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10. Abstract (optional - 250 word limit)  
This consultant's report follows a sudden change in staffing for the Health Information System (HIS) work being done by Project HOPE with the Ministry of Health/Belize. The consultant reviewed the status of the HIS work ongoing and the needs identified by the MOH, the donor (USAID/Belize) and the PVO (HOPE) and made recommendations for short-term support until a new HIS advisor was recruited and arranged local support for hardware and software problems for the MOH computers. A timeline was developed for activities to be done within the period before the consultant's next visit.

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CONSULTANT'S REPORT

HEALTH INFORMATION SYSTEMS

CHILD SURVIVAL TECHNICAL SUPPORT PROJECT

CLIFFORD D. OLSON

THE PEOPLE TO PEOPLE FOUNDATION, INC

(PROJECT HOPE)

MILLWOOD, VIRGINIA 22646

Project #1 SOS-0017

APRIL 5 - 14, 1988

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## EXECUTIVE SUMMARY

The MOH, USAID, and HOPE recognize the importance of data on service delivery and impact in assuring that limited resources are best used to provide the most effective interventions to the largest number of Belizeans. During the consultancy, both the Permanent Secretary and USAID reiterated that the success of HIS should be measured by its impact on management decisions.

To date, HOPE has succeeded in installing computer hardware, commencing training of MOH staff, and through the use of an expatriate long term advisor, demonstrating the collection, processing, and reporting of child survival data.

During the follow-up project, HOPE must institutionalize and Belizeanize these accomplishments. HOPE must also take great care to demonstrate how the HIS impacts management decisions at all levels.

Although the loss of the HIS advisor is keenly felt by everyone involved, it is important to pause, go beyond the loss, and consider the opportunities that this provides for reassessment and restructuring. Skills and competencies required of an HIS advisor during the first phase of the HIS effort are not necessarily sufficient and appropriate for the HIS objectives during the follow-up project.

The following text follows the assigned scope of work by recommending means of meeting immediate needs and assuring the accomplishment of goals and objectives included in the proposal for the follow-up project; but the approach is carefully selected so as to allow the MOH, USAID, and HOPE the time to consider more ambitious application of resources assigned to the HIS efforts.

In summary, the following report recommends that HOPE-Belize contract with local computer support firms to provide additional training plus on-going hardware and software support. Considerable attention is given to describing the details of such a relationship. The appendix includes a proposed Request for Proposals, a draft contract, and proposed curricula. The estimated cost of this approach is one sixth that of a resident expatriate long term advisor.

The report also identifies child survival reporting formats to be developed and delineates timelines and workplans to accomplish this. The Perinatal (previously the High Risk Pregnancy form) has been developed by committee during the consultancy.

The local support option and the form development process have been developed on the assumption that the HIS position will not be easily filled. They have also been developed in the anticipation that this delay will prove to HOPE's long term advantage by providing the time required to assess the viability of local support and the feasibility of a more ambitious approach to HIS efforts.

management.

## 1.0 INTRODUCTION

Project HOPE in consultation with the Ministry of Health (MOH) and USAID-Belize requested this consultancy in order to assess the current status of, and plans for, Health Information Systems (HIS) activities under the HOPE Child Survival Technical Support project. The Scope of Work is included in the Appendix.

Plans for the remainder of the first Child Survival project and the proposal for the follow-up project, scheduled to begin May 1, 1988, had assumed the continued availability of the HIS technical advisor. The proposal had budgeted for a full time resident HIS advisor during the first year with periodic consultancies during the later two years.

This report will recommend actions to assure continuation of HOPE's HIS activities after the death of the HIS advisor. The recommendations will apply primarily to the period of the follow-up project. It is anticipated that the recommendations included here will not affect approval of the already prepared proposal. No additional costs are involved. Neither are the objectives nor tasks included in the proposal altered in any way. Any USAID approvals required for administrative variations can most probably be accomplished through exchanges of correspondence.

The following text reflects the results of eight days of interviews with project staff, MOH officers, USAID officers, local computer support firms, and related PVO's. Unless otherwise stated, the consultant believes the following conclusions represent a consensus among relevant parties.

## 2.0 MEDICAL STATISTICS OFFICE

2.1 CURRENT STATUS. The Medical Statistics Officer and her staff of three people have received tutorial instruction from the ~~previous~~ HOPE HIS technical advisor. The content of this training has focused on basic computer operations, the Disk Operating System (DOS), Wordperfect word processing, and operation of the dBASE III application software used to process the MCH form. Much of this training has been directed toward the MS Officer herself. Another staff person with considerable computer aptitude has joined the office more recently and received less training. Two others have demonstrated less interest and prefer data entry under supervision and manual processing of forms for which software applications have not yet been developed.

The MS Officer demonstrates an ability to competently manage the entry of MCH data, process that data, and generate previously designed reports using the existing software. The staff is able to use Wordperfect to meet their wordprocessing needs. In addition, the tutorial instruction has provided a broad orientation to the use of computers for HIS purposes.

The child survival software development that has occurred to date (i.e. processing of the MCH form) has been done in dBASE III+ database software. It has been programmed to provide user friendly menu-driven applications. Documentation on this software is insufficient verging on nonexistent. Without additional training the MS Office staff is ill

repaired to respond to any occurrence out of the ordinary during use of this software.

Similarly, without additional training the staff is unable to develop additional database software applications. This ability will be needed to process the new forms under development and discussed later in this document.

Although the staff is familiar with the appropriate applications of electronic spreadsheets, they are not able to develop applications. The office does own a copy of Mathplan; but most computer users in Belize use Lotus 1-2-3.

*Should be of your interest?*

RECOMMENDATION: HOPE should purchase a copy of LOTUS 1-2-3 for the MS Office in order to assure compatibility between the spreadsheet applications developed in the MS Office and other installations within the MOH, the GOB, and the commercial sector in Belize.

Currently, were the MS staff to attempt the development of a software application it has no access to programming support to assist when problems arise.

Similarly, although much of the hardware is still under warranty, the office does not have access to persons able to identify hardware problems, remove defective parts, send the parts to the appropriate place for repair, and replace parts.

