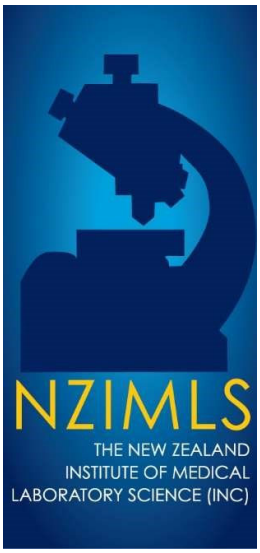
QUALIFIED MEDICAL
LABORATORY TECHNICIAN

COMPONENT PROCESSING

2022 CURRICULUM



Part One: Common Curriculum

Part Two: Discipline Specific Curriculum in Component Processing

Introduction

Definition of a Medical Laboratory Technician

A Medical Laboratory Technician (MLT) is a person employed to perform routine tasks by following established protocols under the supervision or direction and control of a Registered Medical Laboratory Scientist. A MLT may only practise within their area of competence, in a health service that forms part of the medical laboratory science profession. During training, supervision would be direct. However, after suitable assessment of competency, it may be replaced with direction* by a Registered Medical Laboratory Scientist or another registered health practitioner with an appropriate scope of practice, other than a Medical Laboratory Technician.

The QMLT candidate has two curricula to study:

- The Common Curriculum which is common to all NZIMLS technician qualifications.
- The Discipline Specific Curriculum which is common only to the discipline in which the candidate is sitting the QMLT exam.
- This document combines both the Common Curriculum (Part One) and the Discipline Specific Curriculum (Part Two).

Objectives

1. Education of Medical Laboratory Technicians and Medical Laboratory Pre-Analytical Technicians

    a. To provide an employer recognisable qualification in a New Zealand Medical Laboratory/Blood Service.

    b. To provide a qualification that is recognised by the Medical Sciences Council of New Zealand for the Registration of Qualified Medical Laboratory Technicians (QMLT) and Qualified Medical Laboratory Pre-Analytical Technicians (QMLPAT).

    c. To provide sufficient theoretical training to enable a medical laboratory technician or medical laboratory pre-analytical technician to perform their practical work with accuracy, reliability and efficiency.

    d. To enable them to appreciate the reasons for, and the importance of the procedures and the tests that they perform.

    e. To enhance interest in their work and increase job satisfaction and self-esteem.

2. QMLT and Common Curricula

    a. To prescribe the course of study for the QMLT examination.

    b. To define the composition of the examination.

The Transfusion Science Special Interest Group (TSSIG) has prepared both a curriculum and practical assessment for use by Trainee Medical Laboratory Technicians preparing for the NZIMLS QMLT examinations.

The practical assessment found in Part 2 section is compulsory and has been included to aid candidates preparing for the QMLT examinations and to be a record of training or practical competency, accomplished by mastery assessment.

NOTE - The practical assessment is a requirement and must be presented as part of the examination and qualifying process.

The Transfusion Science SIG has taken significant steps to limit the theoretical knowledge required, to be sufficient to perform bench procedures and understand the importance of recognising abnormal or anomalous results for referral to a supervisor.

The request for specific numbers of points and the reduction in the number of tests to be performed in the practical assessment, is an endeavour to limit the quantity of information to learn and examine.

This does not preclude employers training their laboratory assistants for their own needs.

Competence Standards
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Competence standards are a description of the ability of a medical laboratory science practitioner to practise safely and effectively in a variety of contexts and environments. Competence is influenced by many factors including, but not limited to, the practitioner's qualifications, clinical experience, professional development and his/her ability to integrate knowledge, skills, attitudes, values and judgements within a practice setting. A critical value of competence standards is the capacity to support and facilitate professional practice and growth.

The standards set out in this document are expressed as entry-level competencies and behaviours. However, it is expected that all practitioners will successively build on these competence standards to levels expected of experienced practitioners.

The competence standards identify the minimum knowledge, skills and professional attributes necessary for practice. During any one procedure it is expected practitioners will demonstrate elements of practice across a number of broadly defined domains of competence. This recognises that competent professional practice is more than a sum of each discrete part. It requires an ability to draw on and integrate the breadth of competencies to support overall performance.

