

## **My Story, My career, and My 50 years!**

### **Introduction**

17 September 1971, I reported for work as a Laboratory Technician-in training at the senior pathologist office, Singapore General Hospital (SGH).

Those days, my trainees and I, never knew exactly what our job entailed or what real laboratories were like! It was on-the-job training via rotations to all sections in the Department of Pathology (including Haematology lab and Blood Transfusion service. This basic on-the-job training took us 3 years to complete. And if we manage to pass the exam, we were then able to choose our specialist subject for our final examination in our last two trainee years i.e., fourth and fifth year.

My first day in training was in the stool microscopy and sputum acid fast bacilli (AFB) section. It was a total misery. The sight, smell, and the preparation of those specimens for microscopy was just gory! How am I to survive the 7 months block of training at Bacteriology Laboratory? I cried all the way in the bus ride home that day.

In those days, jobs were not easy to come by. I needed a job and I needed to help put food on the table so I adapted and persevered. The first-year salary was only \$190 per month. The annual increment was \$10 for the next 2 years. It was enough to get by. The happiest times were when I saw the salary increment after passing both basic and final training examinations at \$325 and \$465 respectively.

### **Training**

In 1970s and early 1980s, the pay master was MOH. Our main training ground was the laboratories in SGH Department of Pathology. All other hospital laboratories had staff that were posted out from SGH Laboratories. Also there was no requirement to have a MOH licence to operate a laboratory.

The comprehensive on-the-job (OJT) training programme comprised the following: seven months of training each in Haematology, Bacteriology, Biochemistry, Histology disciplines etc; and five months in Blood Transfusion Service, 2 months in Serology (Immunology) and Public Health Laboratory. There were other specialised laboratories with unique patient population where trainees were sent for attachment. Just to name a few, the tuberculosis (TB) culture Lab in Tan Tock Seng Hospital (TTSH) was the only MOH designated laboratory to perform TB culture. Trainees did one-month attachment there. Trainees were also sent to Kangar Kerbau Hospital (KKH) Laboratory to learn various laboratory testing for neonates and pregnant women. Technical procedures were guided and taught by senior technicians. All lectures were conducted by pathologists (haematologist, bacteriologist, biochemist, histopathologist).

We were immediately put on shift duties or night duties once trained in that discipline. Being new, we normally arranged with another trainee friend to assist in the night duties and to keep each other company.

After passing the third-year examinations, trainees continued with two more years of training for a specialist subject of their choice or the subject for the specific Laboratory that they were deployed to. After passing the final examination, I graduated with a certificate of **Medical Laboratory Qualifying Examination in Haematology and Blood Transfusion**. I was then a fully qualified, all-round trained Laboratory Technician with specialisation in Haematology and Blood Transfusion.

Examinations were conducted by the Department of Pathology. They were always never easy. Candidates would need to sit for a written examination, various practical examinations, and a viva voce.

This on-the-job training provided an all-rounded education in Pathology and Lab Medicine, but my learning journey continues every day and 50 years on to be exact!

Training was then taken over by education institutions. The polytechnics offered diplomas in medical technology and medical lab sciences. Few years later, NUS and NTU also offered degree courses in Biomedical Science. Students do come for attachments in hospital laboratories for 6-7 months. Some were given final

year projects too. Because of these changes, the students were stronger in their theory knowledge. The previous OJT system made the students stronger in practical work.

### **Did you know.....Insights of Laboratories in 1970s and early 1980s**

**Laboratories were primitive.** Specimen collection and testing methods were manual and primitive. There was no technology or very little technology in some areas. Reagents were prepared in-house. Disposables were unheard of. Most apparatus, glassware, urine specimen containers were washed and reused. There was always a washing room in the laboratory department for the washing and disinfecting.

