidemiologist and health service administration expert - visited Ghana to confer with Danfa Project senior staff and relevant government officials with a view to assisting the Project and reinforcing the good working relationship between Ghanaian institutions, UCLA and USAID. TDY - September 1-5, 1974

C. UCLA Staff Movements

There were no new arrivals in 1974, the UCLA team being complete.

1. R & R Leaves

- a. Dr. Irvin M. Lourie, C.O.P. and Mrs. Harriet S. Lourie, A.A., were on R & R (annual) leave from 9 April to 20 May. This included two weeks of official duty at UCLA for Dr. Lourie. The C.O.P.'s duties were assumed by the D.C.O.P., and the A.A.'s duties by the Ghanaian accountant/cost analyst (employed regularly by the Project under the local currency budget). The latter received some days of briefing by the A.A. and thus will help train him for later assumption of more wide-scale administrative responsibilities.
- b. Mr. William B. Ward, Health Educator/Behavioral Scientist was on leave with his family from 17 July to 27 August. His work was assumed by various members of the Health Education teams and by a short-term University graduate vacation worker.
- c. Dr. Stewart N. Blumenfeld, Health Systems Analyst/D.C.O.P., was on leave with his family from 18 July to 30 August. His work was covered in part by the F.C., C.O.P. and by the UCLA epidemiologist after the latter's return from leave.

2. Home Leave Plus Annual Leave

- a. Dr. Donald W. Belcher, Epidemiologist, was on leave with his family from 14 June to 5 August (the family actually returned some days later). His work was covered where required by the F.C. and C.O.P.
- b. Dr. David D. Nicholas, MCH/FP Advisor, was on leave with his family from 5 July to 30 August. His work was covered by the Ghanaian MCH/FP Project senior staff member.

IV. Commodities and Shipments

A. Commodities Purchased in 1974

1 Olympia Typewriter	1 G.E. Refrigerator
1 Kodak Movie Camera Mod. #M-30	1 G.E. Freezer
1 Kodak Slide Projector Mod. E-2	2 Chevrolet Blazers
1 Crown Cassette Recorder	2 Plymouth Valiants
1 IBM Electric Typewriter	3 Chevy Suburbans

B. Shipments

Air Pouch	126 packages
Surface Pouch	38 packages
Air Freight	9 packages
Sea Freight	4 crates

Total estimated weight of aboveshipments: 11,343 pounds

Also included in 1974 shipments were seven vehicles and other large items listed above under Commodities.

**TABLE I**  
**Family Planning Statistics - December, 1974**

	December					Cumulative <sup>2</sup>				
	Area I	Area II	Area III	OPA	Totals	Area I	Area II	Area III	OPA	Totals
Visits	49	41	20	-	110	2040	1521	1428	-	4989
Total Acceptors	16	9	5	22	52	571	459	342	648	2020
Male Acceptors	7	4	2	13	26	168	274	237	422	1101
Female Acceptors	9	5	3	9	26	403	185	105	226	919
For Women Only:										
IUD(%)	1(11%)	0(0%)	0(0%)	0(0%)	1(4%)	103(25%)	12(6%)	9(9%)	24(11%)	148(16%)
Pill (%)	8(89%)	5(100%)	3(100%)	9(100%)	25(96%)	193(48%)	106(57%)	61(58%)	120(53%)	480(52%)
Foam (%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	87(22%)	55(30%)	23(22%)	66(29%)	231(25%)
Condom (%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	20(5%)	12(7%)	12(11%)	16(7%)	60(7%)
Other (%)	0	0	0	0	0	0	0	0	0	0

1. OPA - Out of Project Area

2. Cumulative Data - Are based on most recent computer output. Data is not yet entirely "Clean"-corrections currently being made. Final output with corrections made will be available in 1 month.