Context of the Competence Standards
(Reproduced with permission from the Medical Sciences Council of New Zealand)

The competence standards are directly linked to the three medical laboratory science scopes of practice defined by the Council under the Act.

Medical laboratory science practitioners in Aotearoa New Zealand practise within a legislated regulatory framework under the Health Practitioners Competence Assurance Act 2003. Defining scopes of practice serves to protect the health and safety of the public through the use of protected professional titles.

Only individuals who hold current registration with the Medical Sciences Council are permitted to use the professional titles of:

- Medical Laboratory Scientist
- Medical Laboratory Technician
- Medical Laboratory Pre-Analytical Technician

Competence Standards for Medical Laboratory Science Practitioners in Aotearoa New Zealand
An Overview of the Competencies Domains
(Reproduced with permission from the Medical Sciences Council of New Zealand)

Key competencies are arranged within a number of integrated themes called Domains. There are five domains of competence that apply to each of the scopes of practice for medical laboratory science practitioners. In addition, competencies specific to each scope of practice are articulated in a number of subsets (5A to 5C) of the fifth domain.

Domain 1: Professional and Ethical Conduct
This domain covers practitioners' responsibility to be professional and ethical and to practise within the current medico-legal framework. Includes their responsibility for ensuring patient confidentiality/privacy is maintained at all times while recognising the potential role as a patient advocate.

Domain 2: Communication and Collaboration
This domain covers practitioners' responsibility in utilising appropriate, clear and effective communication and their responsibility for ensuring they function effectively as a member of a health team at all times.

Domain 3: Evidence-Based Practice and Professional Learning
This domain covers practitioners' responsibility to engage in evidence-based practice and to critically monitor their actions through a range of reflective processes. It includes their responsibility for identifying, planning and implementing their ongoing professional learning needs.

Domain 4: Safety of Practice and Risk Management
This domain covers practitioners' responsibility to protect patients, others and the environment from harm by managing and responding to the risks inherent in both healthcare and medical laboratory science practice. It includes their responsibility for ensuring high quality professional services are provided for the benefit of patients and other service users.

Domain 5: Medical Laboratory Science Practice
This domain covers the knowledge, skills and capabilities practitioners need to practise the profession of medical laboratory science. Elements in this domain are common to all medical laboratory science practitioners, taking into account the different requirements of each scope of practice.

Domain 5A: Medical Laboratory Scientist
This domain covers the additional knowledge, skills and capabilities specific to the Medical Laboratory Scientist scope of practice.

Domain 5B: Medical Laboratory Technician
This domain covers the additional knowledge, skills and capabilities specific to the Medical Laboratory Technician scope of practice.

Domain 5C: Medical Laboratory Pre-Analytical Technician
This domain covers the additional knowledge, skills and capabilities specific to the Medical Laboratory Pre-Analytical Technician scope of practice.

More detailed information on these Standards can be found on the Medical Sciences Council website under "Competence Standards for Medical Laboratory Science Practitioners in Aotearoa New Zealand (revised February 2018).

Part One
Common Curriculum

Definitions

1. Quality assurance
   All those planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy a given requirement for quality.

2. Quality Control
   The monitoring and control of the process producing the product and service.

3. Total Quality Management (TQM)
   Management philosophy of continual incremental improvement through total involvement. Seeks, through the utilisation of fully trained, informed and involved employees, participating and working with management to satisfy customer requirements, to improve overall quality, productivity, efficiency and company viability.

   Reference ISO 15189

4. Ethics
   The rules or principles that govern right conduct.

5. Confidential information
   Information (written or spoken) given on the understanding that it will not be passed on to others.

6. Patient/Donor confidentiality
   Non-disclosure of patient's/donor's personal information, other than to his or her clinician, unless authorised by that patient/donor.

7. Informed consent
   Agreeing to something once provided with all the facts, understanding them fully and knowing one's rights as an individual.