2.2 TECHNICAL ASSISTANCE REQUIREMENTS. In order to assure the maintenance of existing child survival services from the Medical Statistics Office the following needs have been identified. Arrangements to assure services to meet these needs should begin immediately in order to prevent interruption of MS Office operations. These needs have been categorized under three headings: training, software support, and hardware support.

Training. Additional training is required. Curriculum for each of these topics are included in the appendix as attachments to the Request for Proposals. Portions of this had been detailed by the HIS Advisor in anticipation of locally contracted training services.

Training will be provided by a local contractor, at a site other than the MS office, two hours per day (8:00 am to 10:00 am), four days per week, for the MS officer and one other person from the MS office. The HOPE Management Assistant will participate in the training as time permits in order to broaden her own skills and monitor the quality of the instruction. Training for the second person from the MS office will assure the presence of a trained staff person in the MS office while the MS officer studies in the United States.

In-country training will occur in the following four topic areas and in the following sequence.

Introduction to Hardware, DOS, and System Utilities. Most of this content has been included in tutorial training provided by the HIS advisor. Ten hours of instruction will review this information and assure a common basic knowledge.

Database Applications Using dBASE III+. Software applications for child survival will continue to be developed in dBASE III+. MS Office staff will need to understand the appropriate use of database applications. In the near term they will need to demonstrate a competence at using dBASE III+ in the menu-driven ASSIST mode. This will enable them to manage simple processing of the limited applications required during the remainder of 1988. It will also assist the staff in understanding the concepts and design used for processing the MCH form. (Thirty hours) will provide sufficient time for instruction and considerable practice. New forms should be ready for processing at about the same time the MS staff are learning dBASE III+. The timeline in the appendix illustrates the coordinated timing.

Lotus 1-2-3. Ten hours will enable the MS staff to use elementary electronic spreadsheets. Additional Lotus training can be provided at a later date if sufficient opportunities for Lotus applications develop.

Advanced dBASE III+. After the MS staff have consolidated their ability to use dBASE III+ in the ASSIST mode, and after the MS officer has completed US-based training, an additional 30 hours of training will enable the MS staff to use dBASE III code to develop more sophisticated database applications.

2.4 US BASED TRAINING. Experience with the implementation of similar MIS work in other countries suggest the unique value of US based training in consolidating the results of in-country computer training and in assuring participants the self-confidence they require to assume responsibility for MIS activities within Ministries of Health.

Training courses from the University of Chicago, the University of Michigan, the US Bureau of Census, and Management Sciences for Health (MSH) have been reviewed during the consultancy. The MSH course is the most appropriate for the MS Officer.

The MSH course, "Microcomputer-based Management Information Systems for Health and Family Planning", is the only of the four courses which focuses on MIS, Health, and database programming. The August 15 to September 9, 1988 dates fit well into the training timetable. It will follow preliminary in-country training in hardware, DOS, and system utilities, database applications, and LOTUS 1-2-3. It will precede in-country training in advanced dBASE III programming. The MS Officer should use the Perinatal form as a training exercise during the MSH course. During the June consultancy a committee of MOH officers should meet to identify those data items from the perinatal that should be entered into the computer during the first phase of analysis.

The search for additional US based courses should continue so as to consider any course offered by the University of Connecticut and any courses recommended by the appropriate USAID /Washington D. C. office. Alternative courses should be chosen only if the course has at least equal emphasis on MIS and Health. A greater emphasis on dBASE programming would be advantageous. Alternatively, MSH should be requested to provide one or two weeks of additional dBASE III tutorial training following the course.

A second staff person from the MS office will be ready for US based training after completing the in-country instruction. Assuming that the MS Officer finds the MSH course to meet her needs, HOPE should send this second person to the next scheduled Microcomputer MSH course.

2.5 SUMMARY OF ADVANTAGES. The combination of local service provided through contractual arrangements and US based training will provide the following advantages:

It is the most immediate method of providing the support required to assure the continued operation of child survival HIS. Filling the HIS position included in the proposal may be a lengthy process due to lack of candidates.

Using local firms to provide support will further the institutionalization of the HIS technical assistance. To date, the MS office has been dependent upon expatriate assistance.

If the contractual local support proves successful, it will be possible to rewrite the position description for what had been the HIS long term position. Such a newly defined position might focus less on the technical aspects of installing a computer and more on assisting the MOH in using available information to more appropriately direct limited resources toward carefully selected child survival goals.

A review of the rates charged by local computer support firms suggest that technical support purchased through a contractual arrangement will cost approximately one-sixth the cost of a resident advisor.

2.3 IN-COUNTRY IBM SUPPORT. The establishment of an IBM support office or an IBM distributorship in Belize would considerably facilitate assuring hardware and software support for the MS Office computer installation. The Project Concern International project director has initiated communications with IBM regarding this issue. Since the establishment of such an office would facilitate future installations undertaken by the MOH and funded by donor agencies such as USAID, these organizations should supply correspondence to support these efforts. Sample text for such correspondence is included in the appendix.

RECOMMENDATION: USAID and the MOH should supply correspondence to the PCI project director documenting their intention to install additional IBM computers in Belize.

2.6 TARGET OR BASELINE NUMBERS. Attempts to report coverage statistics for child survival services in Belize have been limited by the lack of appropriate denominators. Target or baseline numbers have been derived from the last census. Mobility within Belize plus an influx of refugee populations from other Central American countries have made these numbers no longer credible. Some immunization statistics, for example, report more than 100% coverage.

Meetings during the consultancy with officers from the Malaria program suggest that Malaria survey statistics may provide better denominators for coverage calculations. Currently, the Malaria workers survey each community in Belize not less than every six months. Their survey techniques are thorough. In one district workers have begun asking for the age of children in the household. This will soon be done nationwide. The Malaria program with assistance from USAID, will soon install a computer. This will facilitate the reporting of up to date data on age specific child populations. HOPE staff will meet with anticipated Malaria program consultants to assure that the Malaria database will be able to generate the appropriate age categories for child survival purposes. The objective is to assure that the Malaria program is able to supply data summaries that specify the number of children by age by village.