Table II

AID/Danfa Project Participant Trainees: Training Outside of Ghana

<u>Name</u>	<u>University Training Field &amp; Degree</u>	<u>Date Initiated</u>	<u>Termination Dates</u>	<u>Present Status</u>
Odai, Joshua K.	Data Processing and records Non-degree certificate	March, 1970	June, 1970	Staff - I.S.S.E.R.
Ashitey, Gilford A.	Field Experience - Communi- cable Disease Control, Center for Disease Control Non-degree certificate	June, 1970	October, 1970	Faculty, Dept. of Community Health, Ghana Medical School
Dovlo, Daniel K.	Data Processing and Records Non-degree student	January, 1971	August, 1971	Substantial portion of the time devoted to DRHP Staff I.S.S.E.R.
Asuming, K.	Data Processing and Records MPH degree (UCLA)	October, 1971	June, 1972	Was Statistician Programmer for the Danfa Project. Resigned late 1973 to obtain more education.
Asante, Dr. R.	MCH-MPH degree (UCLA)	Fall, 1971	September, 1972	Supervising physician Danfa H.C. & Ghana Ministry of Health, Accra Regional Office.
Pappoe, Mrs. M.	Health Education - MPH degree (UC Berkeley)		December 1972	Health Educator in Dept. of Community Health, Ghana Medical School & Health Educa- tor for Danfa Project.
Gadzekpo, J.	Cytotechnology Non-degree certificate Johns Hopkins University	Fall, 1971	Fall, 1973	Technologist, Korle Bu Teaching Hospital

Table II - continued

<u>Name</u>	<u>University Training Field &amp; Degree</u>	<u>Date Initiated</u>	<u>Termination Dates</u>	<u>Present Status</u>
8. Quartey-Papafio, E.	Health Education/Behavioral Sciences - B.A. (San Fernando Valley State College, Ca.)	Fall, 1971	June, 1973	
	Community Organization - M.S. University of Missouri, Columbia, Missouri	Fall, 1973	March, 1975	
9. Abedi, Oscar	Data Processing & Records	Fall, 1972	January, 1973	Research Analyst (Assistant Statistician) Resigned September 1973 to enroll in Univ. of Ghana Programming course)
10. Kwabia, K.	Data Processing & Records Non-degree student	January, 1973	April, 1973	Research Analyst
11. Addy, H.	MCH/Nutrition - MPH degree (UCLA)	September, 1973	August, 1974	Ministry of Health Advisor in MCH/FP/ Nutrition.
12. Lamptey, Peter R.	MCH/FP/Nutrition - MPH (UCLA)	September, 1974	August, 1975	
13. Mensah, Emmanuel N.	Epidemiology - MPH (UCLA)	September, 1974	August, 1975	

January-December 1974

TABLE III

Publications and Papers in ProgressPublished in Previous Years

1. Sai, F.T., F.K. Wurapa and E.K. Quartey-Papafio, "The Danfa/Ghana Comprehensive Rural Health and Family Planning Project - A Community Approach," Ghana Medical Journal, Vol. 11, No. 1, March 1972
2. Neumann, A.K., J. Prince, E.F. Gilbert, and I.M. Lourie, "The Danfa/Ghana Comprehensive Rural Health and Family Planning Project - Preliminary Report," Ghana Medical Journal, Vol. 11, No. 1, March 1972.
3. Sai, F.T., "A Rural Health Model: Danfa, Ghana," in Health Care for Remote Areas, An International Conference, sponsored by Kaiser Foundation International, Bellagio, Italy, May 1972. (James Hughes, editor)
4. Ashitey, G.A., F.K. Wurapa and D.W. Belcher, "Danfa Rural Health Centre: Its Patients and Services 1970-71." Ghana Medical Journal, Vol. 11, No. 3, September 1972.
5. Kpedekpo, G.M.K., "The Planning and Design of Sampling Surveys with Particular Reference to the Epidemiological Survey of the Danfa Project in Ghana," Ghana Medical Journal, Vol. 11, No. 4, December 1972.
6. Kwansa, E.V.G., J.A. Cannon, D.W. Belcher and M. Hosu-Porbley, "Perception and Comprehension of Health Education Visual Aids by Rural Ghanaian Villagers," Ghana Medical Journal, Vol. ii, No. 4, December 1972.
7. Neumann, A.K., F.T. Sai, I.M. Lourie and F.K. Wurapa, "A New Trend in International Health Work: The Danfa Project," International Development Review, 1973/2.

