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LABORATORY CONSULTANCY
IN
SWAZILAND
UNDER THE
PRIMARY HEALTH CARE PROJECT

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July - September, 1990

I. ACKNOWLEDGEMENTS

Thanks and appreciation to the Primary Health Care Project staff, the staff of the Laboratory Services; the Clinic Supervisors and Senior Public Health Matron A. Dlamini, without whose assistance this task could not have been completed.

And, special thanks to Phumie Dlamini for her patience in typing draft copies of this report.

II. INTRODUCTION

The Government of Swaziland in its policy statement has committed the Ministry of Health (MOH) to the World Health Organization's (WHO) goal of Health For All by the Year 2000 (HFA 2000).

The ministry's strategy to achieve this is to mobilize "All for Health" in the development of a comprehensive Primary Health Care System. To this end, the MOH has given high priority to basic health services directed towards mothers and children; and to decentralizing the health care system through the establishment of 4 Regional Health Management Teams (RHMTs). PHC services to mothers and children are provided on a daily basis through a network of clinics and health centres spread throughout the country. In most cases, however, the clinics are inadequately staffed; available staff are not trained to do basic blood tests, and where staff have been trained they are often short of reagents. Transportation and communication between rural clinics and existing laboratories are also inadequate, thus when specimens are collected and sent to laboratories they either perish on their way or the results are so delayed in returning that they are of practically no value.

Additionally, the existing government laboratory services are inadequately staffed, do not themselves have a way of getting specimens from clinics or results back to clinics, and at times are themselves out of reagents.

The RHMTs consist of both government and mission facilities, some of which are in closer proximity to the government clinics than the government hospitals or health centers. The basic pattern of referral from government clinics has however bypassed these facilities.

The Swaziland PHC Project has focussed its attention on maternal and child health issues. In the area of maternal health three major tests are essential: Hb, syphilis screening and urinalysis. Swaziland has decided to follow the WHO Guidelines and do presumptive treatment of anaemia in all pregnant women viewing this as more cost effective than Hb testing except for extreme cases of clinical anaemia.

Over the past several years, there has been an expressed concern about the number of mothers with positive tests for syphilis (approximately 10% of the mothers tested), as this leads to spontaneous abortion, intrauterine death and neonatal syphilis. Adding to the concern was the possibility that some ANC mothers were not being tested, and there was not necessarily follow up of positive cases due to poor communications.

Based on the latest statistics, the 1990 population figure is about 800,000. With a crude birthrate of 4.6 and using statistical analysis, these will be approximately 37,000 mothers visiting their various clinics in 1990.

As the population increases, the need for ANC services will increase. There will therefore be a rising volume of clients requiring syphilis serology (and H.I.V. tests).

To meet these increased demands, regional clinics and laboratories must be effectively staffed, equipped and highly motivated. The need to get the required tests performed will therefore increase and it is therefore imperative that the efficiency and effectiveness of the existing system be improved. Urinalysis is to be performed on each pregnant female at each visit. The clinic nurses are able to perform this if given the necessary reagents.

All the laboratories in Swaziland have the capacity to screen ANC blood for syphilis but are constrained by inadequate staff, inadequate space and a poor referral system.

In responding to the need, the Swaziland PHC project commissioned this consultancy to perform the following scope of work.

III. SCOPE OF WORK

With counterparts where appropriate, under the supervision of the MCH Physician, the consultant is responsible for carrying out the following activities:

1. Responsible for designing and installing, in all four regions, a system to assure that three basic lab. tests (VDRL, Haemoglobin and Urine) are accessible to clinic attendees. The work would include helping to design an effective system for the transport and/or communication of samples and test results.
2. The above system must include work at the clinic, regional and central levels and have the following specifications:
 - (a) Laboratory results should be available to both the Regions and patients. (MIS)
 - (b) Laboratory tests must be done in a cost-effective manner with appropriate quality assurances (practical quality control).
 - (c) The system must be supplied with adequate materials and reagents allowing the tests to take place as needed (inventory control).
 - (d) Lab protocols must be in place for all three lab tests.

IV. EXECUTIVE SUMMARY

In support of its goal of attaining "Health for All" by the Year 2000, the Ministry of Health has emphasized services to mothers and children.

Three basic tests are viewed as essential during the antenatal period--Hb, (VDRLs) RPR's and Urinalysis for protein and glucose. These tests are part of an essential laboratory support system to the PHC nurses working at clinic level, which in Swaziland constitutes the first level of contact between the health services and the community. Unfortunately due to problems related to shortage of staff, shortage of and uncoordinated transport, shortage of reagents, and lack of communication these tests are not performed as regularly as the MOH would like; additionally, where tests are performed quality control is not routinely done.

This consultancy addressed the above issues and resulted in a system design for ensuring that these three basic lab tests were accessible to all clinic attendees.

In developing the design this consultant looked at where tests are currently being conducted vs where they can best be conducted; availability of reagents and supplies, how they are obtained; and current systems in use for the transportation of specimens from clinics and the return of results.

The protocols outlined herein include protocols for specimen collection; preservation of and transport of specimens; and test performance and quality control.

The practicability of the system was tested with the senior public health matron and the clinic supervisors. In relation to transportation, four (4) alternatives are used but only one best system is recommended. Parts of the system were already in place and functioning in some regions. Clinic supervisors have volunteered to present the selected system to the RHMTs for regional adoption. Presently, there seems to be no reason for this system to break down as long as communication is maintained between the RHMT members including the laboratory services, clinic supervisors and the head of the laboratory services (the Pathologist).