8. Cultural Competence
   A set of congruent behaviours, attitudes and policies that enables effect interaction in cross-cultural situations. 'Culture' refers to integrated patterns of human behaviour that include language, thoughts, communications, actions, customs, beliefs, values and institutions of racial, ethnic, religious or social groups. 'Competence' implies having the capacity to function effectively as an individual and an organisation within the context of the cultural beliefs, behaviours and needs presented by patients and their communities.
   (Adapted from Cross 1989).

Word Definition

The following word definitions will be used to describe the level of knowledge a QMLT shall be required to achieve. Examination questions will also use these words.

WORD DEFINITIONS	
CALCULATE	Perform a mathematical process to get the answer
CLASSIFY	Designate to a group
COMPARE	Detail both the differences and the similarities
COMPLETE	Finish, have all the necessary parts
CONVERT	Express in alternative units
DEFINE	State meaning clearly and concisely
DESCRIBE	Give a complete account demonstrating a thorough practical knowledge in a logical sequence
DISCUSS	Give details, explaining both the positives and negatives
DISTINGUISH	Briefly point out the main differences
EXPAND	To express at length or in greater details
INDICATE	Briefly point out
IDENTIFY	Recognise according to established criteria
INTERPRET	Express the results of a test or series of tests in a meaningful format
LABEL	Give a name to
LIST	Headings only
MATCH	Find one that closely resembles another
NAME	A word or group of words used to describe or evaluate
OUTLINE	Write brief notes incorporating the essential facts
STATE	Give the relevant points briefly

Dilution Factor Definitions (where applicable)

Due to inconsistencies in nomenclature associated with dilution expression the following will be used for calculations in the examination:

½ and 1 in 2: implies 1 part added to 1 part making a total of 2 parts, ie. A dilution factor of x2.

1 to 2: implies 1 part added to 2 parts making a total of 3 parts, ie. A dilution factor of x3.

Because of the dual meaning of the expression 1:2, it will not be used in the examinations.

1.0 What is Medical Laboratory Science?

1.1 Describe the role and understand the definition of medical laboratory science within the context of sample collection and analysis to aid the diagnosis and monitoring of disease, medical conditions and treatments thereof and in the testing and accreditation of donated blood and blood products to ensure the health of the donor and the safety of the blood supply.

1.2 Describe the concept of cultural competence, professional behaviour and attitude within a Medical Laboratory or Blood Service pertaining to:

- Patients, clinicians and colleagues.
- Patient fluid, tissue and body parts.
- Blood donors.
- Donated blood, blood components, or tissue.
- Be familiar with the MSCNZ statement of Cultural Competence, December 2007, and the attitudes, knowledge and skills expected of a QMLT or QMLPAT in their dealings with patients and colleagues.

1.3 Outline the role of the professional/legislative bodies representing, training and governing Medical Laboratory Science in New Zealand.

- NZIMLS (New Zealand Institute of Medical Laboratory Science).
- MSCNZ (Medical Sciences Council New Zealand).
- Universities that train Medical Laboratory Scientists.
- Understand the five codes of competencies (practise as a professional, practise as a technician, safe practice, communication and culturally competent practice) and associated standards as outlined in the Medical Sciences Council New Zealand's Code of Competencies and Standards for the Practice of Medical Laboratory Science.

1.4 Outline the major functions of the following departments / sections and their interrelationships within a laboratory.

- Haematology
- Biochemistry
- Microbiology
- Immunology
- Virology
- Histology
- Cytology
- Cytogenetics
- Forensic Science / Mortuary Practice
- Molecular Diagnostics / Genetics
- New Zealand Blood Service
- Collection services (Phlebotomy)
- Call Centre for helpline, results & enquiries
- Specimen Services

1.5 Outline the major functions / roles of the following laboratory staff:

- Laboratory Clinical Director.
- Pathologist, general and specialist.
- Laboratory Manager.
- Technical Head / Head of Department.
- Section Leader / Technical specialist / Supervisor.
- Scientific Officer.
- Registered Medical Laboratory Scientist.

