

PD-AACU-958

5-2-83

INTERNATIONAL CENTER FOR EPIDEMIOLOGIC AND PREVENTIVE OPHTHALMOLOGY

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TRIP REPORT

Tanzania Xerophthalmia Control Program

July 9 to 20, 1983

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Carried out under Cooperative Agreement Number AID/DSAN-CA-0267-931-0045
between the Office of Nutrition, United States Agency for International
Development, and ICEPO.

Wilmer Ophthalmological Institute • Johns Hopkins School of Hygiene and Public Health
W.H.O. Collaborating Center for the Prevention of Blindness

Purpose of the Trip

The purpose of this visit was to continue our participation in the Xerophthalmia Surveillance System and the hospital-based measles, nutrition, and blindness studies that are in progress and to participate in the National Seminar for Tanzanian Eye Doctors on Prevention of Blindness held in Dodoma.

Summary

The present trip to Tanzania seems to have been highly successful. The esprit de corps exhibited at the National Prevention of Blindness Seminar is high and is encouraging for the success of future projects. Review of the xerophthalmia surveillance being conducted by the AMO ophthalmologists shows that this program is progressing well. Some minor modifications have been made, and the program has been extended to include thirteen participating ophthalmologists. Good progress is being made in the two hospital-based studies on measles and corneal ulcers, and although there have been some patchy areas of omission, workers at both hospitals feel that these will be taken care of in the future. There seems to be general agreement on the need, timing, goals, and structure of the proposed prevalence and risk factor survey on xerophthalmia with the basis for good collaboration between TFNC, the National Committee for Prevention of Blindness, ICEPO, and various Dutch interests. I think that ICEPO can continue to provide valuable technical assistance in the area of xerophthalmia and should actively participate in the meeting planned for February, 1984.

Activities

Originally it had been proposed that I should arrive by air in Kilimanjaro and spend one or two days at the Kilimanjaro Christian Medical Center at Moshi to review the activities being undertaken by Dr. Marilyn Scudder in the area of xerophthalmia control. As it proved to be impossible for connecting transport between Moshi and Dodoma, I flew instead to Dar Es Salaam. Dr. Festo Kavishe of the Tanzanian Food and Nutritional Council met me; and on the following day, we drove to Dodoma as we were again unable to get a flight.

The National Prevention of Blindness Seminar held in Dodoma was organized for the National Tanzania Committee for the Prevention of Blindness by Dr. Allen Foster and by Dr. Mmbaga. Approximately forty people attended this meeting including all save two of the AMO ophthalmologists as well as ophthalmologists from Muhimbili Medical Center (Dr. Mtanda), Mvumi Mission Hospital (Dr. Allen Foster), Kilimanjaro Christian Medical Center (Dr. Marilyn Scudder), Dr. Mmrosso, who works with the Dar Es Salaam City Council. The meeting was

also attended by Dr. Gomile, principal of the Medical Assistant Training School; Dr. Maletnlema and Dr. Kavishe and several nutritionists from the Tanzanian Food and Nutrition Center; Dr. Joseph Taylor, representing the Christoffel Blindenmission; and Sir Ivan Newitt, representing the Royal Commonwealth Society for the Blind. Professor Simon Franklin from Holland attended the meeting. In addition, there were a number of other physicians from the surrounding area including Dr. Andrew Barclay, pediatrician at Mvumi, and Dr. Jane Colvin, a missionary working in general practice in Dodoma, and also a number of Tanzanian ophthalmic nurses. The meeting was held in the Christian Training Center in Dodoma, which also provided the residential and dining facilities.

Unfortunately, as we had to drive to Dodoma, I missed the opening afternoon session. The meeting was opened by the regional officer, Mrs. Anna Abdallah, who has a particular interest in prevention of blindness, especially nutritional problems as she sees many of these as a manifestation of disadvantaged position of women in the Tanzanian society.

Review of Papers Presented

A large part of the meeting was, in fact, composed of a review of the various activities relating to xerophthalmia in which we have been taking an active role. Formal papers were presented, and a considerable amount of free discussion followed on the surveillance system being conducted by the AMO ophthalmologists and the studies on measles and nutrition in blindness.