V. APPROACH

In fulfilling the scope of work the following approach was taken:

- Briefings with the Maternal and Child Health, (MCH) Physician of the Swaziland Primary Health Care Project as well as other members of the PHC Project team.
- Protocol meetings were held with Chief of Party, (COP) Management Sciences for Health (MSH). The Chief of Party and the MCH Physician arranged meetings with the Principal Secretary, Director of Health Services, Deputy Director of Health Services and the Financial Controller, Ministry of Health at the Ministry's Office in Mbabane.
- Several interviews were held with the Pathologist in charge of the Laboratory Services. His office is situated at the Central Public Health Laboratory (CPHL) in Manzini.

On the initial visit, the Pathologist advised that counterparts to the consultant would be the Technologists in charge of the four Regional Laboratories. The consultant would work closely with the counterparts in trying to achieve the outlined scope of work.

- Many field visits and interviews were held with the counterparts and other health personnel in the regions as well as with Laboratory personnel at the CPHL, Mbabane Government Hospital Lab, Raleigh Fitkin Memorial (RFM) Hospital Laboratory, Emkusweni Health Center, Sitobella Health Center; Hlatikulu Hospital; Mankayane Hospital and Piggs Peak Hospital.
- A meeting was held with the WHO Representative regarding information on Quality Control for Laboratories in the African Region.
- Regular debriefings were held with the MCH Physician, and other Team Members of the Primary Health Care Project.
- A short debriefing was held with the health personnel at USAID, midway through the consultancy.
- To put the system in place, a meeting was held with the Senior Public Health Matron, Clinic Supervisors from all four regions, and vertical programs. Visits to the clinics were made with clinic supervisors and determination of the most appropriate specimen referral strategy was also done with this group.

VI. FINDINGS

A. Management Information System

There is an efficient MIS in place which was developed by Mr. Richard Haynes of Drew University, in 1988. This should be adequate to meet the needs of Swaziland provided the staff take the time to complete the forms.

Included in the system are:

- (a) a "log book" in which all specimens received by each laboratory and the date of mailing of results are recorded;
- (b) a VDRL requisition form on which the date of collection, clinic number, patients name and surname, etc. are recorded; (sample form attached)
- (c) a central medical stores requisition form; (sample form attached)
- (d) requisition form from Regional lab and clinics to CPHL; (sample form attached)
- (e) an MCH record book which exists in each clinic in which the nurse records the date specimen was taken, results received, and nature of the results.

B. Findings - General

Tests:

The routine tests done on ante-natal clients are:

Hemoglobin (Hb), Rapid Plasma Reagin (RPR) test for syphilis and urine testing for the presence of sugar (glucose) and protein. This routine is known to all personnel at the different clinics in the country. Blood is routinely collected by the clinic nurse and except where a pilot project was conducted in the Mankayane region and equipment procured at clinic level for doing Hb's and RPRs, these specimens are sent to either a hospital lab or the central public health lab for examination. [In both instances there is a lack of quality control.]

Hemoglobin Screening:

Screening for hemoglobin levels in ANC clients has been found to be not really medically necessary or justified from a cost benefit point of view. These tests are costly, time consuming, needs a certain degree of technical ability and should be done within 24 hours, if anticoagulated blood is used. The current recommendation, according to WHO (1989) is that all pregnant women should be treated presumptively with Iron for Iron Deficiency Anemia in pregnancy. Swaziland, is currently doing this.

Hemoglobin testing has therefore been dropped from the ANC protocols at the clinic level.

A clinical assessment of anemia by the clinic nurse, must be referred to the nearest physician for the necessary hematological studies.

Syphilis Screening (RPR Test):

The Rapid Plasma Reagin (RPR) test for syphilis serology is done at all the medical laboratories visited in Swaziland. This test is also the screening test of choice for syphilis serology worldwide. The RPR test is cheap, rapid and accurate. The clinic nurse takes a sample of blood from each ante-natal client for this test on their first visit.

Urine Testing:

Urine tests for glucose and protein are done routinely on each client on their first and subsequent visits at the clinic.

There is an average of four visits per perinatal period. The methodology used in Swaziland is to use the plastic reagent strip manufactured by the AMES company, with brand name URISTIX.

Here, the problem is frequent shortage of reagents and uncertainty on the part of nurses on how and where to order these dipsticks -- from CPHL or Central Medical Stores.

C. Findings - By Region

Lubombo Region - North (Siteki)

Good Shepherd Hospital Laboratory

Staff: One trained laboratory assistant.
One untrained laboratory assistant.

i. Testing

Good Shepherd is a Roman Catholic Mission administered hospital and is designated as the government hospital for the subregion. The laboratory accepts blood serum referred for RPR from nine clinics, namely:

Lomasha	Tikhuba
Siteki P.H.U.	Malindza (Refugee)
Shewula	Mpolonjeni
Siteki Nazarene	S.P. Railway
Vuvulane	

Manyeveni clinic used to refer as well but has since ceased. the Good Shepherd Hospital laboratory has been doing RPR's referred from clinics since May 1990. The total number from May to August 1990 is 900.

Blood specimens are delivered by Ministry of Health drivers, who also collect results for delivery to the various clinics.

The laboratory staff files results by clinic, with each clinic's results in its own file folder.

Unfortunately this laboratory does not do any quality control in RPR testing, thereby leading to questions as to the integrity of blood results.

ii. Reagents/Supplies

RPR reagents are obtained from the CPHL. No problems were reported in this regard.

iii. Transportation of Specimens and Test Results

The Regional Health Administrator, Mr. A. Kunene, has recently organized a proper schedule of Ministry of Health vehicle movements and has recently arranged for two persons to be licensed to drive Ministry of Health vehicles.

Prominently displayed on his office wall are schedules of vehicle movements for (a) Malaria Inspectors, (b) Clinic Supervisors, (c) Public Health Inspectors.