- Registered Medical Laboratory Technician (QMLT).
- Registered Medical Laboratory Pre-Analytical Technician (QMLPAT).
- Registered Nurse within the New Zealand Blood Service.
- Clerical / Administration staff.

1.6 Outline the role of the Laboratory with referring health professionals such as General Practitioners, specialists/ consultants, nurses and patients.

1.7 Identify and expand basic medical terminology and general abbreviations that relate to the laboratory. To include common prefixes and suffixes (e.g., hyper, hypo, -itis, neuro, -philia).

2.0 Ethics and Legislation

2.1 Outline:
- Patient/Donor confidentiality.
- Informed consent.
- Duty of care (do no harm).
- Statutory requirements for release of body parts to patients / families.
- Statutory obligations for the release of samples (to referral laboratories, chain of evidence parties, patients).
- Laboratory policies for the release of information / results to patients/donors.
- A Medical Laboratory's organisation's obligations to the Treaty of Waitangi.
- The Code of Health & Disability Services and Consumer Rights.
- The NZIMLS code of ethics.
- Knowledge of Health Practitioners Competence Assurance Act (2003).

2.2 Outline how the Health Practitioners Competence Assurance (HCPA) Act 2003 and following amendments relates to Medical Laboratory Science and the Health sector.

2.3 Describe the legal obligation for technicians to be registered and to hold an annual practicing certificate.

2.4 Define scope of practice.

2.5 Describe the scope definitions for a medical laboratory technician and medical laboratory preanalytical technician, including the difference between provisional and full registration.

3.0 Human Anatomy and Physiology

3.1 Identify the position of the major organs of the human body.

3.2 Outline their basic function.

3.3 Identify the specimen types (and their origin) encountered in Medical Laboratories.

4.0 Specimens

4.1 Outline procedures for the packaging and transport of specimens for delivery to a laboratory (from the patient to a laboratory, and between laboratories).

4.2 Outline the procedures for the selection, preparation and storage of specimens within the laboratory.

4.3 Describe appropriate specimen labelling requirements including those for New Zealand Blood Service.

5.0 **Safety**

List your personal duties as a worker under the Health and Safety at Work Act 2015.

5.1 Define, with examples, a notifiable injury or illness, notifiable incident, and notifiable event, according to the Health and Safety at Work Act 2015.

5.2 Describe safety precautions and emergency procedures for incidents involving the following:
- Fire
- Electrical apparatus
- Chemical (poisons, carcinogens, corrosive and volatile substances, gases, radioactive substances, liquid nitrogen)
- Spillages of blood and other biological fluids
- Earthquakes

5.3 Outline an accident reporting procedure for the workplace.

5.4 Outline the role of a health and safety representative.

5.5 Describe the safe handling of biological material under the following headings:
- Identification of routes of infection
- Types of infectious material
- Safety equipment
- Handling
- Disposal
- Decontamination
- Transportation

5.6 Identify international safety symbols that are used in the workplace.

5.7 Describe the concept of safe practice within the workplace.

5.8 Describe the prevention and emergency treatment of the following:
- Eye splashes
- Cuts and bleeding
- Needle or sharps injury
- Blood and Body Fluid exposure
- Burns
- Poisoning
- Electric shock
- Loss of consciousness

5.9 Outline Hazard Identification and Management including the use of Material Safety Data Sheets.

5.10 Outline the concept of occupational health and the role of self-protection through staff vaccination programmes, e.g., Hepatitis B vaccination.

5.11 Outline the principle of Occupational Overuse Syndrome/Gradual Process Injuries and its relevance in the laboratory, including some prevention strategies.

6.0 **Equipment**

6.1 Describe the use and routine maintenance (where applicable) of the following equipment:

- Thermo-regulated apparatus (Incubators, water baths, heating blocks, refrigerators, freezers)
- Balances
- Distilled/deionised water apparatus
- Glassware
- Pipetting devices - manual and automated/mechanical liquid handling devices
- Biohazard cabinets
- Fume hoods/fume cupboards
- Transport systems (including pneumatic tubes, couriers)

(NOTE: "Maintenance" in the context of this curriculum refers to daily good house-keeping practices required to keep equipment clean and functioning at peak efficiency. Laboratory technicians are encouraged to recognise faults in equipment but must refer them to their supervisor for corrective action.)