Xerophthalmia Surveillance by AMO Ophthalmologists

The surveillance system has now been running between six and nine months in nine regions. All children seen below the age of ten in the eye clinic are examined for signs of xerophthalmia and when present are recorded on the form. The total number of children seen is also recorded. Children seen by the ophthalmologist in the field while on safari are also included. Further, the AMO ophthalmologist is expected to examine all children in the pediatric wards at least once a week, and any children seen with signs of xerophthalmia are also recorded as is the total number of children seen. To date, approximately 7,000 children have been examined and 84 (1.2 percent) had corneal xerophthalmia (corneal ulceration). Of these children, 49 were unilateral and 35 were bilateral. Seventy-five percent gave a history of having had measles within the last month. Forty-four percent of the children with corneal ulceration were male. Of those children with corneal ulcers, 18 percent were aged under one year, 27 percent were one year old, 14 percent two years old, 19 percent three years old, and 22 percent were aged five or more.

The problems with the surveillance system were discussed openly and in detail. A recording of night blindness proved to be particularly unreliable, there being some 200 cases per month from some areas and no cases seen in other areas. For most regions, there were approximately 200 children seen per month. There seemed to be considerable difficulty in finding a series of specific questions to determine the occurrence of night blindness, and the AMO ophthalmologists had not been able to find a specific local term. After considerable discussion, it was decided to delete the question of night blindness from the surveillance form for the time being.

The recording of conjunctival xerosis with or without Bitot's spots and the recording of corneal xerosis showed large discrepancies, again with some regions apparently grossly over-reporting and other regions not diagnosing any children with these conditions. Corneal xerosis was particularly confused with measles superficial punctate keratitis. It was decided, because of the importance of the signs, to undertake some further in-service training. Consequently, one session was spent reviewing a large number of xerophthalmia slides with the AMO ophthalmologists in an attempt to restandardize them. The accuracy of recording both corneal and conjunctival xerosis will need to be reviewed at the next meeting.

Considerable confusion had seemed to arise from the use of two forms to record corneal ulcers. One form was meant to be used for children examined in the pediatric ward and the other for children seen during eye clinics. In practice, the AMO ophthalmologists tended to use one or the other form for all cases. For these reasons, a revised form was prepared after very valuable input from the AMO ophthalmologists, and this form, with some final modification, will be used starting the first of August. See Appendix I.

A final problem with the surveillance was the intermittent omission of the total number of children seen. The AMO ophthalmologists were exhorted at great length to include this, and considerable discussion was held on whether the forms should be completed on a weekly or monthly basis to make it less likely that the number of children examined would be overlooked. Eventually, it was decided to leave the forms on a monthly basis. Dr. Mmbaga described a short, detailed recording form he had for each patient that enabled him to follow up the children he had seen, and several AMO ophthalmologists intend to use this form to assist in their own management of these patients. The AMO ophthalmologists are to continue to send the forms to Dr. Foster on a monthly basis, who will be responsible for the compilation. Dr. Kavishe from TFNC requested that copies of the forms be sent to him, but Dr. Foster will continue to receive the forms and will attempt to send interim reports to TFNC if and when they become available.

Four additional AMO ophthalmologists are to join the surveillance system. They are based in Kilamatindi, Morogoro, Mwenda, and Buchola (sic), so that now 13 will participate in 12 different regions.

Dr. Foster will review the surveillance data for the end of this year for presentation at the meeting in February, but it is planned that surveillance will continue until at least the end of 1984, if not indefinitely.

Hospital-Based Measles Xerophthalmia Study

Dr. Marilyn Scudder and Salome Katala, an ophthalmic nurse at KCMC, presented the interim results of their study on measles and xerophthalmia. So far, they have examined 115 children admitted with measles and have documentation on 97 of these children. Some have been missed because the ophthalmologists were off on safari. The pediatricians have also limited the number of children who could be entered in the study on any given day to two because of the large number of children who may be admitted to the measles ward on some days (up to ten). Completed eye forms are available on some 50 children. Of the total number of children, 60 received Vitamin A and 55 did not. Nineteen of the children were marasmic and 42 percent were anemic on admission.

Of the 60 that had a completed eye form, two children had corneal ulceration on admission. One died and one healed with Vitamin A treatment. Three of the 60 children had xerosis and one had Bitots spots. Three developed a superficial punctate keratitis. Sixty-eight children have been followed-up at one month, and no children developed ocular lesions. Twelve of the 115 children had died; 7 had received Vitamin A and 5 had not. The causes of death included pneumonia, dehydration, respiratory failure and marasmas, pneumothorax, congestive cardiac failure, and anemia. The data from KCMC is somewhat "spotty" in certain areas, and these areas were discussed subsequently with Dr. Scudder; she will attempt to get a more complete examination on children who are entered into the study. She has not as yet started the protocol for children seen with corneal ulceration but is planning to start that following this meeting.

