Cape Peninsula
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A SURVEY OF THE WORKING ENVIRONMENT OF MEDICAL TECHNOLOGISTS IN SOUTH AFRICA

By

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DECLARATION

I, Moonira Mullah, declare that the contents of this dissertation/thesis represent my own unaided work, and that the dissertation/thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

31 October 2018

Signed **Date**

ABSTRACT

Biomedical Laboratory Technologists play a fundamental role in the diagnosis of disease in patients. Their role in South Africa is currently undergoing profound changes with an emphasis placed on a four-year professional degree that will replace the National Diploma in Biomedical Technology at most Universities of Technology and Comprehensive Universities (UJ and NMU) by 2020. Training and competency programs, along with the retention of experienced staff, remain key in providing accurate laboratory results. It is therefore imperative to investigate this field in factors related to training, work experience and job satisfaction. This study aimed to evaluate the perceptions of Medical Technologists and Medical Technicians with regards to salary, interpersonal relationship, continuing professional development (CPD), work ethic and scope of practice within the profession.

A mixed methods study was conducted to evaluate salary, career choice happiness and CPD compliance of Medical Technologists and Medical Technicians, as well as their perceptions around interpersonal relationships, work ethic and scope of practice. In sampling, a convenience sample was identified, after which a snowballing method was used. A link to a web-based survey was distributed to a group of Medical Technologists and Medical Technicians who attended the Society of Medical Laboratory Technology of South Africa (SMLTSA) Medical Laboratory Professionals congress. This congress was held in 2015 in Port Elizabeth, South Africa.

A sample of 144 Medical Technicians and Medical Technologists was obtained, of which 98.6% were registered with the Health Professions Council of South Africa (HPCSA). Only 54.2% were active members of the Society of Medical Laboratory Technologist of South Africa. Age ($r = 0.674$, $p < 0.05$) and years worked at current employer ($r = 0.533$, $p < 0.05$) proved to have stronger relationships with salary than education ($r = 0.195$, $p < 0.05$). Those employed in the public sector earned significantly lower salaries than those in any other sector ($p < 0.05$), with the exception of those working in independent practice. Both Medical Technologists (44.2%) and Medical Technicians (34.4%) perceived that they did not receive the respect they deserved from Pathologists in their working relationship. In addition, 31.3% of Medical Technicians perceived that their roles were regarded as of lesser value, and that their knowledge, training and attained qualifications were not recognised by the Pathologists. Despite this, this study concluded respondents were generally happy with their career choice, as 71.9% of respondents reported. Findings of this study serve as a strong foundation for additional research on the topic of career happiness versus job satisfaction and retention of staff in medical diagnostic laboratories.

Keywords: HPCSA, SMLTSA, Medical Technologist, Medical Technician, Scope of Practice, CPD.

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IN THE NAME OF GOD, THE BENIFICENT THE MERCIFUL

- "*So, which of the favours of your Lord would you deny*?" Qur'an [55:13]-Almighty God, I am humbled by your constant mercy and favours upon me.
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DEDICATION

This thesis is dedicated to the Biomedical Technology students whom I have lectured over the years

“DREAM IT, WORK HARD FOR IT, ACHIEVE IT.”

TABLE OF CONTENTS

	Declaration	**ii**
	Abstract	**iii**
	Acknowledgements	**iv**
	Dedication	**v**
	List of Figures	**Viii**
	List of Tables	**ix**
	List of Appendices	**x**
	Glossary	**Xi**

CHAPTER ONE: INTRODUCTION

1.1	**Introduction**	**1**
1.1.1	**National Diploma in Biomedical Technology undergraduate programme, post 1994**	**3**
1.1.2	**The new Bachelor of Health Sciences: Medical Laboratory Science (BHSc: MLS) programme**	**4**
1.1.3	**Alternate pathways into the medical diagnostic laboratory**	**5**
1.2	**Background**	**7**
1.3	**Rationale**	**8**
1.4	**Aims and objectives**	**10**
1.4.1	**Research questions**	**19**
1.4.2	**Research objectives**	**10**

