AUT

A FUTURE IN MEDICAL LABORATORY SCIENCE

WHAT IS MEDICAL LABORATORY SCIENCE ABOUT?

When your doctor sends you off to a diagnostic laboratory for blood or urine tests, they're calling on the skills of the disease or health detective, aka the medical laboratory scientist.

Medical laboratory scientists (MLS) are the health professionals that test and analyse blood, urine, tissue and other bodily fluids and specimens. These can come from any part of the body, such as part of a colon or piece of mole, or blood samples and urine samples.

The tests are typically requested by general practitioners (GPs) or medical specialists for the diagnosis and treatment of everything from high blood pressure and iron deficiency to cancers and infectious diseases. Laboratory results produced by medical laboratory scientists are used in the diagnosis of 70–80% of all patient disorders.
Source: NZ Institute of Medical Laboratory Science (NZIMLS)

Medical laboratory scientists work in diagnostic laboratories, usually specialising in one or two of the following: clinical chemistry, haematology, histology, transfusion science, clinical immunology, medical cytogenetics, medical microbiology and the increasingly dominant field of molecular diagnostics.

Do you enjoy problem-solving? Do you want to further your interests in biology and chemistry? Do you find it easy to handle multiple tasks at once? Are you interested in how advances in science can improve people's health? Would you like to be a health professional with great communication skills but not work directly with people? Then medical laboratory science may be a great career for you.

OUTLOOK AND TRENDS

Demand for new advanced diagnostics – A greater understanding of biological processes is driving demand for new advanced diagnostics, generating new career prospects for medical laboratory scientists. In addition to these exciting developments, an aging population will lead to increasing reliance on pathology services, increasing demand for medical scientists who are involved in the improvement of human health.

Increase in automation – The upgrade from manual techniques to automation using sophisticated machinery continues across all aspects of medical laboratory work. Medical laboratory scientists need to maintain and operate machinery, troubleshoot and repair minor faults, and liaise with diagnostic company representatives when more sophisticated issues arise.

Complexity of knowledge – DNA technologies are advancing knowledge of both health and disease at a very rapid rate. Growth in molecular methodology, and the move towards whole genome sequencing for diagnosis, particularly of inherited genetic disorders, requires theoretical knowledge and practical skills. Graduate medical laboratory scientists need to be aware of advancing trends and keep their theoretical knowledge up to date as much as their practical skills.

High level analysis – Due to technological advances in diagnostic laboratory testing and analytical instrumentation, medical laboratory scientists are having to deliver increasingly complex analysis and reports that require high level skills across a variety of IT systems. Sources: University of Kansas/ Auckland District Health Board (ADHB).

The role of AI in clinical practice – Artificial Intelligence (AI) can be used to diagnose diseases, develop personalised treatment plans and assist clinicians with decision-making. Rather than simply automating tasks, AI is about developing technologies that can enhance patient care across healthcare settings. However, challenges related to data privacy, bias, and the need for human expertise must be addressed for the responsible and effective implementation of AI in healthcare.

WORK SETTINGS

The Bachelor of Medical Laboratory Science (BMLS) degree degree is recognised by Medical Sciences Council New Zealand for registration as a medical laboratory scientist. This typically opens up opportunities for MLS graduates to enter medical laboratory scientist roles in community or hospital diagnostic laboratories.

Large community medical diagnostic laboratories are located in main centres. Smaller communities are serviced by laboratories that provide basic testing with supplemental testing referred to bigger centres.

Once medical laboratory scientists have gained some experience they may move into research positions in specialist laboratories within organisations such as universities and pharmaceutical companies.

Non-lab options

Graduates also find careers in public health agencies, biotechnology companies, the pharmaceutical industry, and diagnostic instrumentation and health informatics firms. There are also opportunities to work on science public policy in government departments.

Some find employment as specialist sales representatives and support staff for biochemical or instrument companies such as Roche Diagnostics, Beckmann Coulter or Stago. Others follow their interest in public health and find employment with public health agencies.

With extensive experience and further training, some medical laboratory scientists progress into specialist scientist roles.