**Laboratory safety** was not a key focus or priority. There were no gloves, mask, or goggles when we handled specimens. Gauze was used to protect our hands when we handled all types of specimens including blood, urine, and stool specimens. Gloves were provided only from the 1980s with the existence of HIV. Every process was done either in an open bench area or a little preparation room for stools and urine. There was no fume hood or biological safety cabinets. Dilution of acids were also done openly in the laboratory or washing room. Vertical monocular microscope was used for microscopy work. Staff needed to tilt their head at 90 degree to perform their work. Some staff developed ergonomic health problems like back ache, ankylosing spondylosis, and eye strain. However, certain harmful situations were emphasised over and over again by our seniors (E.g. If the UV light is on, do not enter room as it can cause cancer. Be careful potassium cyanide can kill).

Ladies were provided with a white dress-uniform, the man wore a white tunic over long white pants. There was no lab coat, no covered toes shoe or goggles for protection. By drawing the reagent through the pipette by mouth, accidents could occur, causing injury to the mouth and throat.

In the past, there was lack of infection control across the laboratories. Many processes were unsafe! There was no factories act or WSHA and regulations then.

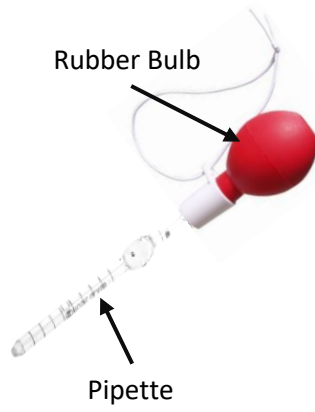
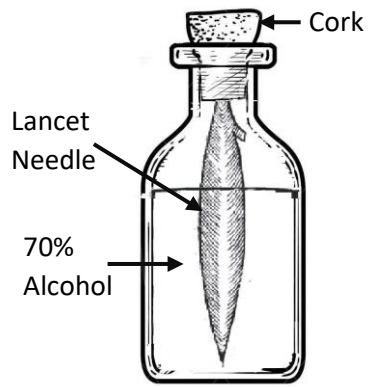
In **Haematology**, blood collection for routine tests was mainly obtained through a finger prick. Each morning, staff would need to prepare their own sharpened steel needles with a wedge sharpening stone, attached the unsharpened end of the needle to a cork, which also served as the holder for the needle. The needles were sterilised by soaking in 70% alcohol and were used for finger pricks throughout the day. After preparation of blood collection box, staff was ready to go on blood collection round for the patients in the wards. Blood was drawn by mouth, by attaching a straight or bulb pipette attached to a rubber sucking tube to the correct mark. The sucking tube is an extender between the mouth of the collector and the pipettes. Dilutions of blood sample were done immediately by drawing appropriate solution up to the correct marking on the bulb pipette for a total white or platelet count or the blood would be mixed into a tube of Drabkin's solution for Haemoglobin test. A blood smear would be made on a glass slide using a glass slider. All these processes were done at patients' bedside using the same sucking tube. There was no rubber bulb to help with collection at that time.

The testing process continued in the laboratory, actual total white count and platelet count were done using a Neubauer chamber, a handheld counter under a microscope. Slides were stained and cell morphology were performed on the peripheral blood smear using a microscope. Haemoglobin levels were measured using a haemoglobinometer. Results were manually reported on the same request form that was sent.

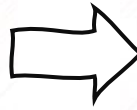
The haemocytometer comprising graduated glass pipettes, Neubauer chamber were all made of top-quality glass and were precisely calibrated. It was made for accuracy but there were variable human errors during blood collection, processing, and reporting.

It was not until my fifth year, where I managed to glimpse automation in Haematology. It was a Coulter Counter. It could automatically measure Haemoglobin and performed total white cell count.