### 3.0 FORM DEVELOPMENT

The MCH form has been revised through an extensive process characterized by broad involvement. Other child survival forms still require review or design, testing, training, and implementation. Many of these forms are related to the introduction of the MCH Norms and Procedures. Discussions with MOH officers yielded the following prioritized list of forms requiring attention:

the Perinatal form

the Take Home Card

the Community Health Worker reporting form

3.1 The Perinatal Form. This form was reviewed by a committee of twelve relevant MOH officers during the course of the consultancy. The committee reached agreement on content, layout, and testing. The form is included in the appendix. The form gathers information on factors associated with high risk pregnancy and serves two functions. Firstly it follows the pregnant women through the ante-natal period and delivery and accompanies the newborn into the nursery. Data collected on the form during this course enables clinicians to provide higher quality care. Secondly, selected information from the card will be entered into a computerized database so that periodic reports will be able to indicate correlation

between particular risk factors, low birth weight, still births, infant mortality, and maternal mortality among population groups in Belize. This information will allow the MOH to better target health information campaigns.

The form will be duplicated in sufficient quantities for initial testing in the high risk clinic at Belize City Hospital. After the development of instructions and the presentation of training sessions for clinicians using the form, testing will run for two months at the hospital and be followed by two months of testing at peripheral clinics. The HOPE nurse / midwife educator will monitor the testing of the form. Printing of larger quantities will occur after revisions have been made. The quantities printed will guarantee supplies for all pregnant women in Belize for not more than two years in order to facilitate periodic revisions. MOH officers suggest that training will be tentatively scheduled for October, 1988.

The Director of MCH has initiated inquiries about alternative means of funding the printing of this form.

3.2 THE TAKE HOME CARD. Belize already uses a take home card in conjunction with an ante-natal card. The perinatal card will replace much of the information currently collected on the ante-natal card. The perinatal card does not include a record of the health education services provided the pregnant woman. Revision of the take home card could focus more on health education and include information on multiple pregnancies.

3.3 COMMUNITY HEALTH WORKER FORM. Both CARE's Maternal And Child Health (MACH) and Project Concern International (PCI) have significant community health worker (CHW) programs. Information on the performance of these CHW's does not reach the MS Office for inclusion in child survival assessments. Neither is it used to support and build supervisory relations with the Rural Health Nurses (RHNS). Neither is it generally available for the planning activities of the District Health Teams (DHTs) being revived under the Director of Primary Health Care. Discussions suggest that neither PVO would resist such a process; in fact, both groups and the Director of PHC are eager to meet and begin designing the process.

For child survival purposes, information on the incidence of diarrheal disease, the use of ORT, the extent of malnutrition, and community level information on immunization coverage can best be collected by CHW's. For PHC purposes the CHW's are the means through which village level felt-needs can be communicated to the DHTs.

From an MOH perspective, the carefully selected content of a CHW reporting form communicates and delineates the priority tasks of a CHW. From a PVO project perspective the CHW reporting form is a constant reminder for the CHW of project priorities.

The Director of PHC plans to contact the relevant PVOs asking that they discuss reporting procedures with their CHWs and bring these comments to a

meeting on Friday, June 10th. The meeting will define minimal common indicators useful to the MOH, define a process that enables each PVD to select additional indicators to be used in its service area, detail protocols for field testing, and begin planning for training to accompany implementation. Implementation training will include RHNs who will use the collected information to provide improved support to the CHWs.

3.4 REVISIONS TO THE MCH FORM. This form has served well for nearly a year; but the best information systems are those in which reporting forms change with evolving programmatic priorities. The MCH form requires revision of the reporting of nutritional status. It will also carry summary CHW information to the MS Office.

3.5 PROBLEMS WITH REGISTER BASED DATA COLLECTION. Currently, much of the data collection undertaken by the MS Office requires staff to borrow registers from hospital clinics, review difficult handwriting to count occurrences or incidence, then manually process the resulting tally into reports. Registers do not serve clinicians because the information in the register is not easily accessed by the clinician during the clinician's contact with the patient. Since such a register based system serves neither quality of clinical care nor the management information systems, it should be replaced by a system of client cards and tally sheets with the use of registers limited to assuring cross indexing.

RECOMMENDATION: In order to assure better access to child survival information and improved quality of care, the MOH should request that HOPE assess the current system and propose a more efficient system.

At rural health centers clinic services are likewise recorded in registers. Currently these registers are not organized by village. A simple revision of recording services by village would allow the CHW to more easily assume responsibility for monitoring coverage of child survival services within the CHWs village.

RECOMMENDATION: The MOH should ask HOPE's assistance in the design of a village based recording system at the rural health centers.

#### 4.0 REVIEW OF HIS ELEMENTS OF HOPE'S PROPOSAL

The following text responds to quoted sections related to HIS from the HOPE proposal. In summary, all sections of the proposal related to HIS remain valid except for the delay in commencing the one year of HIS assistance. Nevertheless, tasks will be accomplished as originally scheduled.

"By the end of the project it is expected that the HIS will be extended

to include all MCH data and that computer operations for the MSO will be self-sufficient." (page 2)

This remains a reasonable expectation. All MCH data systems could be in place as early as 1989. The use of local technical support will facilitate earlier than expected self-sufficiency of the MSO.

"By the end of the project it is expected that central and district level Ministry personnel will use improved monitoring capabilities to apply appropriate managerial responses which increase the coverage and utilization of child survival technologies. Priority areas of expansion are linking the perinatal data from maternity wards, nurseries, Traditional Birth Attendants, and from the High Risk prenatal clinic; strengthening the disease surveillance systems for EPI, CDD, ARI and malnutrition; and integrating the reporting of CHW activities to the MCH and PHC programs. This ministerial programming capability, applied during the life of the project to attain the short-term goals of each child survival program, would be applied after the project to reach and maintain the long-term goals of the programs." (page 3)

The introduction of new child survival related forms will be accompanied by training for central and district level MOH staff in the use of the data generated by these forms for child survival monitoring purposes. Perinatal data and high risk pregnancy data will be collected on the form designed during this consultancy, EPI is included on the MCH form. CDD, ARI and malnutrition data will be included on the CHW form which will integrate the reporting of CHWs to MCH and PHC.