Dr. Andrew Barclay and Dr. Foster presented the results of this study at Mvumi, and they presented the results of 110 children admitted to the measles ward. Note that at Mvumi all children seen with measles are admitted, whereas at KCMC children tend to be referred from the hospital at Arusha and only the more severe cases are referred. There is an apparent lag of about five days from the onset of rash to admission at KCMC, whereas this is usually two to three days at Mvumi.

Of the 110 children seen at Mvumi, 51 received Vitamin A, and follow-up has only been possible on 17 children. Forty of the admissions occurred during a cholera epidemic when it was impossible to have follow-up, and 10 of them have been admitted in the last month. A missionary nursing sister from Germany (Heide) has just arrived at Mvumi, and one of her major responsibilities will be the follow-up of these children. Thirteen of the 110 children had died, but only four of these had received Vitamin A. Dr. Barclay was particularly impressed with the differential in mortality in the two groups, and this most interesting finding, which is consistent with the recent finding of the effect of Vitamin A deficiency on mortality in Indonesia, is worthy of more follow-up. The causes of death included malnutrition in two cases; dysentery in three; diarrhea and vomiting in three; encephalitis in two; and pneumonia, laryngeal obstruction, and meningitis in one each. Seventeen percent of the children were severely malnourished on admission, and the mortality was highest (26 percent) in this group. Four children with corneal ulcers were seen, and all were marasmic. One of these four children, a two year old male with bilateral ulceration and a past history of night blindness, died within 48 hours of admission. The other three children, a four year old male and eighteen month old male and a two and half year old female, all showed healing of their ulcers. Three of the four ulcers were present on presentation, and none of the ulcers could be attributed to herpes simplex or to the use of local treatment.

Dr. Foster has seen 40 children, aged less than ten years, with corneal ulcers and presented the results on 33 of these. Seven cases were excluded because they were clearly attributable to trauma, bacterial infection, or "chlamydial" infection. Nineteen had no history of measles in the last month. Thirteen of these were diagnosed as herpes simplex, and six were in children who were malnourished. Fifteen had a history of measles in the last month; and in some of these, measles was still active. The cases with measles tended to be younger, 14 of the 15 under the age of five, and the ulcers were predominantly bilateral. They were diagnosed clinically as keratomalacia, and 8 of the 9 bilateral ulcers perforated. One child in this group died.

Children with malnutrition also often had bilateral perforating ulcers which were considered to be keratomalacia. Herpes simplex ulcers tended to occur in older children, with half of them being over the age of five, and were usually unilateral although frequently geographic in distribution. None of these children died.

The preliminary results from both these studies are particularly interesting and are consistent with the hypothesis that Vitamin A deficiency is of key importance in the

development of corneal ulceration as seen with measles. It is expected that the follow-up on the children from the hospital-based measles study at Mvumi will be considerably improved with the arrival of the new nurse. So far neither center has been collecting corneal scrapings because of a misunderstanding in the memorandum sent in December. The procedures and protocol were reviewed and agreed upon, and at both centers two immunofluorescent slides and one slide for Geimsa stain will be collected from every child with corneal ulceration. Dr. Joe Taylor is particularly insistent that, if there is any way possible, the immunological studies on herpes should be performed at KCMC. He refers to a promise made by Dr. Sommer to send a technician to teach the technique to be used, and recently a Swiss technician skilled in immunostaining techniques has come on a long-term basis to KCMC. He remained unconvinced by the reasons put forward by Dr. Dawson to have the staining done in San Francisco. He feels that it is a very important issue in political terms apart from the general development of the facilities at KCMC. Further, Professor Rutnner from Zurich apparently has offered to do herpes immunostaining at KCMC if we do not.

Because of the logistics of my present trip and because I would not be able to get the specimens stored at KCMC, it was decided to leave all frozen serum specimens in Tanzania until the next trip. It is strongly recommended that on the next visit by ICEPO staff a small liquid nitrogen container be brought to transport the serum specimens back to Baltimore. This can be discussed further with Aggie Rider.

Dr. Mtanda of Muhimbili said that over 400 patients admitted to Muhimbili with measles had been examined, and the most common complication was blepharoconjunctivitis and superficial punctate keratitis. All children are said to get to Vitamin A on admission; and of these 400 patients, only four children had corneal ulcers, two of which were due to herpes and two of which were due to exposure. No cases of corneal ulceration due to measles or Vitamin A deficiency had been seen.