Mr. Kunene is willing to continue coordinating movement of laboratory supplies and blood results in his administrative region.

Lubombo South - Sitobela

Sitobela Laboratory

Staff: One trained laboratory assistant.

i. Testing

This laboratory accepts RPR referrals from 8 clinics. The laboratory is very small but manages to do RPR tests with quality control.

ii. Transportation of Specimens and Results

There is difficulty experienced in receiving supplies from CPHL, and difficulty in getting results to the respective clinics due to a poor transportation system. Since this is a subregion of Lubombo it is advised that Mr. Kunene arrange a similar transport plan for S. Lubombo as he has done in the North.

Difficulty was also experienced in receiving total number of RPRs done due to the inability of the laboratory assistant to provide proper data. The laboratory is in possession of a recording system developed by a previous consultant through the PHC project, Mr. Richard Haynes of Charles R. Drew University of Medicine and Science. The record is, however, not being kept.

Shiselweni Region

Hlatikhulu Hospital Laboratory

Staff: Two fully qualified technologists
Three trained laboratory assistants

Testing

This laboratory accepts RPR referrals from 18 clinics, 15 Government and 3 Mission Clinics. In 1989, a total of 2440 specimens were tested for syphilis serology. From January 1990 to mid August 1990, this laboratory had already tested a total of 3780 specimens for syphilis serology.

ii. Reagents/Supplies

The Public Health Unit in Hlatikhulu has on staff, in addition to the clinic nurses, a Medical Officer of Health who does once monthly visits to regional clinics on a fixed schedule and ensures that each clinic is supplied with the necessary supplies for the ANC clients.

The Hlatikhulu Hospital laboratory is supplied by the CPHL. It is however, occasionally short-supplied due to shortage of supplies at CPHL

iii. Transportation of Specimen and Results

There were no problems encountered in this region re transportation.

The clinic supervisor states that the presence of a doctor in the region greatly enhances clinic productivity. This doctor, however, is an expatriate and may be leaving soon. The RHA for Shiselweni region would therefore need to organize a transportation schedule similar to Lubombo's to get specimens to the lab. Additionally opening of the lab at Nhlangano clinic will facilitate the collection of specimens and dissemination of results since many government staff based in Nhlangano travel routinely in the proximity of many clinics.

Manzini Region

There are 21 clinics in the Manzini region, of which 9 are Government and 12 are Mission administered. This total does not include private or industry clinics.

Mankayane Hospital Laboratory

Staff: One trained laboratory assistant

i. Testing

This laboratory accepts referrals from 8 clinics, doing an average of 80 RPR tests per month. The clinics are:

Sigcinteni	Luyengo
Mankayane P.H.C.	Musi
Mahlangatsha Sibovu	Gebeni
Mangcongco	
Dwalile	

ii. Reagents/Supplies

No problem reported.

iii. Transportation of Specimens and Results

Blood specimens are referred to the laboratory via any health personnel in this subregion and results are given to the clinic supervisor who then distributes them to each clinic.

All the clinics in this subregion are staffed by one staff nurse, one nursing assistant and one orderly. The exception is the clinic at Luyengo, which has two staff nurses. A medical doctor visits each clinic once monthly following a fixed schedule.

Central Public Health Laboratory (CPHL)

The Central Public Health Laboratory (CPHL) is situated in Manzini and is the referral laboratory for the country of Swaziland. The Pathologist, who is the technical and administrative head of the laboratory services, has his office in this building.

He is also the warrant holder for any expenditure needed for the laboratory services. He and his senior staff, which includes the regional technologists, do an annual budget exercise for recurrent expenditure in the coming fiscal year. This budget is presented to the Ministry of Health for inclusion in the Ministry's national budget.

The pathologist, guided by his budget approval, orders laboratory supplies through the Central Medical Stores.

Raleigh Fitkin Memorial Hospital (RFM) LAB

The RFM Hospital is a hospital administered by the Nazarene Mission.

Staff: The laboratory has a staff of two Laboratory Technicians, two Laboratory Assistants and a consultant American Technologist.

i. Testing

This laboratory accepts all RPR requests providing a fee of E1.00 is paid. If no fees are paid, the blood specimen is referred to the CPHL.

ii. Reagents/Supplies

This laboratory supplies all Nazarene Mission clinics with blood tubes and uristix.

iii. Transportation of Specimens and Results

Sister Anna Mdluli, Mission Clinic Supervisor, has her offices at the RFM Hospital. She supervises all Mission clinics, Private and Industry clinics, and works in close collaboration with her government counterpart.

All clinics which she supervises adhere to the policies laid down by the Ministry of Health.

Blood specimens from each mission clinic is sent to Sister Mdluli's office, from where it is delivered to the RFM laboratory for testing. Results are returned to her offices and she then sends these results to each clinic via some of the methods mentioned below.

Three distant mission clinics were visited with Sister Mdluli. They are:

Engculwini Clinic - (Nazarene Mission)

Staff: One Nurse Practitioner, one Nurse Assistant, one Maid.

ANC Clients: first visit - 6 per month.

There are no telephones nor is a bus route nearby. RFM staff visit monthly to deliver salaries and any mail and collect specimens or deliver test results. Urine tests are routinely done and RPR tests are sent to RFM for testing.

St. Julian Clinic - (Roman Catholic Mission)

Staff: 3 Staff Nurses, 1 Nursing Assistant, 3 Maids.

ANC clients: first visit - 80 per month, including 3 outreach clinics.

Uristix are bought by the clinic from a commercial pharmacy and used routinely. RPR tubes are received from CPHL and blood specimens are sent each Friday to CPHL by courier. Results take from 1 to 3 weeks to return.