6.2 Centrifuges:

- Outline the principle of centrifugation.
- Describe the use and maintenance required.
- Describe the safety precautions necessary including specimen breakage.

6.3 Computers:

- Outline basic computer components including hardware and software.
- Describe the role of computers in the laboratory/workplace.

6.4 Barcodes and Scanners:

- Describe the use of barcodes and barcode scanners

7.0 **Quality Assurance**

7.1 Define quality assurance and total quality management.

7.2 Describe quality control.

7.3 Define and distinguish accuracy and precision.

7.4 Define a Biological Reference Interval.

7.5 Describe the role of ISO 15189 within the Medical Laboratory.

7.6 Outline Harmonisation as it relates to Laboratory Medicine.

7.7 Outline internal and external audit processes including the assessment bodies (e.g., International Accreditation New Zealand (IANZ), Ministry of Primary Industries (MPI)).

7.8 Outline the concept of Documentation Control within the Medical Laboratory.

7.9 Outline quality feedback by customers (patients, donors and health professionals).

8.0 Calculations

The student shall be able to perform basic laboratory calculations including:

- Converting units – for example: µmol to mmol, ml to L, g to kg, fractions to percentage.
- Define SI units – pico, nano, mili, micro, kilo as they relate to the power of 10.
- Common laboratory calculations for dose time and urine volume.
- Define pH and use this understanding to differentiate between acidic and basic solutions.

8.1 Dilutions:

- Calculate volumes required to make a working solution from a stock solution.
- Calculation of patient results post dilution.

8.2 Statistics:

- Calculation of average, mean, standard deviation and coefficient of variation using a calculator.
- Creation of and plotting results onto a Levy Jennings graph.
- Basic interpretation of Levy Jennings graphs.

8.3 Calculation of Molarity from molecular weight (note molecular weight to be supplied in examination).
Other calculations specific to your discipline.
See Guide to Calculations on the NZIMLS website under Education.

9.0 Reference Texts

Below are listed suggested reference texts. The latest versions are recommended. This is not an exhaustive list.

9.1 Specimens

Diagnostic Samples: From the Patient to the Laboratory: The Impact of Preanalytical Variables on the Quality of Laboratory Results Guder W.G, Narayansan S, Wisser H, Zawta B
Wiley-Blackwell

Clinical Diagnostic Technology – The total Testing Process, Volume 1: The Preanalytical Phase
Ward-Cook K.M, Lehmann C.A, Schoeff L.E, Williams R.H
AACC Press, Washington DC

IATA Infectious Substances Guidelines Manual 2015 edition
IATA Dangerous Goods Regulations Manual 2016 edition

Land Transport Rule Dangerous Goods 2005
https://www.nzta.govt.nz/resources/rules/dangerous-goods-2005/

9.2 Human Anatomy and Physiology

Phlebotomy Handbook
Garza d, Becan-McBride K
Pearson Educational, New Jersey USA

Phlebotomy Essentials
McCall R.E, Tankersley C.M
Lippencott, Williams & Wilkins, Philadelphia, USA

9.3 Equipment

Clinical Chemistry: Theory Analysis and Correlation Kaplan L.A., Pesce A.J.
Mosby; Missouri, USA

TIETZ: Textbook of Clinical Chemistry and Molecular Diagnostics
Carl A Burtis, Edward R Ashwood and David E Bruns Saunders; Philadelphia, USA
TIETZ: Fundamentals of Clinical Chemistry and Molecular Diagnostics Carl A Burtis and David E Bruns Saunders; Philadelphia, USA

9.4 Safety

Clinical Microbiology Procedures Handbook
Isenberg H.D. Chief Editor
American Society Microbiology Washington DC

Laboratory Safety Principles and Practices Fleming D.O., Richardson 1.H., Tulis 1.1, Vesley D.
American Society Microbiology Washington DC.