CAREER ROLE EXAMPLES

Medical laboratory scientist (MLS) – tests, analyses and produces reports on bodily fluids and specimens, depending on the diagnostic laboratory's specialisation. Sorts and registers incoming specimens. Maintains and operates the technology, and provides quality control. Hospital-based medical laboratory scientists will be involved in more specialised testing than community lab medical laboratory scientists.

Medical laboratory technician – assists medical laboratory scientists by taking samples, preparing slides, running tests etc. Performs tests on tissue, blood and other body fluids. A degree isn't always required for this role however, a technician role can help degree graduates get into a lab.

Sales/technical support representative – work for biochemical/therapeutics companies either selling products to laboratory scientists, or providing technical support for the equipment and diagnostic kits after purchase.

Health informatics practitioner – stores, retrieves, shares and optimises use of data that relates to human health. Uses information to assess the effect of health innovations on health policy and advance the field of informatics.

SPECIALISATIONS

Medical laboratory scientists may work within any of the following specialisations in a diagnostic lab:

Clinical chemistry – analysis of blood, urine, faeces and tissues, typically testing for diabetes, renal failure, heart disease and hepatitis.

Haematology – study of the development and disorders of blood and bone marrow, typically investigating for anaemia, cancer, bleeding, thrombosis.

Histology – prep, processing and staining of tissues obtained during surgery, biopsy or necropsy, typically looking at diseases such as cancer.

Transfusion science – prepare blood products from donor blood for patients, match patient and donor blood for safe transfusions and transplants.

Immunology – study of body's response to disease, typically to diagnose HIV infection, rheumatoid arthritis, allergies etc.

Medical cytology – analysis of cells from a variety of body sites, for example cervix, lungs or breasts. Typically looking for presence of cancer cells, eg cervical cancer tests (this area of study is not offered at AUT).

Medical Microbiology – examining specimens from anywhere around the body, typically looking at bacteria, fungi, parasites and viruses.

Molecular diagnostics – analysis of chromosomes, DNA, RNA or protein for diagnosis of conditions with a genetic cause.

Source: New Zealand Institute of Medical Laboratory Science (NZIMIS), AUT medical science laboratory lecturers

SKILLS AND KNOWLEDGE

- In-depth knowledge of at least two specialties (see above)
- Acute observation, collection and recording of test results
- Confidence and competence in the use and maintenance of specialist laboratory equipment
- Logical thought processes that facilitate problem solving
- Strong oral and written communication skills
- Ability to follow directions, react appropriately and maintain poise and control under stressful conditions
- Excellence in manual dexterity
- Professional attitude, understanding the importance of patient confidentiality

PERSONAL QUALITIES

- Dependable, responsible, patient
- Mature and able to take the initiative
- Reliable team member
- Highly self-motivated
- Resilient, curious and persistent
- Good time management and planning skills

PROFESSIONAL REGISTRATION

MLS graduates must apply to the Medical Sciences Council (MSC) for registration and an annual practising certificate (APC) to practice. Registration is initially provisional and a minimum of six months.

SALARY GUIDE

Salaries will vary depending on experience, job location and employer, eg Health New Zealand or a community employer. The guide below is based on Health New Zealand's collective agreement.

	Salary (per year)
Medical laboratory scientist graduate (depending on region and employer)	Starting salary: $69,000 provisional registration After 6 months: $74,000 (full registration) 5 to 7 years: approx. $90,000–$100,000 (annual increments) Senior level: $100,000–$150,000+ (depending on responsibility, experience and quals).
Medical Laboratory Technician (depending on region and employer)	Starting salary: $69,000 Up to 5 years: approx. $84,000
Senior scientists/ specialist experience	$108,000–$124,000+

Keep up to date with medical laboratory worker salary data by visiting these websites:

Allied Scientific and Technical (APEX) union – collective employment agreement – apex.org.nz

Careers NZ – Medical Laboratory Scientist – careers.govt.nz

Payscale – payscale.com

Salary range is indicative of the New Zealand job market at the time of publication (early 2024) and should only be used as a guideline.

