Southern Ethiopia/Gwent Healthcare Link

Report of Visit to Ethiopia 20.03.09 – 30.03.09

Written by – Dave Williams

Personal Background/Role in Link

I am the Lead Biomedical Scientist for Microbiology in Gwent. I have been involved with the link since 2000 and have made a total of 8 visits to Southern Ethiopia. I am currently leader of the laboratory section of the link.

Specific role in the visit

This visit was undertaken largely as a result of the need to monitor the progress of the laboratories in the exemplar health Centres and also following up on a request from Dr Yifru to assist with the setting up of a microbial culture laboratory in the Referral Hospital at Hawassa. When the visit was planned it was intended that I would be the sole representative of the laboratory section as we had intended concentrating on health Centres only but when the request to assist with the setting up of the laboratory at Hawassa was made, approximately one month before the visit, I requested the involvement of a second microbiologist. Hence, Iestyn Harrigan, a specialist grade Biomedical Scientist from Royal Gwent Hospital agreed to make the trip at short notice.

Objectives

1. Visit all 3 exemplar Health Centres to assess further laboratory needs and offer training on maintenance of laboratory equipment.

2. Visit designated microbial culture laboratory, report on its suitability and assist in setting up culture procedures.

Activities during the visit

Hospital Laboratory

I was made aware of the existence of the designated Microbiology (culture) laboratory during my previous visit in March 2008. This area actually consists of 4 rooms with an adjoining toilet surrounding a large space which could be converted to a reception area. It is on the first floor of the hospital. During my visit in 2008, the area had not been equipped and had been invaded by a swarm of bees.

A report on this laboratory prepared for Dr Yifru to assist with laboratory preparation is included as appendix 1 of this report so a detailed description of the equipment and facilities is not included here.

We were able to attend the Hospital laboratory for the 3 days from Monday 23rd through to Wednesday 25th of March and again on Friday 27th, having visited Alaba Health Centre on Thursday 26th.

The first half of Monday 23rd was spent connecting up and testing various pieces of equipment and moving some items to enable the power cable to reach sockets. During the afternoon we were able to prepare and instruct the 9 designated workers in the preparation of several types of agar plates though this was hampered by the poor condition of the autoclave and the intermittent electricity. This activity was also jeopardized by the lack of a hot air oven for sterilizing glassware including Petri dishes. The contingency used, flaming the glass Petri dishes, is not to be recommended as it constitutes a fire risk and is less effective.

The second day, Tuesday 24th was used for culturing urine samples as submitted to core laboratory for microscopy. Direct antibiotic sensitivities were performed on urine samples showing large numbers of white blood cells on microscopy.

Culture plates were examined on Wednesday 25th. Although few were positive, multi resistance to antibiotics was evident in one patient. Since this would have normally have been treated empirically with amoxicillin or norfloxacin, both of which were resistant, this goes to prove the value of this type of service.

We had hoped to perform culture on a wider variety of specimens including CSF and wound swabs but none were available at the time.

Having visited Alaba Health Centre on Thursday 26th, we returned to the Referral Hospital on Friday 27th and met with Dr Yifru, Abay and Misganaw to discuss the laboratory and additional needs (see Appendix 1). We also spent some time decontaminating and cleaning Petri dishes used over the course of the week before leaving for Wondo Genet.

During our time at the Hospital we were also able to visit the stores and liberate some laboratory equipment for use in the laboratories. This included glassware, CO2 jars and 3 microscopes. Access to the stores is not easy and we had to be persistent to achieve this but it seemed a lot easier to remove items for use than in previous visits once access had been gained. However I was told that there was another section which we could not access because the key holder was not available and that this may or may not hold a hot air oven. This needs to be checked before such an item is purchased to avoid unnecessary expense.

Key Impressions of the Hospital Microbiology laboratory

There is definite need for this type of laboratory activity in an important institution such as Hawassa Referral Hospital. There also appears to be a clear commitment to get the laboratory to a functional state and Dr Yifru appears to be the main driving force behind the project.

There is adequate space and staffing provision for the project and some of the staff involved have appropriate experience. However, attention needs to be paid to service provision problems (electricity and plumbing) and additional equipment as detailed in Appendix 1.

I am assured that adequate funding is available for the project and I see no reason why it cannot be successful.

Health Centre Visits

Unfortunately, due to a short illness and a very tight schedule I was unable to visit the Health Centre at Yirgacheffe. However I recovered sufficiently to visit the others.