9.5 Legislation and Standards

Health Practitioners Competence Assurance Act (2003)

ISO 15189:2012 Medical laboratories – Requirements for quality and competence

AS/NZS 2243 Safety in laboratories

Clinical and Laboratory Standards Institute (CLSI) guidelines www.legislation.govt.nz

Code of Ethics of the New Zealand Institute of Medical Laboratory Science www.nzimls.org.nz

Competence Standards for Medical Laboratory Science Practitioners in Aotearoa New Zealand (revised 2018). www.mscouncil.org.nz

Statement of Cultural Competence (2007) www.mscouncil.org.nz

Part Two
Discipline Specific Curriculum Component Processing

1.0 Good Manufacturing Practice and Regulatory Requirements

1.1 Discuss the need for, and aim of, Good Manufacturing Practice (GMP).

1.2 Outline the basic principles of Good Manufacturing Practice for each of the following key areas:
- Quality Management
- Personnel
- Premises and Equipment Documentation Production
- Quality Control
- Contract Manufacture and Analysis Complaints and Product Recall Internal Audit (self-inspection)

1.3 Outline:
- Licence to Manufacture Medicines
- Registered Medicine
- Named Patient Only Medicine
- New Zealand Blood Service (NZBS) Manufacturing Standards

2.0 Collection of Blood

2.1 List the major blood donor eligibility criteria and explain the importance of the health questionnaire (DSR).

2.2 Describe the interaction/relationship between collections and the laboratory including:
- The process of Consignment of blood and samples
- Packing requirements for products and samples for transport to the donor centre

2.3 Describe what Therapeutic Venesection is and why it is performed.

2.4 Describe what donation withdrawal is and how it is handled from a collection's perspective.

2.5 Outline the constituents and function of:
- Bag type anticoagulants and additive solutions, used for the collection and storage of blood and blood products

3.0 Donation Accreditation

3.1 List the mandatory tests required to accredit a donation of blood in accordance with NZBS Manufacturing Standards.

3.2 List the supplementary tests and outline their significance with regard to transfusion.

3.3 Explain the significance of Nucleic Acid Technology (NAT) testing.

4.0 **Equipment**

4.1 Outline the key principles and importance of validating equipment.

5.0 **Controlled Temperature Storage**

5.1 Define what a 'Controlled Temperature Storage' device is.

5.2 Outline the essential requirements and maintenance procedures of Controlled Temperature Storage Devices.

5.3 Discuss why it is important to have controlled temperature storage systems in place.

6.0 **Manufacture of Blood Components**

6.1 Describe the process of receipt and separation and explain why it is important that the correct separation profile is applied

6.2 For the following blood components describe:
- The principles and method of preparation of the component
- The clinical uses of the component

1. Red Cells Resuspended, Leucocyte Depleted (RCR)
2. Whole Blood Plasma Reduced, Leucocyte Depleted (WBPR)
3. Red Cells Resuspended, Neonatal, Leucocyte Depleted
4. Fresh Frozen Plasma, Leucocyte Depleted (FFP) for fractionation from Whole Blood
5. Apheresis Fresh Frozen Plasma, Leucocyte Depleted (FFP) for fractionation
6. Platelet Pool in Additive Solution, Leucocyte Depleted
7. Platelets Apheresis Leucocyte Depleted
8. Platelets, Neonatal Apheresis Leucocyte, Depleted
9. Intermediate Plasma
10. Neonatal Plasma.
11. IgA Deficient Plasma
12. Frozen Red Cells
13. Washed Red Cells
14. Cryoprecipitate
15. Red Cells for Intrauterine Transfusion
16. Concentrated Platelets
17. Washed Platelets
18. Whole Blood Leucocyte Depleted
19. Granulocytes
20. Buffy Coats for Clinical Use
21. Serum Eye Drops
22. Cryopreserved Red cells
23. Cryopreserved Platelets

7.0 **Manufacture of Fractionated Blood Products**

7.1 Describe the relationship between NZBS and CSL with regard to production of Fractionated Plasma Products

7.2 Describe the process of plasma boxing

7.3 Outline the process of plasma fractionation

7.4 Describe the clinical uses of the following fractionated products:
- IVIg
- Immunoglobulins
- Albumex
- Factor VIII
- Prothrombinex