THE AUT APPROACH

At AUT, you can do a Bachelor of Medical Laboratory Science (a four-year degree in medical laboratory science) or a Bachelor of Science degree with a Graduate Diploma in Medical Laboratory Science. Check with MSCNZ for further information on the most appropriate qualification for you. Fourth-year students do two 15-week work placements of 30 hours a week in New Zealand and/or Australia.

NB: The University of Otago (Dunedin) also offers a medical laboratory science degree.

FURTHER STUDY OPTIONS

There are a range of postgraduate study and research areas in MLS, including the Master of Medical Laboratory Science, which has a specialist scientist or management pathway. A PhD can be also be done in this area.

Research topics include immunology, molecular diagnostics, microbiology, transfusion research, clinical chemistry and pharmacology.

SHAKIL MOHAMMED

Medical Laboratory Scientist, LabPlus Histology Department, Auckland City Hospital

Bachelor of Medical Laboratory Science

"I started working as a trainee student scientist when I was in the third year of my degree, mainly working in the specimen reception and biochemistry departments. I specialised in Clinical Chemistry and Histology, and I completed my placements at LabPlus and APS. After my graduation, I continued working as a technician for two months after which I was offered the MLS position. I have been in this role over two years now.

In this role, I'm responsible for processing routine tissue samples and preparing slides for the pathologists for examination and diagnosis of malignancies or anatomical dysfunction.

Because we are based at Auckland City Hospital, we also receive a large number of urgent tissue samples from the operating theatres. Some of that specimen requires preparation of frozen sections by cryotomy, followed by rapid staining, for an urgent diagnosis to be made. My role also covers more specialised areas of histology involving slide preparation during Mohs surgery, for removal of skin cancers, located at Greenlane Hospital.

Histology samples can be very precious and irreplaceable, therefore the communication between theatres and scientists is crucial to maintain tissue integrity. Histology involves a multi-bench workflow, so teamwork, good time management, and organisational skills are important.

Workload is not always constant in a hospital setting. The volume of work varies. You can be running smoothly in the morning and be overwhelmed in the afternoon. Being flexible really helps.

It's a very competitive profession, so it's okay to start as a technician, because there is always opportunity to grow. Once you are in a laboratory, absorb all the knowledge you can, expand your network and maintain your professionalism."

EMPLOYER COMMENT

"I look for graduates who are passionate about this work and are willing to learn and excel in their job.

University is a place where you learn all your principles and the lab is where you put all that knowledge into practice. Therefore, it is beneficial to have knowledge of basic principles, a strong theory background and solid understanding of the importance of quality and health and safety in a laboratory.

I advise graduates to never stop chasing their dreams. Grab any opportunity that comes your way, whether it's a fixed term or a technician position. Use that opportunity to gain experience and be seen as a valuable staff."

Joe McDermott
Scientist Unit Manager, LabPlus Histology Department, Auckland City Hospital

MEDICAL LABORATORY SCIENCE

USEFUL WEBSITES

The New Zealand Institute of Medical Laboratory Science
nzimls.org.nz

APEX Medical Laboratory Workers Union
apex.org.nz/divisions/medical-laboratory-workers

Medical Sciences Council of NZ
mscouncil.org.nz

FURTHER INFORMATION

For more information about the Bachelor of Medical Laboratory Science, visit aut.ac.nz/mls

For other future career sheets visit: aut.ac.nz/careersheets

EMPLOYABILITY & CAREERS
For employability and career support, AUT students can book an appointment through elab.aut.ac.nz/
@AUTEmployabilityandCareers

FUTURE STUDENTS
Contact the Future Student Advisory team for more information: aut.ac.nz/enquire
futurestudents@aut.ac.nz
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CURRENT AUT STUDENTS
Contact the Student Hub Advisors team for more information: 0800 AUT UNI (0800 288 864)
aut.ac.nz/enquire | studenthub@aut.ac.nz

CITY CAMPUS
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Connect with us now:

The information contained in this career sheet is correct at time of printing, early 2024.