Other Papers Presented

Miss Ballard and Dr. Kavishe of TFNC presented the results of a pilot nutrition assessment undertaken in a village approximately 40 kilometers from Dar es Salaam. Ten children were studied with the weighing of food on three consecutive days and using the recall method for another three consecutive days. Each of these assessments was then repeated by another interviewer. The study was conducted at a time of food scarcity, and the energy consumption was only 34 percent of the RDA for Tanzanian children and the protein consumption was 32 percent of the RDA. Interestingly, Vitamin A consumption was

138 percent of the RDA because the children were eating a lot of casava leaves at this particular time because of a shortage of all other foodstuffs. By and large, there was fair agreement between the weighing and recall methods, although in all cases of discrepancy a high frequency was seen with weighing. This study was conducted as a pilot study to gain information on methodology to be used later in the large-scale national survey.

Several papers were presented on trachoma, including a paper by Dr. Gamili, who re-examined school children in an area where a WHO sponsored trachoma control program ran from 1968 until 1972. He had worked with the previous program and found no real change in trachoma prevalence over the ten-year interval. Interestingly, he did find the presence of the water within the school compound was associated with a lower prevalence of trachoma in the school children. His study was conducted for his M.P.H. thesis two years ago, and although he has a continuing interest in trachoma, he is not conducting any work at this time. Dr. Mmbaga reported the preliminary results of a study he has conducted in Hombolo, a village approximately 30 miles from Dodoma. He had examined 32 percent of the 3,500 people living in this area and found a prevalence of 1.9 percent of blindness and 20 percent of the population with trachoma.

Professor Franken gave a general paper on Vitamin A deficiency and mentioned the association with other infections such as ascaris, smallpox, and whooping cough. He also speculated about a possible increase in mortality in children who are Vitamin A deficient. He discussed some of the other signs of Vitamin A deficiency, including conjunctival pigmentation, alteration of the Meibomian glands, and skin changes. He has been interested in the histopathology of the anterior polar cataracts that occur after corneal perforation and discussed these in some detail.

Dr. Kavishe presented a report on the IVACG meeting, which both he and Dr. Mmbaga attended.

Dr. Peter Mihale, an AMO ophthalmologist at Iringa, presented a prospective study on uveitis. In the last few months, he has seen 21 patients with uveitis; 14 had anterior uveitis, 5 had panuveitis, and 2 had posterior uveitis. So far he has been doing blood film examinations and ESRs. Uveitis seems to be a particularly important cause of eye disease in some regions in Tanzania, and in two short visits to the eye departments at Dodoma and Mvumi, I saw more than a dozen cases of uveitis. In some of these cases, particularly in the younger children, giardiasis seems to be an important etiological factor, and treatment with Flagyl has been noted to be a significant improvement. Dr. Mihale will continue his

study and will be including stool and urine examination. Dr. Foster is collaborating closely with Dr. Mihale on this study.

Dr. Foster also presented his results from Mvumi. In the last 18 months, he has seen 68 cases of posterior or panuveitis, with a quarter of them occurring in children under one year and two-thirds of them occurring in children less than the age of ten. Twenty-five percent of the cases are bilateral and frequently have a hypopyon. As a rule of thumb, if they have an ESR over 100 and cough, they are treated for T.B. If they have greater than 10 percent eosinophils, they are treated with mebendazole for toxocara and others are treated with Flagyl, as mentioned. Unilateral uveitis is treated with retrobulbar Depo-medrol, and bilateral cases are treated with systemic steroids.

Dr. Mmroso from Dar es Salaam presented the results of his study of 100 patients in the Mwenda Leprosarium and suggested that 1 to 2 percent of the blindness in Tanzania was probably due to leprosy. He found increasing ocular involvement with increasing duration of leprosy and inadequate treatment.

Dr. Foster reviewed the etiology of corneal ulcers seen in adults at Mvumi. In the last 18 months he has seen 100 cases, and he compared his results with 115 cases reported from Muhimbili. Herpes simplex was responsible for approximately one-third of the cases seen. Of particular interest was the visual outcome in those treated within one week from the onset in that 70 percent retain 6/6 vision and only 18 percent had less than 6/60 vision. If treatment was delayed until after one week beyond the onset, only 6 percent retain 6/6 vision, and 68 percent had less than 6/60 vision. As a rule of thumb, bilateral red eyes were treated with tetracycline ointment, and a unilateral red eye was treated with tetracycline and atropine ointment.