CHAPTER TWO: LITERATURE REVIEW

2.1	**Training and certification**	**13**
2.1.1	**Tertiary education**	**13**
2.1.2	**Post-tertiary training and maintaining quality assurance**	**14**
2.1.3	**Continuing Professional Development (CPD)**	**15**
2.2	**Scope of practice**	**16**
2.3	**Employers in South Africa**	**17**
2.4	**Employer retention**	**18**
2.5	**Interpersonal relationships in an organisation**	**19**
2.6	**Dissatisfaction with career choice and leaving a profession**	**20**

CHAPTER THREE: METHODOLOGY

3.1	**Research design**	**21**
3.2	**Population and sample**	**21**
3.3	**Data collection instrument**	**22**
3.4	**Data collection**	**23**
3.5	**Analysis**	**24**
3.6	**Reliability and validity**	**27**
3.7	**Ethics**	**27**

CHAPTER FOUR: RESULTS

4.1	**Response rate and demographics**	**28**
4.2	**Objective 1**	**31**
4.3	**Objective 2**	**37**
4.4	**Objective 3**	**37**
4.5	**Objective 4**	**41**
4.6	**Objective 5**	**43**

CHAPTER FIVE: DISCUSSION

5.1	**Demographic characteristics**	**45**
5.2	**Salary scales between the different age groups and employers**	**47**
5.3	**CPD awareness, participation and compliance**	**48**
5.4	**Working relationships among laboratory personnel in a work environment**	**49**
5.5	**Perceived work ethic and scope of practice in a laboratory environment**	**50**
5.6	**Medical Technologists who have left the profession**	**51**
5.7	**Limitations**	**51**
5.8	**Directions for future research**	**52**

REFERENCES **54**

APPENDICES **60**

LIST OF FIGURES

Figure 1.1: Employment tiers in a private pathology laboratory 2
Figure 1.2: Employment tiers in the NHLS 3
Figure 1.3: Theory of Work Adjustment 9
Figure 3.1: Objectives, research model and data analysis methods used 26
Figure 4.1: Pairwise comparison of salary between employer groups 33
Figure 4.2: Salary distribution of Medical Technologists working in the NHLS laboratories for different age groups 34
Figure 4.3: Salary distribution of Medical Technicians working in the NHLS laboratories, for different age groups 35
Figure 4.4: Salary distribution of Medical Technologists working in private laboratories, for different age groups 35
Figure 4.5: Salary distribution of Medical Technologists working in private laboratories, for different age groups 36
Figure 4.6: Salary distribution of Medical Technicians working in blood transfusion services, for different age groups 36