"MCH program activities outside of the health centers has yet to be integrated into the HIS." (page 5)

The CHW form scheduled for the June 10th meeting, and minor revision of the MCH form will assure integration of these activities into the HIS.

"The MOH will have to identify means by which ongoing computer maintenance and other computer support will be absorbed in their budget." (page 9)

This process will be facilitated by establishing contractual relationships for local support earlier than originally planned so that the relationship can be perfected and costs more clearly established.

"The Health Information Specialist will work full time for the first year of the project, completing the training that will provide the MSO the capability to maintain the Child Survival HIS. Additionally a training course, developed specifically for the MSO, will be taught on an annual basis by the Medical Statistics Officer and possibly a private sector computer trainer - both Belizeans. The Health Information Specialist will

return to Belize semiannually during the last two years of the project to provide supervision and consultation for the MCH MIS." (page 10)

Training for the MSL will be completed through the contractual relationship with the local firm plus US based training. The one year of Health Information Specialist will be delayed by the lack of candidates and in order to provide time to assess the success of local support. The same year could be used to support an Information Specialist with a more management orientation. The training course will be provided as suggested. Periodic visits by an HIS consultant will still be required.

#### "OBJECTIVES

1. Perinatal data is incorporated into the MOH HIS by May 30, 1989. (page 17)

This will be accomplished during 1988.

1. The computerized HIS is institutionalized in the MOH by April 1, 1991.
  - a) The HIS is extended to include all MCH data by April 30, 1989.
  - b) Computer operations for the MSD are self-sufficient by April 1, 1991." (page 18)

The HIS will be extended to include all MCH data by April 30, 1989 and the MSD will be self-sufficient by April 1, 1991.

"By the end of the first year of the project, a database of perinatal information will be established which will provide information on the extent and nature of the problems in high-risk pregnancies in Belize." (page 22)

By the end of the first year the perinatal database will include 12 months of data from the Hi-Risk Pregnancy Clinic and eight months of nationwide data.

IMPLEMENTATION TIMELINE  
PROPOSED

TASK	88			89									
	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	
PERI-NATAL FORM													
DESIGN	X												
PRETEST TRAIN		X											
FIELD TESTING, BCH		X=====											
FIELD TEST, CLINIC			X=====										
REVISIONS					X								
SOFTWARE DEVEL						XXXX							
PRINTING						XX							
NATIONWIDE TRNING									XXXX				
CHW FORM (draft only)													
DESIGN			X										
PRETEST TRAIN				X									
FIELD TEST				X=====									
REVISIONS						XX							
NATIONWIDE TRNING									XXXX				
MCH FORM REVISION								XX					
TAKE HOME NATAL CRD (draft)													
DESIGN													
PRETEST TRAIN				X									
FIELD TEST, CLINIC				X=====									
REVISIONS						X							
PRINTING							XX						
NATIONWIDE TRNING									XXXX				
OUTPATIENT FORM (draft)													
DESIGN									XXX				
PRETEST TRAIN										X			
FIELD TESTING, BCH										X=====			
FIELD TEST, DIST HOSP											X=====		
FIELD TEST, CLINIC												X=====	
REVISIONS												X=====	
NATIONWIDE TRNING												X=====	
MSD TRNING, IN COUNTRY													
Intro, hard DOS utl				X									
dBASE, ASSIST				XX									
LOTUS 1-2-3					X								
dBASE, code									XXX				
MSD TRNING, USA												XXXX	

NOTE: The term "draft" indicates the proposed schedule has not been approved by the MOH & represents the consultant's recommendations only.

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## REQUEST FOR PROPOSALS

### COMPUTER SUPPORT FOR THE MOH MEDICAL STATISTICS OFFICE

#### PROJECT HOPE, BELIZE CITY, BELIZE

INTRODUCTION. The Project HOPE Child Survival Technical Support project has purchased and installed two IBM PC computers in the Medical Statistics Office of the Ministry of Health. A HOPE resident expatriate technical advisor has supervised the installation of these computers, developed software to process the MOH Maternal and Child Health (MCH) reporting form, and provided ongoing tutorial training to the MSO staff.

The MSO staff are able to enter data and produce previously formatted reports generated from this data. They are also able to meet their word processing needs.

Currently, HOPE does not provide expatriate technical assistance. Some support needs are anticipated; and HOPE plans to meet these needs through a contractual agreement with a Belizean firm. The following text will detail anticipated needs for assistance.

Interested parties should respond to Project HOPE with a proposal that includes:

- description of the responding firms past and current work,
- resumes for the relevant staff members,
- text describing how the firm provides the required assistance, and
- projected costs.

HOPE intends to contract with the selected firm for an initial period of six months for the designated training according to the descriptions listed below; and for the technical and software support on an as needed basis within the limits described herein. Terms of the contract may be expanded by agreement of both parties. It is anticipated that the contract will be extended beyond the first six months based upon experience during the initial period.

The Project HOPE child survival contract with USAID extends for a three year period beginning May 1, 1988. The envisioned contractual relationship may prove a model for other USAID assistance to the Government of Belize and for other computer installations within the MOH.

The deadline for submission of proposals is April 27, 1988. Selection will occur on May 1. The contract will be signed as soon as possible after the selection and training will commence in mid-May.

## I. TRAINING NEEDS.

Three persons will be trained two hours per day (8:00 am to 10:00 am), five days per week, for a total of eight weeks at the firm's office. The contractor must have three computers available at its office in order to provide hands-on experience for both students at all times. Instruction will be provided consistently during the two hour sessions and homework assignments will be completed outside of the two hour sessions.

Training will include the following components:

INTRODUCTION TO HARDWARE, DOS, AND SYSTEM UTILITIES: (One week, five days)

suggested curriculum for this component is included in Appendix A.