Bhekinkosi Clinic - (Nazarene Mission)

Staff: One Staff Nurse, 1 Nursing Assistant, 1 Maid.

ANC Clients: First visit - 12 per month.

Uristix are done routinely and blood specimens are sent to RFM (or CPHL if E1.00 is not paid).

Results from RFM are delivered by the clinic supervisor or the payroll clerk. Results take 2-3 weeks to return from CPHL.

Hhohho Region

Piggs Peak Hospital Laboratory

i. Testing

This very small laboratory is staffed by a qualified medical technologist and a trained laboratory assistant. It services the Piggs Peak Hospital only and is merely a collection point for any ANC specimens referred for syphilis serology. All ANC specimens are referred to CPHL for RPR testing. Hospital requests for RPR's are routinely done with the proper quality controls.

The laboratory staff at this institution should be strongly encouraged to do RPR tests locally, as there is no technical reason for referring tests to CPHL. The RPR test is rapid and is one of the easiest test to perform in a medical laboratory; a minimally trained lab assistant can do ten tests in five minutes.

The pathologist, on being told of this situation, states that he will correspond with the laboratory technologist instructing him to test all ANC requests for RPR's and desist in referring to CPHL for such simple tests in the future.

Emkhuzweni Health Centre - (Mission)

The laboratory at this clinic is staffed by a recently graduated Laboratory Assistant, Mr. Themba Shabangu. In addition to regular hospital lab requests this lab routinely does RPR tests for syphilis serology.

i. Testing

The statistics are:

1985: 917 RPR tests
1986: 1964 RPR tests
1987: 2470 " "
1988-89: In training in Lesotho
Jan - Aug 1990: 1737 RPR tests

Presently, only the Mangweni clinic refers RPR tests to this laboratory and Mr. Shabangu states that he is quite prepared to test all RPR requests from the North Hhohho region. This laboratory also does internal quality control and external quality control referred from Raleigh Fikini Memorial Laboratory.

ii. Reagents/Supplies

Reagents and supplies are purchased directly by the Mission. A payback/supply system needs to be worked out by the Hhohho RHMT to ensure that Emkuzweni has the necessary reagents to do the required Government tests.

iii. Transportation of Specimens and Results

Emkuzweni is on direct road access between Mangweni and Herefords clinic and Piggs Peak. These clinics make regular referrals to Emkuzweni. Specimens can therefore be easily sent and results returned.

Mbabane Government Hospital Laboratory

This laboratory serves the largest government hospital in Swaziland. The staff consists of two qualified Medical Technologists and four trained Laboratory Assistants.

i. Testing

Four clinics refer blood specimens to this laboratory, namely:

- a) Nkhaba
- b) Lobamba
- c) Sigangeni
- d) Entsenjaneni

ii. Reagents/Supplies

Are obtained from CPHL.

Internal quality control is done on each batch of RPR's tested.

iii. Transportation of Specimens and Results

The results are returned by courier from the clinics with a return time of 3 to 7 days.

Clinics

Visits were made to 8 clinics in this region, and on two occasions, in the company of Sister Mary Magagula, Government Clinic Supervisor and Sister Joyce Vilakati, Mission Clinic Supervisor.

Below is a description of each clinic visited:

Horo Clinic

Staff: Two Staff Nurses.

ANC clients: First visit - 40 per month.

Urine tests: Done routinely

RPR tests: Done and referred to Piggs Peak, results are returned in 2-3 weeks from CPHL.

This clinic has no telephone.

Entfonjeni Clinic

Staff: Two staff nurses

ANC: First visit - 40 per month.

Urine tests: Done routinely

No RPR tests done

This clinic has no telephone.

Motjane Community Clinic

Staff: One Nurse Midwife, one enrolled nurse.

i. Testing

ANC clients - First visit 12-15 per month.

ii. Reagents/Supplies

This clinic buys its own Uristix from a commercial pharmacy when money is available.

iii. Transportation of Specimens and Return of Results

RPR specimens are sent to Mbabane laboratory by a porter, using public transport.

Results are mailed or returned by courier within 7 days.

Sigangeni Clinic

Staff: One Nurse midwife

i. Testing

ANC clients: First visit - 7 per month

ii. Reagents/Supplies

Urine test: Done routinely - Uristix supplied by Central Medical Stores

iii. Transportation of Specimens and Test Results

RPR test - Tubes available but tests not done due to unavailability of transport.

This clinic has no telephone and no nearby bus route.

The clinic supervisor has no fixed visiting schedule.

Nkhaba Clinic

Staff: Two Nurse/Midwives

i. Testing

ANC clients - First visit - 35 per month

ii. Reagents/Supplies

Urine tests - Out of stock but order sent to CMS

iii. Transportation of Specimens and Test Results

RPR tests - Sent to Emkhuzweni Health Centre every Thursday by courier, with a log book of the clients names entered. The courier collects the results the same day, with the blood results entered in the log book by the laboratory assistant. The medical doctor from Emkhuzweni visits monthly to see referred clients.

This clinic has a telephone and is near a bus route.

Herefords Community Clinic

Staff: One Staff Nurse, one Nursing Assistant

i. Testing

ANC clients - First visit - 15 per month

ii. Reagents/supplies

Urine tests - Done routinely

iii. Transportation of Specimens and Test Results

RPR tests - Tubes available but not being done due to lack of transport and no courier.

Once this problem is solved, RPR requests will be sent to Emkhuzweni for testing.

The medical doctor from Emkhuzweni visit once monthly to see referred clients. This clinic has no telephone but is near a bus route.