A working session was conducted, reviewing the activities of the AMO ophthalmologists, including the need for them to provide ophthalmic input to the various medical and paramedical training programs; the need for the training of increased number of people to perform cataract surgery; problems with the distribution of glasses, the utilization of ophthalmic opticians, and drug supplies and vehicles.

Dr. Foster presented the results of a survey of blindness, conducted informally by Dr. Taylor and himself, in which they had examined over a thousand blind people during routine field work. Fifty-one percent of the blindness was due to cataract, and approximately 25 percent due to corneal scarring, of which about half was attributable to trachoma. Dr. Foster estimates that there are 150,000 people blind by cataract requiring surgery at the present. In the last year, approximately 1,500

cataract extractions have been performed by the twelve ophthalmologists in the country. For each ophthalmologist, there is a backlog in excess of 10,000 cases. One of the major problems in dealing with the backlog of cataract is that cases do not appear to be presenting for surgery. This is an observation common to all the operating ophthalmologists present at the meeting.

As well as providing a teaching session on xerophthalmia using xerophthalmia slides, I also gave two more formal one-hour lectures dealing with the overall understanding and epidemiology of trachoma and the effects of ultraviolet light on the eye including cataract.

Recommendations arising from the Seminar

The following recommendations were formulated by the meeting to be forwarded to the National Prevention of Blindness Committee:

1. A survey in Tanzania estimates the prevalence of blindness to be approximately 1.5 percent with cataract responsible for about 150,000 blind people and xerophthalmia and trachoma being the other major causes.
2. A preliminary report of surveillance of xerophthalmia by assistant medical officers of ophthalmology in nine regions shows very encouraging progress and has been extended to other regions.
3. A special multi-centered study on measles and the role of Vitamin A has already shown interesting preliminary results and is continuing.
4. Emphasis was placed on the training of all medical personnel, especially those working in the rural areas, and delegates will make every effort to provide teaching to medical assistants, regional medical aides, nursing and maternal and child health schools.
5. AMO ophthalmologists should be given opportunity for continuing education by short, in-service courses.
6. A nationwide campaign to encourage the introduction of dark green leafy vegetables into the weaning diet should be mounted as a practical measure for the eradication of nutritional blindness (xerophthalmia).
7. In view of the huge numbers of untreated cataract, it is recommended that specific steps should be taken to train cataract surgeons.

Other Discussions

Dr. Maletnlema

I was able to have a long discussion with Dr. Maletnlema, who attended the first day of the meeting in Dodoma. He is

particularly pleased with the progress that is being made by the surveillance program and by the general activities in prevention of blindness and xerophthalmia control. One of the things that pleases him particularly is the interest and involvement of people from many different groups and interests who are working together with TFNC. He sees the role of TFNC as not being strictly or narrowly defined but more as a facilitator of nutritional and related programs. I thought this was particularly important as the activities against blindness develop and expand with the creation of the National Committee, particularly as a survey of xerophthalmia is likely to include, at least in passing, observations on other eye diseases such as trachoma.

Dr. Maletnlema identified as one of the biggest problems the need to find local alternative sources of Vitamin A. He feels that Tanzania cannot afford capsules for the hospital treatment of children with measles. It is estimated that approximately one million Tanzanian children develop measles each year and to provide one capsule to each of these children would cost at least \$10,000 per annum. He was interested in the approach used in India, where Vitamin A syrup is used instead of capsules, and was wondering about the possibility of this being formulated in Tanzania. Although this may reduce the price per unit dose, I understand that the oft-quoted figure of one cent per capsule is the cost for delivery in the field and the cost of the capsule itself is only about one-third of a cent. So that even if a Vitamin A source were free, it would still cost approximately \$6,000 per year to distribute. He is interested in the possibility of looking into the use of powdered mchicha, possibly used as a slime, as an alternative local source of Vitamin A for use therapeutically. Alternatively, fish oil could be used if it could be freed from insecticides.

There is general agreement that it would be premature to plan a survey of xerophthalmia for Tanzania at present, and Dr. Maletnlema is keen that this should not commence until after the meeting in February, 1984. He expects, and wants, our close cooperation with the survey, particularly with the design, planning, and training aspects. He stressed the importance of proper sample selection, as he feels the need for firm prevalence data for political reasons. This is one of his areas of reservation about the surveillance program as it does not provide this sort of information. The actual responsibility for conducting the survey was not discussed, but it is implicitly understood that it will be under the direction of TFNC. The responsibility for data analysis was not discussed. Where the funds for such a survey will come from was not discussed in detail, but it is inferred that they will have to come from outside sources as the resources are not available in Tanzania. It is anticipated that help will be

sought from international agencies such as WHO, UNICEF, and the Dutch or Danish aid agencies.