Alaba

We visited the Health Centre at Alaba for the whole day on Thursday March 26th. The laboratory is very busy. The staff consists of 2 technical staff and a nurse taking blood samples from patients. The bulk of the workload was made up of Malaria films. On a typical day they would expect around 110 films, approximately 90 of these being positive. Several other types of specimen were processed during our visit including faecal Parasitology an ZN films on sputum for TB. The laboratory appeared well organised and the workflow was swift.

The staff had no complaints regarding equipment but I noticed that there was only one objective lens suitable for Malaria films between the 2 microscopes in use. When one microscope was temporarily out of use due to a power cut (the other one works off the Sun), the lens had to be transferred from one to the other. The microscope that we had donated to the Health Centre in March 2008 had been stolen and not yet recovered. Consideration needs to be given to supplying another one provided that security is satisfactory. At least we should be able to supply a lens from spares kept at Nevill Hall.

The main problem at Alaba is due to high workload and the staff are struggling to cope. They would be able to handle a wider variety of specimens if they had more staff.

Wondo Genet

Having travelled to Wondo Genet on the afternoon of Friday 27th, we visited the Health Centre on Saturday 28th. The morning was taken up with meetings and the presentation of the motorbike ambulance but we were able to visit the laboratory in the afternoon.
The main problem facing the laboratory at Wondo Genet is the lack of available space. There are plans to address this by demolishing a toilet cubicle which is unused and encroaches on the laboratory.

The laboratory had only one functional microscope at the time of the visit which had been purchased for them by the link in March 2008. There were no spare bulbs available for this as the spare supplied at the time of purchase had been used.

The other microscope we were shown was non-functional due to an obscured 100x oil immersion lens and a condenser which had seized up due to immersion oil hardening on it. I was able to address the condenser problem by stripping down and cleaning with alcohol but despite our efforts to do the same with the lens it remained sub standard. This will be replaced with a spare lens from donated microscopes available at Nevill Hall. A spare bulb will also be supplied.

It is my intention to improve maintenance of laboratory equipment at the health centres as this seems to be a general problem. I have purchased 4 copies of the publication by AMREF ' Standard Operating Procedures – Care and Maintenance of Laboratory Equipment'. These were not available at the time of the visit because of a problem with the electronic ordering system but have since arrived. They contain basic but useful information and should be of some use to Health Centre staff.

Future of the Laboratory Link

The laboratory section of the link has been involved from the beginning and a total of 7 Biomedical Scientists and one Biomedical Science Lecturer (UWIC) have made visits. Most have visited on several occasions. Until recently the Deputy Coordinator for the link in Ethiopia was a Haematology Lecturer. From the initial concentration on practical teaching of students, the laboratory section Has moved into supporting the laboratories in the Exemplar health Centres and Hawassa Referral Hospital and I think that this will continue.

Particular attention will be paid to the fledgling microbiological culture laboratory at Hawassa. We will be following its evolution in detail and assisting staff where possible. During our visit we advised staff members to start with a very narrow range of tests and to broaden its repertoire in a stepwise fashion, with the steps possibly coinciding with link visits. However we must recognize that their work is

driven by demand as is every clinical laboratory and they may decide to progress independently.

Benefits to Gwent Healthcare Trust

During my involvement with the link it has been my privilege to take several younger members of staff with me on visits and to witness the effect it has on their development. Once again I was able to do this on this visit with Iestyn. Not only do staff members gain experience of tropical medicine but they develop communication skills and an ability to improvise and adapt. Involvement with the link also gives an insight into the problems encountered on a day to day basis in the developing world. This gives a greater appreciation of different cultures in the local and national setting in the UK.

Although I would stop short of formal inclusion of working with the link in any training portfolio, I would definitely encourage link participation as a part of career development.

Appendix 1

REPORT ON MICROBIOLOGY LABORATORY FACILITIES AT AWASSA REFERRAL HOSPITAL MARCH 2009

For Attention of Dr Yifru Berhan – Dean of Hawassa University
CC Mr Biku Ghosh – Link Co-ordinator

Written by Dave Williams – Gwent Healthcare Trust

PERSONNEL

The laboratory appears to be adequately staffed with 9 members of staff assigned to work in this area.

Key members of staff:

Abay Abate – Lead Technologist for Microbiology and Deputy to overall Laboratory lead Demisse.

Getahun Almeskel – Quality Officer.

Abay should be consulted as to who would deputise for him in the Microbiology section during his absence.

SUPPORT SERVICES

Electricity – Some power sockets were non functional. These had been bypassed by connecting wires to the mains behind the socket. This is unsafe and could result in electrocution if accidentally touched by members of staff. Faulty sockets need to be replaced. Likewise some equipment was connected to mains using bare wires taped together or taped to pins of plugs. This is extremely dangerous particularly in wet conditions which can exist in any laboratory. Failure to adequately address this problem could result in the loss of a member of staff.