DATABASE APPLICATIONS USING DBASE III PLUS: (Three weeks, 15 days)

Most of the work undertaken by the MSO involves database applications. It is essential that both trainees demonstrate competence in the use of dBase ASSIST and the screen editor, the ability to design simple file structures, and generate simple reporting formats.

a sample curriculum is included in Appendix

LOTUS 1-2-3: (one week, five days)

DBASE III+ ADVANCED. This training will occur beginning in late September after the Medical Statistics Officer returns from US based training. A curriculum for these weeks has not yet been developed.

## 2. SOFTWARE SUPPORT

Time required for software support is more difficult to predict. Ranges of time are included here and reimbursement will be made according to actual time expended up to the limit included in the contract.

MCH FORM PROCESSING. The contractor will be expected to assist in revisions of the existing programs for processing the MCH forms if problems should arise or modifications prove advisable. (maximum estimated time requirement = 40 hours)

PROGRAMMING FOR NEW FORMS. The contractor will be asked to assist with the design of file structures and any programming tasks beyond the skill level of the MSO staff. (maximum estimated time = 80 hours)

3. HARDWARE SUPPORT.

The contractor is expected to be available to consult with MSO staff regarding suspected hardware problems, remove defective parts, send the parts to the appropriate address for repair, and replace the new board or part upon its arrival.

The contractor will advise MSO staff regarding on-going maintenance.

Based upon the seven months experience with the two computers, 30 hours of assistance is anticipated during the 6 months contractual period.

Although Project HOPE prefers to contract with a single firm or individual for all of the above services, respondents may choose to bid on only one or two of the three components (training, software support, hardware support). Proposals for more than one element should break down the cost by element.

SUMMARY OF MAXIMUM TIME REQUIRED PROJECTIONS

	HOURS	HOURS
TRAINING		
INTRODUCTION HARDWARE, DOS, UTILITIE	10	
DATABASE III+	30	
LOTUS 1-2-3	10	
DATABASE III+ (advanced)	30	80
SOFTWARE SUPPORT		
MCH FORM PROCESSING	40	
HIGH RISK PREGNANCY FORM	80	120
HARDWARE SUPPORT		
		30
		-----
		230

## I. Hardware Overview

### A. Keyboard

1. Connection
2. Adjustments
3. Special Keys
  - a. ESC
  - b. Shifts
    - (1) Shift
    - (2) Ctrl
    - (3) Alt
  - c. Locks
    - (1) Num Lock
    - (2) Caps Lock
  - d. Cursor Navigation
    - (1) Arrow keys
    - (2) Page keys
    - (3) Home, End
  - e. Character Deletion
    - (1) Insert
    - (2) Delete
    - (3) Backspace
    - (4) Space bar

### B. Screen

1. Types
  - a. graphics
  - b. color
2. Connection
3. Adjustments
  - a. position
  - b. brightness
  - c. contrast

- C. Disk Drives
  - 1. Location
  - 2. Types
  - 3. Floppies
    - a. type 360Kb - 1.2Mb
    - b. insertion
    - c. write protect tab
    - d. in-operation light
    - e. formatting
  - 4. Hard disk
    - a. type
    - b. in-operation light
    - c. subdirectories
    - d. partitioning - formatting
- D. Expansion Slots
  - 1. Location
  - 2. Types
    - a. memory 640K
    - b. disk drive controller
    - c. monitor board
    - d. additional applications
    - e. parallel / serial communications
      - (1) cabling
      - (2) naming conventions
- E. Main processing board
  - 1. Location
  - 2. description
    - a. memory
    - b. CPU
    - c. keyboard controls
- F. Printer
  - 1. paper feed mechanisms
    - a. positioning feed bins
    - b. loading bins with paper
    - c. selecting bin
    - d. loading paper into machine
    - e. refilling printer with paper during operation
  - 2. control panel
    - a. select on/off
    - b. feed line/form
    - c. mode LQ/DRAFT
    - d. FONT
    - e. QUIET
  - 3. ALERT light/PANEL Code
  - 4. Maintenance
    - a. changing ribbons
    - b. cleaning/dusting use of dust cover

MSO Computer Operations Training

## II. DOS Command Program and System Utilities

## A. Orientation

## 1. Installation of DOS on the MSO computers

- a. COMMAND.COM installed in \(\root)
- b. External DOS commands in \BIN
- c. Additional utility files in \UTIL
  - (1) Norton Utilities
  - (2) Sideways
  - (3) waitasec
  - (4) dskwatch
  - (5) CED

## 2. Additional resources for DOS and Utilities

- a. Manuals for DOS, Users Guide, Norton Utilities
  - (1) List of commands
  - (2) Index
  - (3) Installation instructions
  - (4) Simple instructions for getting started
- b. Master copy of program on floppy disks
  - (1) DOS program
  - (2) BASIC
  - (3) Norton Utilities
  - (4) Tutorials
- c. Tutorial introduction to DOS
  - (1) Accessed thru Training menu selection (T)
  - (2) Broken into lessons to orient new user to basics
- d. Introduction to Norton Utilities
  - (1) Introductory tutorial
  - (2) Accessed at the DOS level by NI
- e. Textbook Managing Your Hard Disk
  - (1) Introduces use of DOS by topic

## B. Description

1. Files access
2. Program access
3. device control

## C. Disk preparation

1. FORMAT
2. FDISK
3. CHKDSK

SIMPLIFIED PERINATAL CLINICAL RECORD INSTITUTION

FILE No

SURNAME OTHER NAMES

ADDRESS AGE Years LITERATE Yes No EDUCATION LEVEL None Se- cond Prim Univ CIVIL STATUS Married wife Single Div DRUGS alcohol cigarettes other

DISTRICT HISTORY PERSONAL No Yes OBSTETRICAL ABORTIONS VAGINAL LIVE BORN STILL ALIVE ANY PREVIOUS NEONATE OF LESS THAN 2500 g