8.0 **Labelling**

8.1 Explain the difference between ABO labelling and automatic labelling and give examples of what each one is used for.

8.2 Discuss how we use the principles of line segregation and line clearance in labelling and why they are important.

8.3 Define 'concatenation' and explain why it is important to complete concatenation properly.

8.4 Explain how a label printer produces labels and discuss the significance of using this type of label for ABO labelling of blood components

8.5 Describe processes for printing additional donation numbers and destruction of labels not required.

9.0 **Quality Control**

9.1 Describe processes for quality sampling of blood components including what correct practices are for safe handling of specimens and explain why it is important to perform quality sampling correctly.

9.2 Explain the test principles of:
- Residual WBC testing
- Performing cell counts on the Haematology Analysers
- pH Testing
- % Haemolysis Expiry Testing

9.3 Explain the principles of bacterial monitoring in platelets and describe how bacterial testing is conducted on platelet components.

9.4 Describe what Statistical Process Control software is used for and why it is necessary to enter data correctly.

9.5 Describe how abnormal or trending results are identified and how they are dealt with.

9.6 Describe NZBS's involvement in Quality Assurance Programmes

9.7 Define 'discard limit' and 'specification' and explain the difference between the two.

9.8 Explain why we have component specifications

10.0 Laboratory Hygiene and Aseptic Technique

10.1 Describe the difference between 'open' and 'closed' systems. Explain when and why aseptic technique is required.

10.2 Outline the risks of contamination in blood components and give examples of potential sources of contamination.

10.3 Describe what is meant by 'Aseptic Technique' and give examples of use of aseptic technique in the processing laboratory with reference to:
- Biological Safety Cabinets and Clean Rooms

10.4 Explain the difference between pathogenic and non-pathogenic microorganisms and explain why we need to have procedures in place to deal with microbial contamination of blood components and products.

10.5 Describe the procedures used to deal with microbial contamination of the following:
- Platelet products
- Haematopoietic Progenitor Cells Apheresis
- Femoral Heads and Cranial Bone Flaps
- Serum Eye Drops

11.0 Logistics and Dispatch

11.1 Explain why we need to have procedures in place to control our inventory of blood components and products

11.2 Describe the following:
- packaging requirements including use of dataloggers and ballasts
- Transport timeframes

11.3 Describe packing and despatch requirements for the following blood components/products, demonstrating an understanding of the reasons for these requirements:
- Resuspended Red Cells
- Neonatal Red Cells
- Platelets
- Neonatal Platelets
- Frozen products

11.4 Outline the changes that take place in blood during storage.

12.0 **Irradiation**

12.1 Describe the checks that must be conducted before irradiation can occur and describe the consequences of irradiating a blood component beyond the specified shelf life.

12.2 Discuss why we need to irradiate blood components

13.0 **Cellular Therapy and Tissue Bank**

13.1 For the following products describe:

- The principles and method of preparation of the component
- The clinical uses of the component

1. HPC Apheresis
2. Bone Marrow
3. T Cells
4. Cord Blood
5. Femoral Head Bone
6. Cranial Bone Flaps
7. Skin

14.0 **Immunohaematology (Blood Banking)**

14.1 Define:
- Antigen
- Antibody
- Haemolysin
- Haemolysis

14.2 Identify the major antigens and antibodies associated with the following blood group systems:
- ABO
- Rh
- Kell

14.3 Identify the common phenotypes of the Rh blood group system and demonstrate understanding of Fisher-Race and
Weiner nomenclature.

14.4 Identify the abbreviated nomenclature for the antigens associated with the following blood group systems:
- Duffy
- Kidd
- Lewis

14.5 Outline the aetiology of Haemolytic Disease of the Newborn (HDN) and the use of Rh Immunoglobulin in the prevention of Rh HDN.

15.0 **Reference Texts**

- NZBS Clinical Compendium, NZBS. NZBS Manufacturing
- Standards. NZBS Collection Standards
- Blood Donor Eligibility Criteria
- Blood Processing Training Modules