Electricity supply was intermittent during our time at Hawassa. Breaks in electricity supply cause fluctuations of temperature in incubators and refrigerators which can result in false negative cultures or deterioration in media and reagents. To ensure service continuity and quality, the laboratory needs to be connected to an emergency electricity supply.

Plumbing – Both sinks in the laboratory leaked profusely causing water to drop on the floor.

EQUIPMENT AVAILABLE

Refrigerator – A large refrigerator was present, this was found to be fully functional and considered adequate for present needs.

Weighing Scale – A scale for weighing out agar powders was present which was fit for purpose. A spare machine was supplied during the visit which is located in a drawer in the laboratory.

Hot Plate – A large hot plate for boiling agar prior to autoclaving and re-heating 10% blood agar to produce chocolate agar was present and fully functional.

Incubators – There were 3 incubators present; a Memmert (German construction) and Genlab (UK construction) were found to be functional and holding temperature well when tested with thermometers. A third incubator manufactured by Insif of India was found to be faulty and would not get up to the required temperature. This should either be repaired or removed from the laboratory.

Autoclave- The autoclave used was borrowed from the University. This was full of old cultures which had been in it for some considerable time. After emptying and cleaning, it functioned intermittently, requiring attention from an electrician during our stay. It is understood that delivery of a new autoclave for use in this laboratory is imminent.

EQUIPMENT REQUIRED

In order to function as a complete Bacteriology laboratory the following equipment is needed:

Hot Air Oven (moderate cost) capable of heating up to 160 degrees C. This is required for sterilizing glassware including Petri dishes, glass beads (for defibrinating sheep blood) and glass vessels for the collection of blood.

Class 1 Safety Cabinet. This is particularly important if it is decided that the laboratory should undertake TB cultures. Cultures of meningococcus should also be handled in a safety cabinet to prevent inhalation by staff. This is likely to be a high cost item and may be difficult to purchase in Ethiopia. Laboratory managers at the Black Lion Hospital or the Pasteur Institute in Addis may have experience of sourcing this type of equipment.

Anaerobic Jar. This is a low cost item and should be available in Addis. Gas generating envelopes are necessary for this type of equipment and ongoing availability of these should be considered when selecting. Please note that the CO2 (candle jars) found in Hawassa Hospital stores are not suitable for generating an anaerobic environment.

Blood Cultures. Processing of blood cultures is necessary to diagnose septicaemia. A manual system such as the Oxoid Signal system or similar is thought to be more appropriate than the automated continuous monitoring systems which prevail in Europe. Local availability should be investigated before deciding on a particular system.

Small Items of Equipment – Forceps for handling antibiotic discs and additional Petri dishes should also be acquired. These are low cost and available In Addis.

FURTHER CONSIDERATIONS

Sheep blood – One of the two sheep purchased for blood supply was successfully bled by Abay during our stay in Hawassa. Abay is experienced in this procedure, having acquired the necessary skills during his previous employment at Yir Gelem. This skill needs to be taught to other members of staff. There was some concern about the security of the sheep, being a possible target for theft by humans or hyenas.

Supply of Consumables – There is a considerable amount of bacteriological media available in the laboratory. This is from a variety of suppliers but most appeared to be within its expiry date. Continued supply of media and other consumables such as antibiotic discs must be assured.

Cleaning of Petri dishes – This can be achieved by soaking cultures in bleach solution for several hours before removing the agar. The dishes then need to be washed with water to remove all traces of the bleach and sterilized in a hot air oven at 160 degrees C. As this procedure will have to be done regularly a continuous supply of bleach needs to be assured.

Organism Identification – Definitive identification of most micro-organisms beyond genus level is probably not necessary. However catalase, oxidase and coagulase tests will be needed. Hydrogen peroxide for catalase testing was available in the laboratory and coagulase testing can be done using human plasma (care must be exercised to avoid blood-borne infections). Oxidase reagent will need to be purchased in Addis.

Control Organisms – These are needed to check the quality of media and the potency of antibiotic discs. It is impossible to supply these form the UK because of International Legislation (IATA). Availability should be checked with Black Lion Hospital or Pasteur Institute.

Urine Microscopy – During our visit to Hawassa, urine microscopy was carried out in the Core laboratory and the samples were transferred to the Microbiology lab for culture. Time and effort could be saved if the complete operation was carried out in the Microbiology lab. This would necessitate locating a microscope and a centrifuge in the Microbiology lab.