PREGNANCY Pre-preg-weight Height LMP EDC Day Month Year Doubl. TETANUS TOX ACTUAL PREVIOUS 1° 2°/B BLOOD GROUP HOSPITALIZATION REFERRAL

VISIT No	1	2	3	4	5	6
DATE						
WEEKS OF AMENORRHEA						
WEIGHT (Kg)						
BLOOD PRESSURE Sys/Diast (mm Hg)						
URINE prot glu						
UTERINE HEIGHT Pubis - fundus (cm)						
Foetal hear rate/movements						
PRESENTATION Vertex Breech or Transv						

LABOUR/ABORT Referred From GEST AGE ONSET MEMBRANES Time of Rupture Vertex Breech Transv

LABOUR	Time	Maternal Heart Rate	BLOOD PRESSURE Sys/Diast (mm Hg)	CONTRACTILITY FREQ 10 min/DURATION sec.	STATION/POSITION	Foetal Heart Rate	DILATION CX. (in cm)	MECONIUM

- PROBLEMS OF PREGNANCY/DELIVERY/PURPERIUM
- Multiple pregnancy
  - Previous hypertension
  - Pre-eclampsia
  - Eclampsia
  - Cardiac Disease
  - Diabetes
  - Urinary infection
  - Other infections
  - Parasitosis
  - Threatened Premature Labor.
  - Ceph Pelv Disproportion
  - 1st trim bleeding
  - 2nd trim bleeding
  - 3rd trim bleeding
  - Chronic anaemia
  - Premature rupture of mem.
  - Puerperal infection
  - Puerperal bleeding
  - Other
  - None

DELIVERY Spont. C-Sec. Forcep. Oth. LEVEL OF CARE 3° 2° 1° Home Other Attended by Physician Nurse/Midw Auxil. Student/T.B.A Other NEON. CLIN RECORD No NEON. Name

INTRAPARTUM MEDICATION Local Anest. Reg Anest. Gen. Anest. Analgesic Tranquil Oxytocin Antibiotics Other None

NEWBORN F - SEX M APGAR score 1m 5m 0-6 at 1m Resuscitation BIRTHWEIGHT Gest. AGE estimated by exam. Weight/GA 1st neon. Exam. TIME ELAPSED SINCE DELIVERY/ABORT TEMPERATURE PULSE (b.p.m.) BLOOD PRESSURE Sys/Diast (mm Hg) UTERINE RETRACTION LOCHIA

ROOMING-IN DISCHARGE (neon) AGE AT DISCHARGE or REFERRAL AGE AT DEATH FEEDING Breast Br.+Bott. Bottle Maternal discharge Healthy Referral ILL Maternal death during pregnancy Delivery Puerperium Contraceptive advice Condom I.U.D. Oral Nonn Tubal ligation Rhythm Other

MSO Computer Operations Training

- D. File access
  - 1. DIR
    - a. file name conventions
  - 2. TYPE
  - 3. DS
  
- E. File Control
  - 1. COPY
  - 2. RENAME
  - 3. DELETE / ERASE
  
- F. Hard copy
  - 1. PRINT
    - a. Loading PRINT
    - b. Printer Device names
  
- G. Hard disk file access
  - 1. DIR, DS
  - 2. CD, MD, RD
  - 3. PATH
  - 4. NCD, LD
  - 5. FF
  
- H. Advanced features of DOS
  - 1. BAT files to automate command entry
  - 2. AUTOEXEC.BAT file to automate system start up
  - 3. SYS files to redefine devices
  
- I. Limitations
  - 1. 640 K
  - 2. command structure requires command memorization
  
- J. Use of PATHMASTER to allow for ease of use to novices
  - 1. entry and return to PATH usually automatic
  - 2. if at DOS level and want to return to menu PMENU or RETURN
  - 3. exit form PATH, (F1, password, menu choice EXIT TO DOS)
  - 4. updating PATH
    - a. new entries to menu
    - b. new submenus
  - 5. Use of passwords in PATHMASTER for system security
    - a. what should be protected
    - b. who should know the password

IV. Database applications using dBASE III Plus

A. Orientation

1. Installation of the Program on the MSO computers

B. Additional resources for dBASE

a. Two volume Manual set

(1) Volume I includes

(a) List of commands

(b) Index

(c) Installation instructions

(d) Simple instructions for getting started

(2) Volume II includes

(a) Overview and samples of programming techniques

(b) Intro to ADMINISTRATOR for LAN use

(c) Intro to RUNTIME +

b. Master copy of program on floppy disks

(1) dBASE program on two system disks

(2) Tutorial, and sample programs

(3) Applications generator

c. Tutorial introduction to dBASE III +

(1) Accessed thru Training menu selection (T)

(2) Broken into lessons to orient new user to terminology and basics of database

C. Introduction to dBASE program.

1. Orientation to ASSIST

a. pull down menus

(1) navigation thru menus

(2) sequence of selections

b. Status bar

c. command line

d. Navigation line

e. help

- TO
2. Creating a database file
    - a. design file structure
      - (1) data available
      - (2) data types and range of values
      - (3) how to be retrieved and reported
    - b. program file structure
    - c. design screen format
    - d. data entry
  3. Modifying a database file
    - a. editing file contents
      - (1) individual changes EDIT, BROWSE
      - (2) systematic replacements REPLACE
      - (3) copying files and portions of files to new files COPY
    - b. editing a file structure
      - (1) copying structures COPY FILE
      - (2) changing the characteristics of a field MODIFY STRUCTURE
      - (3) adding/deleting fields
    - c. Changing the order of information
      - (1) logical access of data by INDEX
        - (a) index upon opening of file
        - (b) reindexing after changes
        - (c) multiple index files
      - (2) physical location of data by SORT
  4. Retrieving information from database
    - a. locating a single record LOCATE, FIND, SEEK
    - b. retrieving data across records SUM, AVERAGE, COUNT
      - (1) for all records in a file
      - (2) conditional selection of records
    - c. standardized reports
    - d. customized programs
- D. Orientation to programs written in dBASE program language
1. Menu selection by function
    - a. Data Entry
      - (1) types of Forms
        - (a) for MCH monthly form
        - (b) for Booking clinic form
        - (c) for ORU form
      - (2) Login procedure for forms as enter MSO
      - (3) deadline for data entry to meet reporting dates

