

## LEARN ABOUT LABORATORY SCIENCE

Events during the 2009 changeover of community laboratory contracts in Auckland highlighted the vital role that medical laboratory science plays in a safe and efficient health system - in particular, the need for a qualified and experienced medical laboratory workforce that is able to produce accurate results in a timely manner.

Once our phlebotomists have taken your blood, what then? What goes on in a modern medical laboratory, open 24/7? Read on. We will explain what happens and who does the work.

Along with Pathologists, we are the registered health professionals who run the laboratories, test, interpret and report the laboratory results. We are trained to identify disease and abnormalities through studying blood, tissue and other body samples. Unlike doctors and nurses, we work 'behind the scenes', but we are an integral part of the health workforce and our work is vital to the patient's treatment. Over 90% of doctors' treatment requires laboratory input, to aid or confirm diagnosis and to monitor drug levels or disease progression.



We are highly regarded and sought after worldwide. Unfortunately, the current situation in New Zealand, of contracting out of laboratory services, is having a catastrophic effect on our profession. Our older colleagues are leaving, and younger science students are choosing other careers. Ours is the only professional health science degree where the number of places in the university is greater than the number of students applying.

Medical Laboratory science is a bit like detective work. We look for answers to the disease "puzzle", to help doctors diagnose and treat their patients – Are these cells abnormal? What do these blood cells tell us about this person's health? How does it fit in with their other symptoms? How much of drug 'x' is in this person's blood? Is it working effectively? What bug is making this person sick?

Our job has a high level of responsibility. We often have to make important decisions under pressure. Emergencies can occur at any time, day or night, so we have to prioritize and take the initiative, often without much back-up. If the doctor needs to know the answer, we have to deliver. Sometimes this means working through the night providing results while a patient fights for their life in another part of the hospital or a surgeon waits, mid-operation, for our phone call.

We develop, adapt and apply scientific methods of analysis and high standards of quality assurance to our work. We have to understand the method and theory behind complicated, technical and automated equipment, as well as develop the skills to identify and interpret abnormalities seen under the microscope, or by other methods of testing.



## OUR PROFESSION IS DIVIDED INTO THE FOLLOWING DISCIPLINES:

**Haematology**, where diseases of the blood and bone marrow, such as leukaemia or anaemia, are diagnosed. We work alongside pathologists to monitor these and other blood related diseases. We are expert at recognising abnormalities in blood cells, like malarial parasites, or lead poisoning. We monitor the blood thinning drugs that help prevent heart attacks and strokes, detect essential blood clotting factors, help diagnose and monitor haemophilia and other bleeding disorders.

**Transfusion Medicine**, where blood, collected from donors, is typed and screened for life saving transfusions, or made into essential blood products like platelets or Factor VIII. Our skills may be needed at any time, 24/7, to provide blood and blood products for motor vehicle accidents or other sudden traumas, surgery, and sometimes during birth, for mother or baby. We also test tissue and bone marrow for skin grafts, bone marrow and organ transplants.

**Immunology** is where the body's response to disease is studied, often through the measurement of antibodies. In immune disorders it is the body's own overreaction to certain substances that causes harm. This field of science is expanding as immune disorders become more commonly recognised and diagnosed. Some of the diseases we help to diagnose are: rheumatoid arthritis, allergies, lupus, vasculitis (blood vessel disease), irritable bowel syndrome and various forms of cancer.

**Biochemistry**, where disorders, such as diabetes, heart attacks, kidney failure and hepatitis are diagnosed and monitored. In this department we analyse the chemical content of the blood and other tissues, using sophisticated instrumentation. We also test for illegal substances, like 'P', amphetamines, 'speed', as well as for poisons and other toxic substances in the blood.

**Anatomical Pathology or Histology / Cytology**. Here we help diagnose various forms of cancer and other diseases from tissue samples obtained during surgery or by biopsy from the lungs, brain, lymph nodes, liver, skin and elsewhere. Samples are embedded into wax and then sliced into single cell thickness. We apply sophisticated staining and tagging techniques to these samples to help the pathologist identify and diagnose the type of cancer or other abnormality. In cytology we investigate cervical smears for cervical cancer through the National Cervical Screening Programme.

**Microbiology**, where we study and test for infectious diseases like meningitis, tuberculosis, pneumonia, septicaemia (blood poisoning) and necrotizing fasciitis (flesh eating disease). We provide information about the effectiveness of antibiotics used in the treatment of infections. We use microscopic examination as well as biochemical and culturing methods to isolate and identify the bacterial, fungal and parasitic causes of disease.

**Cytogenetics**, where we study disease according to its genetic basis. By studying chromosomes, the building blocks that lie within the nucleus of every living cell, we provide information about congenital diseases such as Down's syndrome. We also provide important information about the abnormal changes that occur in the chromosomes of people with diseases like breast cancer, leukaemia and other forms of cancer.



**Virology** is where diseases such as swine flu, measles, chicken pox, HIV and hepatitis are diagnosed. We use sophisticated equipment and techniques to identify and monitor the progress of viruses; organisms which are so small they can not be seen through a normal microscope. We test for their presence in the blood and other body fluids. Our role is vital during a flu epidemic or worldwide pandemic.

## WHAT TRAINING AND QUALIFICATIONS DO MEDICAL LABORATORY SCIENTISTS HAVE?

Medical laboratory scientists hold a Bachelor of Medical Laboratory Science, which comprises four and a half years of study and training. On successful completion of four years' study we must then be employed as an intern for a further six months minimum before applying for registration from the Medical Laboratory Science Board. In order to practice we must be registered, fulfil annual competency requirements and hold a current practicing certificate.