Ebulandzeni Community Clinic

Staff: One Staff Nurse, one Nursing Assistant, one Health Assistant

i. Testing

ANC clients - First visit - 15-20 per month.

ii. Reagents/supplies

Urine test - Have recently acquired new supplies from the Clinic Supervisor

iii. Transportation of Specimens and Test Results

RPR tests - Sent to Piggs Peak by available transport. Results are mailed back in about 2-3 weeks.

This clinic has no telephone and is not near a regular bus route.

VII. SYSTEM DESIGN

A. Test Location

Figure 1 (attached) shows where specimens should be sent by region.

FIGURE 1 -- REGIONS FOR SP

Manzini			Hhohho N.		Hhohhc
Mankayane Gov't Hosp	CPHL	RFM	Emkusweni Health Ctr	Piggs Peak Hospital	Mbabar Hospit
Musi Sigcineni Mahlangatsha Sibovu Mangcongco Dwalile Luyengo Gebenl	St. Phillips St. Juliana's	All Nazarene Clinics	Herefords Mangweni	Ntonjeni Horo Bulanzeni Piggs Peak PHU Company Clinics	Nkaba Lobaml Sigan Entse:

B. Laboratory Supplies

Difficulty has been experienced by some clinics in obtaining sufficient supplies to effectively follow the protocol designed for their ante-natal clients.

The following is to be used to obtain blood tubes and Uristix from the laboratory.

1. Each clinic is to inform their regional Laboratory headquarters, in writing, of the amount of urine dipsticks and blood tubes they expect to be using for the coming year. This total is to be based on how many specimens were tested in the past year or the amount of first visits made by ANC patients and a 15% increase added to the total to cover any increases in client numbers.
2. The regional laboratory headquarters will tally the totals from each clinic, add their own request and send these totals to the Central Public Health Laboratory.

(a) Regional Laboratory

Central Public Health Laboratory (CPHL).

3. The CPHL will tabulate totals from each region, do the proper costing and order the amounts from the suppliers.
4. The Pathologist, and/or the Chief Technologist will ensure that sufficient supplies are available in stock at all times.
5. The supplies, once in country, are requisitioned by the technologist in charge of each regional laboratory from the CPHL.
6. Each clinic, through their clinic supervisor, will then requisition a 3 month supply from their regional laboratories, to ensure that each clinic has an adequate supply on hand. Alternatively, the regional laboratory will send replacement supplies based on the amount of blood tubes sent to the lab.
7. Re-orders must be made once a two month supply level has been reached.

In a meeting with the clinic supervisors, agreement was reached on the above protocol.

The Pathologist recently applied to the Ministry to have full control over laboratory supplies stored at the Central Medical Store so as to resolve the stock-out situation occurring from time to time in the clinics.

The central laboratory should place orders on a 6 monthly basis with an overlap of 2 months to cover for delays in delivery.

C. Transportation/Communication

Blood specimens for syphilis serology must be transported to the laboratory within a week after collection; they must be kept refrigerated before transport and kept cool during transportation. A special cooler must be provided to the various clinics for this purpose.

There are four options available to effect proper transport of specimens:

1. A courier/porter attached to a clinic use public transport to transfer specimens from the clinic to the laboratory. On his return trip, he brings back whatever results are ready for his clinic. This trip can be on a weekly basis on fixed days. This option can only work if the clinic is near to a regular bus route.
2. The clinic nurse telephones regional headquarters notifying her supervisor that she has blood specimens in her refrigerator for referral to the laboratory. The clinic supervisor will then arrange transport to collect the specimen.

Approximately 40% of the clinics do not have a telephone. This option can thus only work where telephones are available.

3. The clinic supervisor/nurse or staff member who visits the clinics on a regular basis collects blood specimens during their round of clinic visits.

Some clinic supervisors visit their clinics in an irregular manner, especially distant clinics, therefore this option will leave some clinics unattended for up to two months.

4. A schedule of Ministry of Health vehicle movements be posted in each clinic in each region. This schedule is to be prepared by the Health Administrator in each region. The clinic nurse will then know which day Ministry of Health vehicles will be travelling to their clinics and prepare specimens for referral accordingly.

In a meeting held with the clinic supervisors, agreement was reached that option 4 is the best way to achieve the desired result of referring specimens to the laboratory and retrieving results from the laboratory to the clinic with little delay.

The clinic supervisors will liaise with their health administrators at the next Regional Health Management Team meeting, so as to agree on the following:

1. Vehicle movements for the Malaria Team, Tuberculosis Unit, Clinic Supervisors and Public Health Inspectors will be given to the Regional Health Administrator.
2. This schedule of vehicle movements is to be widely circulated by the Administrator.
3. The Health Administrator is to instruct each vehicle driver to collect any specimens from clinics and, in particular, to collect any results from CPHL, whenever in Manzini.
4. The clinic supervisor to collect results from each facility on a weekly basis and give these to whomever (MOH personnel) would be visiting clinics next. A record book should be kept for this purpose.

The clinic supervisors also requested this consultant to arrange a meeting between them and the Pathologist with a view to further refining the above schedule. This has been set for 12 Sept 1990. The Pathologist is also desirous of resolving the situation of delayed results being sent to the clinics from CPHL.

D. Protocols

1. Tests

The methodology is as follows:

For RPR Tests

1. Blood is drawn from the client using a syringe or vacutainer and placed in a red top tube.
2. The client's full name with date and name of the clinic is printed on the tube label. (See Annex B and C).

The client's number corresponding to the number and name on the RPR request form or log book is also printed on the blood tube label.

3. The tube sits on the clinic desk until evening of the same day, when the clot is removed by a needle or a stick.
4. The blood serum is then refrigerated until onward transmittal to the laboratory for testing.
5. This referral of specimen to the laboratory should take place within seven days.