Freir Pepping is to come from Holland in August and will spend three years working with teams in TFNC. TFNC now has an HPLC unit for assessing Vitamin A levels, which apparently is in working order. It is anticipated that the Dutch will concentrate on biochemical aspects of Vitamin A rather than in epidemiological or field surveys. Dr. Maletnlema wants the Dutch to work on two aspects of the biochemistry. The first is to look at the Vitamin A content of various local foodstuffs. Dr. Maletnlema is aware of our preliminary data on the Vitamin A content of mchicha samples and hopes that the Dutch will do a lot more of this work. Secondly, he sees them doing serum Vitamin A levels in specimens probably obtained from patients at Muhimbili hospital. He does not feel that serum Vitamin A biochemistry is needed in a survey, partially because of the cost and logistics that would be involved. If we wanted to have serum Vitamin A levels determined in the sample, I'm sure we could have these included, but, at present, TFNC is not pushing for this.

Dr. Kavishe

I had a number of long discussions with Dr. Kavishe, who is presently the officer in charge of the Vitamin A activities at TFNC. He also has some responsibility for goiter, but Vitamin A is his primary area of interest and responsibility. He is planning to spend three months in Europe and England starting in August this year and, starting in one year, hopes to undertake a Ph.D. at the London School of Hygiene and Tropical Medicine into some aspect of Vitamin A nutriture. He plans to spend one year in London and the following two years in field work in Tanzania. His wife is still working in England. Dr. Kavishe is still uncertain as to what will be the topic of his thesis. We discussed the possibility of him finding some aspect of the proposed national survey for his special interest and activity. As an alternative, he discussed the possibility of examining Vitamin A stores in liver specimens from different regions. I think this area will require further thought and discussion to try to get the most relevant and appropriate area of endeavor for Dr. Kavishe, who is undoubtedly a most valuable resource.

Dr. Allen Foster

Dr. Allen Foster will be returning to London for two months in December and January. He will use part of this time to analyze data that has been collected on both the surveillance and hospital-based measles studies. It was suggested that it may be possible for him to come to Baltimore for one week at the end of January to review this data with ICEPO staff

members. It probably would be a particularly valuable exercise; and if he were able to come to Baltimore, it may be that he could also lecture on some aspects of his work.

Sarah Day

Sarah Day, a community health nurse who has spent several years working with Professor Jones in London has just arrived at Mvumi. She will spend two years as a CBM-sponsored missionary, although her affiliation with London still remains unclear. She will be based in the Leprosy Hospital in Hombolo, where there is already an eye-trained nurse working at a community level. It is unclear exactly what work she will undertake for the next two years, but it is expected that a decision will be taken sometime in the next two weeks after further discussions with Dr. Foster and Dr. Joe Taylor. Her work will be aimed at examining community intervention measures and not at a purely service or therapeutic role. Professor Jones is very keen that she should work on trachoma, and the possibility of her undertaking a trachoma health intervention study was discussed in considerable detail. This may or may not be preceded by a limited risk factor study. As an alternative, she may look at the reasons why patients are not presenting for cataract surgery and attempt to modify the community awareness and attitude to cataract surgery. At present, Barrie Jones has given a firm commitment to attend the February meeting to be held in Arusha and will also spend some time during that visit working with Sarah.

February 1984 Meeting

The next Tanzanian blindness seminar will be held in February, 1984, at Arusha, and Dr. Marilyn Scudder is taking a key role in the organization of this meeting. The National Prevention of Blindness Committee was planning to hold a regional meeting in March, but it seems quite likely that the meeting in Arusha will be a joint meeting attended by the Kenyans. The Kenyan Society had previously planned to hold their own meeting and to invite people from Sudan, Ethiopia, and Somalia to attend. Now it is anticipated that all these representatives will be invited to the meeting in Arusha. Representatives will also be invited from Uganda, Malawi, and Zambia. It is anticipated that Professor Barrie Jones from London and Dr. Al Sommer and I will also attend this meeting. It is expected that approximately 100 people will attend this meeting and that it will cost approximately \$40,000 to \$50,000. The Tanzanian National Committee will have to seek external support for this meeting as it is beyond their capacity to find this amount of money within Tanzania. I am not sure at this time exactly what efforts they will make to get this.