Published in 1974

8. Neumann, A.K., D.A. Ampofo, D.D. Nicholas, S. Ofosu-Amaah and F.K. Wurapa, "Traditional Birth Attendants - A Key to Rural Maternal and Child Health and Family Planning Services," Journal of Tropical Pediatrics and Environmental Child Health, February, 1974.
9. Neumann, A.K., F.T. Sai, S.R.A. Dodu, "Danfa Comprehensive Rural Health and Family Planning Project: Ghana, Research Design," Journal of Tropical Pediatrics and Environmental Child Health, February, 1974.
10. Neumann, A.K. and S.R.A. Dodu, "Danfa Project" letter to Lancet, March 30, 1974.

11. Wurapa, F.K., D.W. Belcher, A.K. Neumann and I.M. Lourie, "An Approach to Illness Measurement in a Rural Community," Ghana Medical Journal, June, 1974.

In Press

12. Belcher, D.W., A.K. Neumann, F.K. Wurapa, D.D. Nicholas, and S. Ofosu-Amaah, "The Role of Health Survey Research in Maternal and Child Health/Family Planning Programs: Danfa Project, Ghana," accepted by Journal of Tropical Pediatrics and Environmental Child Health.
13. Belcher, D.W., F.K. Wurapa, W.B. Ward and I.M. Lourie, "Guinea Worm in Southern Ghana," accepted by American Journal of Tropical Medicine and Hygiene.
14. Belcher, D.W., F.K. Wurapa, and W.B. Ward, "Failure of Thiabendazole and Metronidazole in the Treatment and Suppression of Guinea Worm Disease," accepted by American Journal of Tropical Medicine and Hygiene.
15. Wurapa, F.K., D.W. Belcher and A.K. Neumann, "Morbidity in Rural Communities - The Questionnaire Interview Approach to Providing Useful Data for Health Planning," paper presented to the Inaugural Conference of the Population Association of Africa, University of Ibadan, May, 1974, to be published in Proceedings.
16. Neumann, A.K., "Management Issues in the Organization and Delivery of Family Health/Family Planning Services," paper presented at the Second Interuniversity Workshop in Family Planning Administration, March, 1974, to be published in Proceedings.
17. Britt, P.M., S.N. Blumenfeld, F.K. Wurapa, G.M.K. Kpedekpo, and A.K. Neumann, "A Case Study in Computer Applications for Developing Countries -- The Danfa Comprehensive Rural Health and Family Planning Project, Ghana," paper presented at the Second Jerusalem Conference on Information Technology, July-August, 1974, to be published in the Proceedings.
18. Wurapa, F.K., "A Community Approach to the Organization of a Comprehensive Rural Health Care System - the Danfa Experience," paper presented at the Conference on Health of the Family Unit, University of Sierra Leone, September 1973, to be published in Proceedings.

Papers Prepared/Submitted

19. Neumann, A.K., S. Ofosu-Amaah, D.A. Ampofo, D.D. Nicholas, R.O. Asante, "Integration of Family Planning and MCH in Rural West Africa."
20. Belcher, D.W., D.D. Nicholas; S. Ofosu-Amaah, F.K. Wurapa, S.N. Blumenfeld, "Factors Influencing Utilisation of a Malaria Prophylaxis Programme in Ghana."