## LOTUS CURRICULUM

### INTRODUCTION TO SPREADSHEETS AND THEIR APPLICATIONS

#### AN OVERVIEW OF 1-2-3

- formulas
- functions
- spreadsheet commands
- graphics
- database applications
- installation
- starting up and exiting

#### LEARNING THE SPREADSHEET BASICS

- entering numbers
- entering text
- entering formulas
- moving around the spreadsheet

#### 1-2-3 COMMANDS

- using ranges in the worksheet
- using worksheet commands
  - erasing worksheets
  - setting column width
  - using windows
  - using titles
- deleting and inserting rows and columns
- saving the file

#### FORMATTING CELL CONTENTS

- formatting
  - fixed format
  - currency format
  - comma format
  - percent format
  - date format
  - text format

#### USING FUNCTIONS IN THE SPREADSHEET

- mathematical functions
- basic statistical functions
- data management functions
- logical functions

## FILE MANAGEMENT

- saving files

- retrieving files

- protecting files with passwords

- deleting files

- TRANSFERRING FILES BETWEEN 1-2-3 AND DBASE

## PRINTING REPORTS

## CREATING AND DISPLAYING GRAPHS

- selecting a graph type

- specifying a worksheet data range

- adding labels, titles, and legends

- preserving the graph

## PRINTING GRAPHS

OTHER NAMES

ADDRESS

COUNTRY

AGE Years: Under 15 y s. Over 35 y s.

LITERATE: Yes No

EDUCATION LEVEL: None, Se- cond., Univ.

CIVIL STATUS: Com-law, Married, wife, Single, Oth

DRUGS: alcohol, cigarettes, other

HISTORY: FAMILY (Diabetes, Pulmonary TB, Twins, Others), PERSONAL (Pulmonary TB, Diabetes, Hypertension, Uter-pelvic surgery, Infertility, Others), OBSTETRICAL (PREGNANCIES, ABORTIONS, DELIVERIES, VAGINAL, C-SECTION, LIVE BORN, STILLBORN, STILL ALIVE, DIED in 1st week, DIED after 1st week)

ANY PREVIOUS NEONATAL OF LESS THAN 2500 g: No Yes

HIGHEST PREVIOUS BIRTHWEIGHT: [ ]

DATE OF TERMINATION OF LAST PREGNANCY: [ ] [ ] [ ]

PREGNANCY: Pre-preg weight, Height, LMP, EDC, Day, Month, Year, Doubt, IETANUS TOX PREVIOUS, ACTUAL PREVIOUS, BLOOD GROUP, HOSPITALIZATION, REFERRAL

CLINICAL Exam (NORMAL), BREAST Exam (NORMAL), PELVIS (NORMAL), PAPSMEAR (NORMAL), CERVIX CLIN Exam (NORMAL), VDRL

SICKLE CELL, Trait Disease

VISIT No	1	2	3	4	5	6
DATE						
WEEKS OF AMENORRHEA						
WEIGHT (Kg)						
BLOOD PRESSURE Sys/Diast (mm Hg)						
UTERINE HEIGHT Pubis - fundus (cm)						
Foetal hear rate/movements						
PRESENTATION Vertex Breech or Transv						

LABOUR/ABORT: Referred From, GEST AGE, ONSET (Spont, Ind), MEMBRANES (Int, Rupt), Time of Rupture (Hr, Day, Month), Vertex, Breech, Transv

PROBLEMS OF PREGNANCY/DELIVERY/PUERPERIUM: Multiple pregnancy, Previous hypertension, Pre-eclampsia, Eclampsia, Cardiac Disease, Diabetes, Urinary infection, Other infections, Parasitosis, Threatened Premature Labor, Ceph Pelv Disproportion, 1st trim bleeding, 2nd trim bleeding, 3rd trim bleeding, Chronic anaemia, Premature rupture of mem, Puerperal infection, Puerperal bleeding, Other, None

LABOUR: Time, Maternal Heart Rate, BLOOD PRESSURE, CONTRACTILITY, STATION/POSITION, Foetal Heart Rate, DILATION CX, MECONIUM

DELIVERY: Spont, C-Sec, Forc, Oth, LEVEL OF CARE (3\*, 2\*, 1\*, Home, Other), Attended by (Physician, Nurse/Midw, Auxil, Student, T.B.A, Other), DELIVERY, NEWBORN

NEON. CLIN RECORD No, NEON. Name

INTRAPARTUM MEDICATION: Local Anest, Reg Anest, Gen. Anest, Analges, Tranquil, Oxytocin, Antibiotic, Other

NEWBORN: F, SEX, M, APGAR score, BIRTHWEIGHT, GEST. AGE, Weigh V.G.A., 1st neon. Exam., TIME ELAPSED SINCE DELIVERY/ABORT, TEMPERATURE, PULSE (b.p.m.), BLOOD PRESSURE, UTERINE RETRACTION, LOCHIA

DISCHARGE EXAM., NEURO. EXAM., PROBLEMS: H.M.D., Aspiral. Synd., Bleeding, Other RDS, Apnoea, Congen. Anom., Other, Hiperbill., Infection, Neurol., None

ROOMING-IN, DISCHARGE (neon), AGE AT DISCHARGE or REFERRAL, AGE AT DEATH, Maternal discharge, Maternal death during pregnancy, Contraceptive advice



MANAGEMENT SCIENCES FOR HEALTH  
Management Training Program  
presents a four-week training course in English:

## **MICROCOMPUTER-BASED MANAGEMENT INFORMATION SYSTEMS** **FOR HEALTH AND FAMILY PLANNING**

14 MARCH TO 8 APRIL AND 15 AUGUST TO 9 SEPTEMBER, 1988  
at the MSH training center in Boston, Massachusetts, USA

### Audience

Managers working in National/International Health, Nutrition, MCH or Population Programs; Technical staff responsible for designing, implementing and operating microcomputer-based information systems to support these managers. Since the course assumes little or no experience in microcomputer operations, it is not for programmers or advanced microcomputer users.