Note: If the clinic is in a distant area and regular transportation is unavailable, the blood serum can remain in a refrigerator for up to twenty-eight days, providing the temperature does not exceed 10 C.

The current problem is that there is no fixed pattern of transport for getting blood from clinic to laboratory and several specimens are lost in the process. Effective treatment and follow up cannot therefore take place. Where nurses have been doing this test at the clinic level they encounter problems of shortage of reagents, lack of quality control and sometimes lack of time.

For Urine Tests

A freshly voided urine specimen is collected in a clean container. If testing is not possible in one hour after voiding, refrigerate the specimen and return it to room temperature before testing.

CAUTION: Contamination of the urine by antiseptic can give a false positive test for protein.

Procedure:

1. Completely immerse all reagent areas in the specimen and immediately remove the strip.
2. Tap the edge of the strip against the side of the urine container to remove excess urine. Hold the strip in a horizontal position to prevent possible mixing of chemicals from adjacent reagent areas and soiling of hands.
3. Compare test areas with corresponding color charts on the bottle label at the reading time specified for each area. Holding the strip close to the color blocks, watch the colors carefully and record in the clients ANC history record (See Annex D).

Protein:

May be read immediately - timing is not critical.

Glucose:

Read at 10 seconds.

Tests other than negative must be reported to the physician for follow up.

Caution on Handling and Storage of Strips

1. Do not use the strips, if the expiry date, printed on the bottle label, has expired.
2. Store only in the original bottle. Cap tightly.
3. Protect against moisture, light and heat.

2. Quality Control (QC)

Quality Control in any laboratory is to ensure that laboratory tests are done with precision and accuracy.

In RPR tests, an internal quality control is to be introduced with each batch of tests done on blood serum of known reactivity. A strongly positive specimen, a weakly positive and a negative specimen. These tests should read as indicated above. External quality control is done using specimens of unknown reactivity in a programme from outside the region. The results once tested are mailed to the referral laboratory for confirmation, and if the results are wrong, the testing laboratory is then advised of this with a view to remedy the situation.

In RPR tests, false results are usually due to inappropriate storage of the RPR antigen used for testing. RPR internal quality controls are done in all the laboratories visited with the exception of the laboratory at Good Shepherd Hospital in Siteki, Lubombo Region.

An external quality control is done at two laboratories only.

Emkhuzweni Health Centre Laboratory does an external quality control referred by Raleigh Fitkin Memorial Hospital (RFM).

RFM is enrolled in an external quality control program with a private laboratory in Johannesburg, R.S.A.

The representative of WHO in Swaziland is willing to expedite the enrollment of CPHL in an external quality control program with the WHO regional laboratories in Brazzaville. This will be at no cost to the Ministry of Health.

Quality control on the urinary dipsticks is done by dipping the sticks in a urine specimen which is a known positive for glucose and protein, done by a chemical

method.

External Quality Control is done as for RPR's.

VIII. RECOMMENDATIONS

Clinics

1. All clinic nurses to adhere strictly to the protocol on syphilis screening and urine screening.
2. All clinic nurses to post in each clinic the schedule of Ministry of Health vehicle movement in their region.

Regional Health Management Team (RHMT)

1. Clinic supervisors to visit their clinics on a monthly basis.
2. Telephones to be installed in each clinic.
3. Clinic supervisors to circulate to each clinic a schedule of Ministry of Health vehicle movement in their region.
4. The senior laboratory technologist in each region to be a member of the RHMT.

Regional Laboratories

1. Laboratories in the four regions to be staffed by qualified laboratory technologists, such technologist to have responsibility for all laboratory activities in the region.
2. Laboratories to have an internal and external quality control programme. This programme to be monitored by the Central Public Health Laboratory.
3. The senior laboratory technologist in each region, in conjunction with the clinic supervisor, to ensure that all clinics have at least a two month supply of laboratory supplies for ante-natal clients.
4. The senior laboratory technologist in each region, in conjunction with the clinic supervisor, to expedite rapid return of laboratory results to each clinic.

Central Public Health Laboratory (CPHL)

1. The Pathologist to be responsible for all laboratory services in Swaziland.
2. The Pathologist is to ensure that all laboratories, whether Government, Mission or Private, be enrolled in a recognized quality control program.
3. CPHL to enroll in the Quality Control Programme offered by the WHO Laboratories in Brazzaville.
4. CPHL senior staff to have regular meetings with, and regular supervision of all regional government laboratories.

IX. ABBREVIATIONS

MOH	Ministry of Health
MCH	Maternal and Child Health
PHC	Primary Health Care
USAID	United States Agency for International Development
MSH	Management Sciences for Health
COP	Chief of Party
CPHL	Central Public Health Laboratory (Manzini)
Hb	Haemoglobin
RPR	Rapid Plasma Reagin
TPHA	Treponema Pallidum Hemagghutmatation Assay
RHMT	Regional Health Management Team
WHO	World Health Organization
CMS	Central Medical Stores
ANC	Ante Natal Clinic
HFA	Health For All
UNFPA	United Nations Fund for Population Activity
IPPF	International Planned Parenthood Federation

X. REFERENCES

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12. The Laboratory Services in Swaziland by Dr. N. Nkanza, 1990.
13. Preventing and Controlling Iron Deficiency Anemia through PHC, WHO Publication, 1989.