# Exhibits



Monocular Microscope



Ergonomic Binocular Microscope



Photo Courtesy of Mr. Tan Chua

**Bacteriology** laboratory was very self-sufficient. Solid, semisolid, and liquid culture media, as well as antibiotic disc for sensitivity tests were all prepared in-house. Solid media includes blood agar plates, chocolate plates, eosin methylene blue (EMB) plates, MacConkey plates and Sabaroud agar plates. Liquid media includes Hartley's broth for coagulase test, Cooked Meat media and many other sugars and broths for biochemical testing. These were used for identification of organisms. Litmus papers were used for checking of pH. There was no pH meter then. As there was no CO<sub>2</sub> incubator, the Lab improvised and created its own CO<sub>2</sub> environment for bacteria that would grow and thrive in CO<sub>2</sub>. Those culture plates would then be put inside an empty ovaltine tin. A candle was lit and placed inside the tin which was then tightly closed. Once the candle went off, only CO<sub>2</sub> was left in the tin. This tin with the cultured plates was then placed in the 37 degree celsius incubator for culture overnight.

There were so many types of ova, parasites, amoeba we encountered those days that we became very good in identifying them. However, as the community become more affluent and hygienic, we hardly see these parasites nowadays.

The laboratory used lysol for cleaning and disinfecting. The smell was so pungent and repulsive, it stuck to your clothing, hair, and body. People could smell it from afar, and nobody would sit next to you in the bus!

### **Histopathology Laboratory**

The main concern then was ventilation and exhaust issues. The moment you stepped into the laboratory, you would be overwhelmed by the strong formalin and xylene smell. Exposure to such fumes could cause health hazards like carcinoma, skin irritation, and lung diseases.

Processing of trimmed tissues was manual. Staff needed to set timer and move the metal baskets containing the tissues from one jar of chemicals to another. There was no ready mould to hold processed tissue in paraffin wax. Our seniors had to make moulds from pieces of wood to create a trough, put the processed tissue in this trough and pour melted wax into it. When wax was hardened, the tissue block can be proceeded to microtomy.

Microtome blades were not disposable. Each day they had to be sharpened with leather strap so that they would be sharp enough to cut the processed tissues.

There was no automation, every stain, routine or special had to be prepared from scratch and stained manually. All trainees would have to spend a month in the mortuary to assist pathologist in post-mortem. We witnessed on the autopsy table, the cause of death of the deceased, assisted in specimen collection, weighing organ, and taking notes. We gained a lot of knowledge through this first-hand exposure. It was an eerie but rewarding experience.

**Biochemistry** Laboratory was the only laboratory that had some semi automation. Most tests were manual and single analyte. Many tests required the technician to prepare the test standard curve, using of spectrophotometer, titration, and flame photometry. It was the Biochemistry Lab that started EQA program for Biochemistry tests for all the clinical laboratories in Singapore hospitals and later to the polyclinics laboratories as well.

Posting to **Public Health Laboratory** was every trainee's favourite. Vendors would send their ice cream to the lab for testing. A small portion of ice cream would be used for testing. The remainder would be consumed by staff and trainees. It was a happy incentive!

### **Today**

Pathology and Lab Medicine has advanced by leaps and bounds. SingHealth Duke-NUS Pathology Academic Clinical Programme, through the four hospitals, is advancing academic medicine with an aim to be internationally recognised for its Clinical Service, Education and Research. Current strategic focuses are to provide integrated seamless safe patient care through clinical service transformation, quality and innovation, computational and digital pathology, laboratory automation and artificial intelligence; to develop clinician scientist, translational research, and development of advanced molecular diagnostics; to build a ready future

workforce and growing programme to be choice centre for training activities through education and collaboration. We are always ready to step up for emergency situations or pandemics.

**Looking back,**

I am tremendously heartened by how far Pathology and Lab Medicine has evolved. From its humble beginning during my trainee days to proud moments of what we can offer to our patients today! Laboratory Medicine is an important part of healthcare.

I marvel at the changes as we progress from third world to first world laboratories.

I am very proud and considered myself extremely privileged to have this opportunity to serve and contribute to the many changes and development in building up a quality lab service. It has been an enjoyable learning journey as I perform my job in different aspects of Laboratory Medicine as I moved from rank and file in the last 5 decades.

Thank you all, my family, bosses, teachers, mentors, colleagues, and friends for the wonderful support and for making my amazing journey in Pathology and Lab Medicine possible.

Proud to be a Medical Lab Scientist!

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