### Course Overview

This four-week course aims to provide participants with the necessary skills for developing, implementing and operating microcomputer-based information systems in the context of Health, Nutrition, MCH, and Population Programs. The course begins with an examination of the issues related to the design and implementation of Health Management Information Systems. Common misconceptions, design-related problems and implementation issues are discussed. A practical and simple step-by-step approach to designing information systems is presented and practiced in class using specific applications based on the interest and experience of the participants. In addition, participants will learn how to use state-of-the-art microcomputer software as effective tools in their information system.

### Course Content

This course takes a practical "laboratory" approach to the subject of microcomputer-based information systems for health programs. Course topics include:

- Issues related to information systems in the public health setting
- Introduction to systems analysis and the design of user-oriented information systems
- Defining the role of the microcomputer in an information system
- Selection of an appropriate microcomputer system
- Microcomputer operation and management
- Improving office productivity using word processing
- Using electronic spreadsheets
- Using relational database technology
- Development of microcomputer-based information systems

### Fees

\$3800 includes tuition and course materials. Airfare, per diem, and health insurance are the responsibility of the sponsoring organization. There is an additional \$350 fee for computer rental.

\*The course will be offered in Spanish in Latin America during the summer of 1988; and in French in West Africa during the fall of 1988.

Applications should be sent by 9 February and 29 July, respectively, to:

Management Training Program  
Management Sciences for Health  
165 Allandale Road  
Boston, Massachusetts 02130  
USA

Telex: 4990154 MSHBOS  
Cable: MANSHEALTH  
Telephone: (617) 524-7799  
FAX : (617)524-2825

PERSONS CONTACTED

Ninette Reneau	Medical Officer for MCH	MOH
Douglas Fairweather	Perm. Secretary	MOH
Juanita Gill	Practical Midwife	MOH
Lorita Haylock	Family Nurse Practitioner	MOH
Elorine Hall	Ward Sister	MOH
Julia Castillo	Matron Grade II	MOH
Dorla McKenzie	Public Health Nurse	MOH
Janice Avaloy	Practical Midwife	MOH
Elaine Clarke	Medical Statistical Officer	MOH
Marcelo Coyi	Obstetrician / Gynecologist	MOH
Dr. J. Lopez	Medical Officer for Epidemiology	MOH
Mr. R. Lashley	Central Supplies	MOH
Dr. K. Rao	Director of PHC	MOH
Mr. Wesby	Malaria Control Program	MOH
Araceli Moguel	Sr. PHN	MOH
Pat Benguche	Inspector of Midwives	MOH
<i>YVETTE Empletow</i>	Assr. Stal. Officer	MCH
Mellen Duffy-Tanamly	GDO	USAID
Sue Brechin	HPM	USAID
Mary Kroeger	Project Director	HOPE
Abigail McKay	Management Assistant	HOPE
Hervan Morgan	Morgan Computer Services	
Myrtle Palacio	Glassima Institute	
Urban Reyes	Consolidated Enterprises Ltd.	
Leopold Perriott	Consultant	PAHO
Robert Tucker	Project director	PCI
Frank Brechin	Country Director	CARE
Nancy Minett	CARE-MACH director	CARE

**SCOPE OF WORK**  
Clifford D. Olson

PROGRAM: Belize: Child Survival Technical Support  
POSITION: Fellow, Management Information Systems  
DURATION: April 5-14, 1988  
REPORTS TO: On site: Project HOPE Program Director, Belize  
HOPE Center: Belize Country Manager

REPORTING TO THIS POSITION: No one

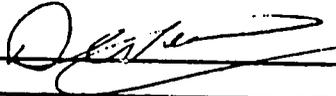
**GENERAL FUNCTION:**

The purpose of this consultancy is to assess the current status of Management Information Systems (MIS) technical assistance undertaken by the Project HOPE Child Survival Technical Support project in Belize, provide immediate assistance where necessary, and plan MIS implementation timetables throughout the continuation project.

**OBJECTIVES:**

1. Assess the current status of the MIS technical assistance project and the immediate needs of the MOH/MSO.
2. Propose detailed implementation timelines for the development of data collection forms, training in the use of these forms at each level, and in the analysis of data for management purposes.
3. Demonstrate the data collection development process by leading a discussion with MOH/MSO counterpart that results in the development of at least one format such as the high risk pregnancy form.
4. Develop detailed timelines, task specific workplans, and budgets for the implementation of the MIS objectives for the first year of the project.
5. Document the work done during the consultancy by preparing a consultant's report which will be reviewed with Project HOPE staff, the MOH and USAID before departure from Belize.

Prepared by: Carolyn C.K. Brye, Ph.D., R.N.,  
Country Manager, Belize Date: March 16, 1988

Approved by:  Date: 7.16.88

3/16/88/SA

SCOPE OF WORK  
CLIFFORD D. OLSON

PROGRAM: Belize, Child Survival Technical Support  
POSITION: Fellow, Management Information Systems  
DURATION: June 7 - 16, 1988  
REPORTS TO: On site: Project HOPE Program Director, Belize  
HOPE Center: Belize Country Manager  
REPORTING TO THIS POSITION: No One

GENERAL FUNCTION:

The purpose of this consultancy is to support the HIS efforts of the project by assessing the progress of in-country contractual support and further the development of child survival reporting forms.

OBJECTIVES:

1. Assess the progress of training, software support, and hardware support provided under local contract.
2. Work with MOH officers to identify element of the perinatal form to be included in a perinatal database.
3. Meet with MOH officers and PVD representatives to develop the CHW child survival reporting form and the field testing and training involved in implementing this form.
4. Meet with MOH officers to develop the Women's Take Home Card and join in the planning for the field testing and implementation of this form
5. Review the field testing of the perinatal form at Belize City Hospital and assure the commencement of field testing at peripheral clinics. Update plans for the training which will accompany introduction of this form nationwide.
6. Review and update recommendations and timelines produced during the April consultancy.