XI. NAMES POSITIONS OF PEOPLE SEEN

Mr. Chris Mkhonta, Principal Secretary, MOH

Dr. J.J. Mbambo, Director of Health Services, MOH

Dr. Q.Q. Dlamini, Deputy Director of Health Services, MOH

Mr. P. Thompson, Financial Controller, MOH

Mr. J. Anderson, RHPDO, USAID

Dr. D. Kraushaar, Chief of Party, MSH

Mr. R. Maseko, A.A. Officer, MSH

Ms. J. Makhanya, Secretary, MSH

Mr. A. Neill, Health Management Associate, MSH

Mr. P. Shipp, Consultant, MSH

Dr. V. Joret, MCH Physician, MSH

Ms. M. Kroeger, MH/FP Nurse Midwife, MSH

Dr. M. Edmondson, Clinic Management Associate, Charles R. Drew University

Ms. J. Bazilio, Project Backstop/Training Coordinator, Charles R. Drew University

Dr. N. Nkanza, Pathologist, MOH

Ms. D. Mndzebele, Acting Senior Technologist, CPHL, MOH

Mr. S. Machere, Technologist, Mbabane Gov't Hospital, MOH

Mr. George Kabiri, Technologist, Hlatikhulu Gov't Hospital, MOH

Dr. Theo Braecken, Medical Officer, Public Health Unit, Hlatikhulu, MOH

Mr. Jeremiah Dlamini, Lab. Assistant, Good Shepherd Hospital

Mr. A. Kunene, Regional Health Administrator, Lubombo Region
Sr. Nyoni, Nurse Incharge, Siteki Public Health Clinic, MOH
Mr. J. Whitehead, Consultant Technologist, R.F.M. Hospital
Dr. M. Golding, Medical Officer, Sithobela Rural Health Centre, MOH
Mr. Ronald Maryatsi, Lab. Technician, Sithobela, MOH
Sr. E. Nxumalo, Nurse Incharge, Siphofaneni Clinic, MOH
Mr. H. Sukati, Technologist, Piggs Peak Gov't Hospital
Ms. R. Shongwe, Nurse/Midwife, Horo Clinic, MOH
Sr. M. Magagula, Clinic Supervisor, Hhohho Region (North), MOH
Sr. J. Vilakati, Clinic Supervisor, Hhohho Region (North), MOH
Sr. H. Msibi, Clinic Supervisor, Hhohho Region (South), MOH
Dr. W. Mwambazi, WHO Representative
Sr. P.S. Khumalo, Maternal Health/Family Planning Coordinator
Mr. Sabelo Dlamini, Lab. Assistant, Mankayane Hospital, Manzini Region, MOH
S/N C. Makhanya, Mankayane Public Health Unit, Manzini Region, MOH
Dr. R. Mwaikambo, Chief Technical Adviser UNFPA/IPPF Project.
Matron A. Dlamini, Senior Matron Public Health Unit, MOH

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LABORATORY SERVICES

According to the Fourth National Development Plan, the Central Public Health Laboratory (CPHL) should act as the national referral laboratory:- "diagnosis, screening and advising on diseases of public health concern, and acting as a central point of referral of specialist diagnostic services in pathology". It aims to provide accurate, appropriate and affordable services to users in the most efficient and cost effective manner.

On the five year plan period, which ends in the current GSO fiscal year, laboratory services aimed:-

1. to decentralise laboratory services to district level and provide essential equipment.
2. to train 40 additional laboratory assistants, technicians and technologists.
3. conduct in-service training.

Efforts to strengthen the quality and efficiency of laboratory support have, however, continuously fallen short of expectations, with widespread dissatisfaction both on the part of users and laboratory staff. Key problems highlighted in a recent MOH report: "Assessment of Laboratory Services" August 1987 include:-

- (1) Lack of a Discernible Organizational Structure, with widespread confusion about the role and level of responsibility of the pathologist at the Central Public Health Laboratory. (For example, laboratory staff at Mbabane, Hlatikulu, Piggs Peak, and Mankayane hospitals are unsure whether they should report to the senior medical officer at the hospital or the CPHL pathologist).
- (2) Lack of career ladder with prospects for advancement, and no inservice training.
- (3) No discernible rationale for which tests should be conducted at which laboratory facility, resulting in an unnecessary duplication of expensive equipment and reagents.
- (4) Inadequate Communication among Government Laboratories and no clearly defined policy on integration and cooperation with mission and private industrial laboratories.

- (5) Lack of systematic recording system, such that not all tests are recorded and the CPHL fails to act as a public health disease surveillance unit.
- (6) Lack of a quality control programme specifying standardised laboratory procedures.
- (7) Lack of an articulated referral mechanism for transferring samples to laboratories and transmitting reports back to clinics and practitioners.
- (8) Inadequate space and equipment at all laboratories.
- (9) No clear policy on standardization and preventive maintenance of equipment.
- (10) Periodic shortages of essential reagents.
- (11) Inadequate staffing and low levels of morale and motivation amongst personnel in all laboratories.

The report gloomily concludes:-

"The ability of the laboratory services to conduct necessary tests can at best be seen as very weak and in urgent need of strengthening".

In view of the problems identified by the report, we would like to make the following recommendations to improve the provision of laboratory services.

- (1) The role and responsibilities of the pathologist be clarified by the MOH, such that he/she concentrates on managing patient-related diagnoses.
- (2) The post of a chief pathologist be established with responsibility for overall supervision and coordination of technical laboratory services.
- (3) A hierarchy and well-defined career ladder be developed by the laboratory cadre, with improved opportunities for in-service training.
- (4) The Central Public Health Laboratory be extended, reorganised, equipped and staffed to serve as the national referral laboratory, conducting all specialised tests.