I discussed with Dr. Mmbaga the present status of the proposed HKI study on village level blindness intervention. The study was planned to be carried out in a region near Dodoma where Sarah Day had originally planned to work. Because HKI was planning to do a study, she was forced to move to another area. Dr. Mmbaga has not heard from HKI since May, although there was some correspondence with Larry Campbell indicating that he would attend the present seminar; however, he did not come. To date it seems that no progress has been made.

Visit to Malawi

After several series of discussions, it was unanimously agreed that Dr. Mmbaga from Dodoma and Dr. Peter Mihale from Iringa should visit Malawi at the time of the start of the survey of xerophthalmia and blindness that is being conducted there. Dr. Kavishe will be in Europe at this time, and this decision was widely accepted. It is anticipated that they will probably visit Malawi for two to three weeks over the end of September and beginning of October. Their visit should include some of the training sessions for the field teams and also some time during which active field work is being conducted. It is anticipated that they will observe the methods being used for both training and field work so that they will be in a position to apply their experience in the survey that is planned to be conducted in Tanzania. Dr. Mmbaga has written to Dr. Chirambo in Malawi asking for an official request; and provided their travel allowances arrive in Tanzania without problem, they are not expecting any difficulties with obtaining the necessary government clearance to make this visit. They are also planning to write a brief report on their visit and observations.

Vitamin A Determinations in Vegetables

A further four specimens of dried dark green leafy vegetables were obtained from Mvumi. These were prepared by the nutritionist at the hospital following the standard traditional methods. A freshly prepared specimen of Mlenda was obtained. This leafy plant is the most commonly used dried vegetable. A sample of Mchicha was obtained, prepared in the traditional manner. It is usually cooked a little with some tomatoes and then dried. Specimens of Kunde, a pea-like plant of which only the leaves are dried, and Maboga, the leaves of a pumpkin plant, were also obtained. Fresh specimens of Mchicha, Kunde, and Maboga were purchased at the main market in Dar es Salaam as well as casava leaves (which are only eaten fresh). Mlenda, which apparently varies widely from region to region, was not in season.

Proposed National Survey and Coordination of Dutch Activities

I had a long and detailed discussion with Professor Franken and Dr. Kavishe about the planned national survey, with particular emphasis on the roles and responsibilities of the various institutions. The following points were discussed in detail and agreed upon:

1. Freir Pepping's first and major responsibility is to develop the biochemical capability at TFNC so that he can reliably determine Vitamin A levels and other tests related to Vitamin A biochemistry.
2. He will conduct some studies using serum Vitamin A determinations on serum obtained from Muhimbili and the Dar es Salaam region. He will concentrate on children with malnutrition, measles, and possibly other infectious diseases.
3. He will study biochemically the Vitamin A nutriture of children in a sample village near Dar es Salaam. He will quantify their daily intake and correlate this with serum levels. A major part of the study will be the determination of Vitamin A and pro-Vitamin A content of various local foods that are consumed. Once this methodology has been established, he may extend these studies into four to six villages representative of different regions.
4. It is generally agreed that the protocol designed by ICEPO for the study in Malawi should act as the basis of a protocol for the study in Tanzania. It is seen that ICEPO will take a leading role in the development of the protocol. It is hoped that it will be possible to meet for one to two days after the February meeting to review this protocol in detail and modify it for the Tanzanian situation. It is expected that this meeting will include several representatives from TFNC, The Tanzanian National Committee for the Prevention of Blindness, ICEPO, AMO ophthalmologists (probably Drs. Mmbaga and Mihale), Drs. Taylor and Foster, and representatives from Holland including Professor Hautvast from Vageningen and Professor Franken as well as Drs. Sommer and Taylor from ICEPO. Dr. Kavishe and Professor Franken have asked that they be sent copies of the protocol to review prior to the meeting, and such copies should probably be sent to the others as well.
5. Franken feels that he can probably find the funds needed for the survey from various Dutch agencies, particularly the Dutch Ministry for Foreign Aid, which has funds available for work of public health importance. He feels this should not be a great problem as Tanzania is one of the few countries that have been selected as concentration areas for Dutch