21. Belcher, D.W., A.K. Neumann, F.K. Wurapa, and I.M. Lourie, "Comparison of Morbidity Interviews with a Health Examination Survey in Rural Africa."
22. Belcher, D.W., J.O.M. Pobee, E.O. Larbi, K. Occran and F.K. Wurapa, "Non-Response Factors in a Rural Health Examination Survey in Ghana."

In Progress

23. Neumann, A.K. and S.R.A. Dodu, "Institutionalising Technical Assistance Programmes."
24. Neumann, A.K., W.B. Ward, M.E. Pappoe, D.L. Eoyd, "Evaluating the Impact of Integrated Health and Family Planning Education in Rural Ghana: The Danfa Project."
25. Beausoleil, E.G., A.K. Neumann, "Ghana: Health Services."
26. Belcher, D.W., F.K. Wurapa, A.K. Neumann, I.M. Lourie and O.G. Johnson, "A Household Morbidity Survey in Rural Africa."
27. Belcher, D.W., F.K. Wurapa, D.D. Nicholas, G.M.K. Kpedekpo, S. Ofosu-Amaah, L.K. Derban, R.O. Asante, "Conducting a Rural Health Survey: Experience from the Village Health Survey, Danfa Project, Ghana." (for publication as project monograph)
28. Belcher, D.W., et. al., "Factors Related to Selection of Health Services."
29. Belcher, D.W., F.K. Wurapa, W.B. Ward, I.M. Lourie, untitled, Clinical Study on Guinea Worm Disease.
30. Series of vital events and demography papers to be published as Project monographs:
  - Vital Events 1: Kpedekpo, G.M.K., D.W. Belcher, F.K. Wurapa, A.K. Neumann and I.M. Lourie, "Results of the Analysis and Evaluation of Vital Registration Data from the Four Project Areas."
  - Vital Events 2: Kpedekpo, G.M.K., F.K. Wurapa, I.M. Lourie, D.W. Belcher, and A.K. Neumann, "Estimates of Indices of Mortality from Registration Data."
  - Vital Events 3: Kpedekpo, G.M.K., D.D. Nicholas, S.O. Ofosu-Amaah, F.K. Wurapa, D.W. Belcher, "Estimates of Indices of Fertility from Registration Data."

- Vital Events 4: Kpedekpo, G.M.K., F.K. Wurapa, I.M. Lourie, A.K. Neumann, D.W. Belcher, "Some Results and Problems on the Estimation of Vital Rates in a Rural African Setting via Multiple Methods."
- Vital Events 5: Kpedekpo, G.M.K., F.K. Wurapa, I.M. Lourie, A.K. Neumann, D.W. Belcher, "Migration Patterns, Population Growth and Change in the Project Areas of Danfa."
- Demography 1: Kpedekpo, G.M.K., I.M. Lourie, F.K. Wurapa, D.W. Belcher, J.L. Mickey, A.K. Neumann, "The Basic Demographic Characteristics of the Danfa Project Areas--An Analysis of the Population Size, Age/Sex Distribution"
- Demography 2: Kpedekpo, G.M.K., F.K. Wurapa, D.W. Belcher, A.K. Neumann, I.M. Lourie, "The Basic Demographic Characteristics of the Danfa Project Areas--An Analysis of Marital Status, Education, Ethnic, Religious and Occupational Composition"
- Demography 3: Kpedekpo, G.M.K., K. Asuming, S.N. Blumenfeld, F.K. Wurapa, D.W. Belcher, "The Basic Demographic Characteristics of the Danfa Project Areas--An Analysis of the Characteristics of Households, Household Size, Household Heads and the Relationship within the Households"

#### Papers Presented

31. Belcher, D.W., F.K. Wurapa, D.D. Nicholas, "Health Care and Family Planning", presented at the International Health-Family Health Conference, Washington, D.C., October, 1974.
32. Ward, W.B., R. Engberg, D.W. Belcher, "A Preliminary Report of Efforts to Develop Social Indicators to Guide and Assess Rural Development," University of Ghana, May, 1974.