- (5) Tests be decentralised at 5 levels (see organigram) to improve efficiency and obviate misdiagnosis and costly duplication of equipment and reagents.
- (6) A clear strategy be developed by the MOH Planning Unit to promote integration among MOH, mission and industrial facilities, so that back-up services are provided to outlying areas which lack easy access to Government laboratories.
- (7) A management information system be developed by the Chief Technologist in conjunction with HPSU to ensure that tests are routinely recorded in a standardized format and the CPHL fulfils its national disease surveillance function.
- (8) Clear protocols be drawn up by the Chief Technologists specifying quality controls and laboratory standards.
- (9) Laboratory personnel in the regions be represented on all RHMTs.
- (10) A clear system of referral be developed to ensure that specimens are delivered to laboratories and reports fed back to clinics and public health centres in a timely and efficient manner.
- (11) An inventory of equipment be drawn up, and future equipment standardised and well maintained by a specialist technician based at the CPHL.
- (12) Funds be sought from donors by DEPS to extend the CPHL in accordance with the architectural plans developed by MOH and MWC.
- (13) Alternative financing mechanisms be explored by PHC Project such that any increase in demand, generated by an improvement in the delivery of laboratory services can be supplied. Proposals already under discussion include the production of simple reagents within country, and charging patients for tests to cover the marginal cost of service provision.

SYPHILIS SCREENING

11/1/79

Instructions to Clinic Nurses in Shiselweni Region On Obtaining and Sending RPR Samples

1. Perform RPR syphilis blood test on all pregnant mothers presenting for their first (booking) visit. If for some reason you don't draw the sample when they book then draw the sample on the next visit.
2. Use plain red top blood tube.
3. Label the tube immediately after you have drawn the specimen to ensure that blood is not put in a tube labelled for another client. Include the client's name printed clearly, the date, the clinic's name, and the number corresponding to the name on the VDRL Request Form. The lab staff in Hlatikulu Hospital have requested that samples be numbered for ease of handling.

SEE EXAMPLE AT BOTTOM OF PAGE

4. If unable to ensure that the sample can reach the lab at Hlatikulu Hospital within 24 hours, then remove the clot with a stick or needle and store the serum in the refrigerator. With the clot removed, these samples can be stored for some time, but after storage for one week, contact the clinic supervisor and ask her to arrange for transport to pick up these samples. Don't wait until the samples are spoiled to arrange for transport!
5. Send the samples along with the VDRL 88/ Request Form in the same envelope to ensure that the lab technologist can record the results on this form as the tests are performed.
6. The Medical Officer for Public Health will review all results before they are returned to the clinics. If there are positive results he will try to notify the clinic nurse immediately so she can initiate treatment as soon as possible.
7. If after more than two weeks from the time the samples leave the clinic, there are no results returned, then the clinic nurse should take the responsibility of contacting Hlatikulu Hospital lab and find out why there is a delay.

CONTACT: Mr. George Kabiri or any laboratory staff at:

Telephone 76111

VDRL 88/REQUISITION FORM						
CENTRAL PUBLIC HEALTH LABORATORY						
P.O. Box 54 Maseru						
Date received						
Date performed Positive control						
Test performed by: Negative control						
Name of center: <u>Zombodze Clinic</u>						
Date of collection	Lab number	Name & Surname	VDRL	Dilution	TPHA	Tech
9-5-89	201	M. Dlamini				
9-8-89	202	S. Mamba				

VAC - U - TEST 2

Patient - M. Dlamini 4/2/89

Hospital - Zombodze

101

Test tube Label

OBSTETRIC HISTORY and PREGNANCY RECORD

Name _____		Age _____
Height _____ cms	Less than 150 <input type="checkbox"/> *	GRAVIDA _____ PARA _____ + _____
First Pregnancy? / Last Child Over 6 Years <input type="checkbox"/> *		L.M.P. _____ E.D.D. _____
Age over 35 / 6 or More Pregnancies <input type="checkbox"/> *		Periods: ? Normal <input type="checkbox"/> ? Regular <input type="checkbox"/> ? Pill <input type="checkbox"/>
FORCEPS Or VACUUM EXTRACTION <input type="checkbox"/> *		Interval Since Last Birth _____
PPH or Manual Removal <input type="checkbox"/> *		Family Spacing Method Used _____
CAESAR X _____ Reason _____ <input type="checkbox"/> **		R.P.R.: Date _____ Result _____
Previous Stillbirth Or Neonatal Death <input type="checkbox"/> **		Return Date for R.P.R. Results _____
Premature Infant Or Midtrimester Abortion <input type="checkbox"/> **		Rx: Benzathine Penicillin Dose 1 Date _____ 2.4 Mega Units Dose 2 Date _____ Weekly X 3 Dose 3 Date _____
Infant Deaths: Check cause and advise on childcare <input type="checkbox"/>		Repeat R.P.R.: Date _____ Result _____
MEDICAL HISTORY	TB, Diabetes, Heart Disease <input type="checkbox"/> **	Husband requested to attend <input type="checkbox"/>
	Other (see front of Mother's Card) <input type="checkbox"/> **	

RISK INDICATORS

- No Risk: Deliver at clinic or home. (See every 8 weeks until 28 weeks, then every 4 weeks.)
- * RISK: ADVISE FOR HOSPITAL DELIVERY. (See every 4 weeks until 28 weeks, every 2 weeks until 36 weeks, then weekly.)
- ** RISK: REFER TO MEDICAL OFFICER

HISTORY	Date of Visit								
	Weeks Pregnant								
TESTS	Bleeding ** Anemia **								
	Urine Alb/Sug Alb+ve - Send MSU	/	/	/	/	/	/	/	/
EXAMINATION	Weight: Wt Loss **								
	BP: Above 130/90 **								
	Fundus in cms: (too) large/small **								
	Lie/Presentation Vx: Br ** Tr **								
	Foetal Heart Absent **								
	Kick Count Under 10/day **								
	Oedema: With Albumin ** Vulva: Sores or Discharge **								
Reason for Referral									
Iron and Folic Acid									
Date of Next Visit									