- aid. I indicated that the ICEPO collaboration in protocol development and other field-related activities, as mentioned below, would probably be covered under our existing USAID cooperative agreement.
6. The field teams on this project will be made up of Tanzanians with a Tanzanian project coordinator. It is envisaged that an expatriate could work with the Tanzanian project coordinator and assist in the general field supervision. I indicated that it would be unlikely that ICEPO would be able to provide such a person, and Professor Franken feels he can probably arrange for someone.
 7. The problem of data analysis was discussed at some length. Dr. Kavishe was rather keen to have the analysis performed in Tanzania, pointing out that TFNC does have an Apple II computer. Professor Franken also felt that it probably could be performed in Holland, where they have extensive computer facilities. I indicated our experience in data analysis from such surveys (for example, Malawi) and that we have both the hardware and the software but stressed that we did not have the funds to undertake such data analysis and would need extra support to do this. This matter will be more fully discussed in February.
 8. Professor Franken will discuss these proposals with Professor Hautvast and also Professor Jane Kusin (Professor Oomen's successor), and he will write to Dr. Kavishe and to ICEPO with the outcome of his discussions. It should be noted parenthetically that Dr. Joe Taylor stressed the need for a clear decision to be taken sometime during the February meeting on the number of people required for the survey and how long they would be required.

Other Meetings

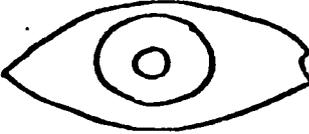
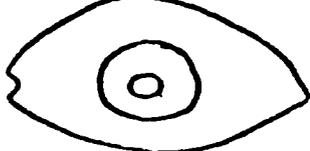
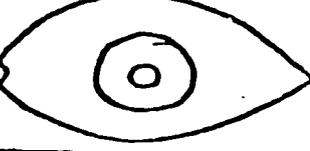
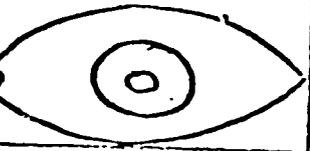
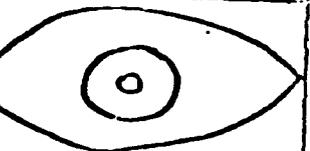
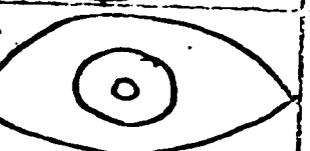
In Dar es Salaam, I had the opportunity to meet with Dr. Paul Ehmer, the officer in charge of health related activities for USAID. With Dr. Kavishe, we reviewed the Vitamin A activities in Tanzania and the technical assistance being provided by ICEPO. We talked at some length about the proposed survey, and there was general agreement on the present outline. Dr. Ehmer requested that we should keep his office better informed of our activities and suggested that we could send a copy of correspondence when planning further trips as well as copies of trip reports that may take more than half a year to arrive from Washington. He is also leaving Tanzania within the next few weeks; and his replacement, Dr. Joe Joseph, in fact, arrived the day of our meeting.

Also while in Dar es Salaam I had the opportunity to meet

with Dr. Urban Jonson, Director of UNICEF in Tanzania, and reviewed our overall progress to date and plans for the future activities. He was interested and supportive. Note--UNICEF is providing some assistance for the measles studies at Mvumi. UNICEF and WHO are collaborating on a model community health and nutrition project in the Iringa region. They are following a highly integrated and wide-ranging program at the most basic community level. Dr. Jonson indicated it would be most appropriate for UNICEF to assist with the travel arrangements for Drs. Mmbaga and Mihale.

Also, while in Dar'es Salaam, I visited the eye clinic at the Muhimbili Medical Center. Unfortunately, Dr. Singawe was not there, but I did have the opportunity to meet with Dr. Kinabo and Dr. Mtanda.

A.M.O. CHILDHOOD CORNEAL ULCER SURVEY - ALL CORNEAL ULCERS IN CHILDREN AGE 0-10 YEARS.

<u>NAME</u>	<u>SEX</u>	<u>AGE</u> YRS.	<u>RIGHT EYE</u> Draw and label the ulcer and any other relevant details. eg. BITOT SPOTS XEROSIS, HYPOPYON etc.	<u>LEFT EYE</u> Draw and label the ulcer and any other relevant details. eg. BITOT SPOTS XEROSIS, HYPOPYON etc.	<u>MEASLES</u> Did the child have measles in the last month?	<u>HISTORY</u> Any history of night blindness, trauma or local medicines. Please state.	<u>CAUSE</u> What do you think is the cause? eg TRAUMA HERPES S. MEASLES, BACTERIA.	<u>WT.</u> KG.	<u>HT.</u> CM.	<u>TREATMENT</u> What R _y was given and what was the outcome?
										
										
										
										
										

TOTAL NUMBER OF CHILDREN EXAMINED WITHOUT MEASLES..... MONTH.....

TOTAL NUMBER OF CHILDREN EXAMINED SUFFERING MEASLES HOSPITAL.....