LIST OF TABLES

Table 1.1:	**National Diploma curriculum at UoT's, post 1994**	**4**
Table 3.1:	**Reliability and validity of questions using Cronbach Alpha analysis**	**27**
Table 4.1:	**Demographic characteristics of the surveyed respondents**	**29**
Table 4.2:	**Occupational characteristics of the surveyed respondents**	**29**
Table 4.3:	**Are you currently happy with your career choice? illustrating that the older professionals >35 years of age are happier in their career choice that those < 35 years of age**	**31**
Table 4.4:	**Happiness with career choice for different employer groups**	**31**
Table 4.5:	**Spearman's rank-order correlations between salary brackets, age, years worked at current employer and education showing a positive relationship between salaries and years worked.**	**32**
Table 4.6:	**Kruskal-Wallis test indicating differences in mean rank in salary brackets for employer groups**	**32**
Table 4.7:	**Post-hoc results for mean rank of employer groups compared on salary levels**	**33**
Table 4.8:	**Qualitative analysis of expressed reasons for non-attendance of CPD activities**	**36**
Table 4.9:	**Mean ratings for perceived interpersonal laboratory relationships as provided by Medical Technologists and Medical Technicians, where lower ratings for relationships with pathologists indicates more negative perceptions**	**37**
Table 4.10:	**Mann-Whitney U test for evaluating the differences in Medical Technologists and Medical Technicians perceptions and ratings of the various interpersonal laboratory relationships indicating significant differences in how the two groups perceived relationships with pathologists**	**36**
Table 4.11:	**Mean Ranks for Mann Whitney U test indicating that Medical Technologists perceived relationships of pathologists towards themselves and Medical Technicians more negatively than did Medical Technicians**	**39**
Table 4.12:	**Summary of reasons for providing a low relationship rating given by respondents**	**40**
Table 4.13:	**Qualitative reasons for the low rating of the relationship of 'Pathologists towards Medical Technologists'**	**40**
Table 4.14:	**Qualitative reasons for the low rating of the relationship of 'Pathologists towards Medical Technicians'**	**41**
Table 4.15:	**Perceptions of the adherence to the scope of practice of the different groups of laboratory personnel**	**42**
Table 4.16:	**Mean scores of perceived work ethic of the different laboratory personnel by occupational type highlighting positive work ethic**	**42**
Table 4.17:	**Demographics for Medical Technologists who have left the profession**	**43**

APPENDICES **60**

Appendix A: Ethical clearance **60**

Appendix B: SMLTSA permission **61**

Appendix C: HPCSA permission **62**

Appendix D: Ethical clearance 2 **63**

Appendix E: Rules of conduct **64**

Appendix F: Scope of practice (SANAS) **65**

Appendix G: Questionnaire invitation/covering letter **66**

GLOSSARY

Terms/Acronyms/Abbreviations	Definition/Explanation
ARV	**Anti-Retroviral**
BHF	**Board of Healthcare Funders**
BHSc	**Bachelor of Health Sciences**
BTech	**Baccalaureus Technologiae**
CEU	**Continuing Education Unit**
CPD	**Continuing Professional Development**
CPUT	**Cape Peninsula University of Technology**
DUT	**Durban University of Technology**
HPCSA	**Health Professions Council of South Africa**
IFBLS	**International Federation of Biomedical Laboratory Science**
MLS	**Medical Laboratory Science**
MSc	**Master of Science**
NHLS	**National Health Laboratory Services**
NMMU	**Nelson Mandela Metropolitan University**
NQF	**National Qualification Framework**
PBMT	**Professional Board for Medical Technology**
SANAS	**South African National Accreditation System**
SANBS	**South African National Blood Transfusion Services**
SMLTSA	**Society of Medical Laboratory Technology of South Africa**
TWA	**Theory of Work Adjustment**
UJ	**University of Johannesburg**
UoT	**University of Technology**
VUT	**Vaal University of Technology**
WIL	**Work Integrated Learning**
WPBTS	**Western Province Blood Transfusion Services**

CHAPTER ONE
INTRODUCTION

1.1 Introduction

Biomedical Laboratory Scientists play a fundamental role in the diagnosis of patient diseases. The International Federation of Biomedical Laboratory Science (IFBLS) defines Biomedical Laboratory Science as a well-developed body of knowledge that includes aspects of basic medical sciences, medical techniques and research methods. This facilitates and ensures quality medical diagnostic testing. Accuracy of results has valuable diagnostic outcomes in the treatment and prognosis of disease.

The current structure of the diagnostic medical laboratories in South Africa includes the National Health Laboratory Service (NHLS) and private pathology or medical technology laboratories. Approximately 80% of South Africa's population access the NHLS through a network of laboratories (NHLS, 2019a). The *2009 Lancet series* on Health in South Africa ascribed the poor health status to the country's history of colonialism and apartheid, which resulted in every aspect of life being racially segregated. There was also exploitation of the working class, high poverty and unemployment, and extreme wealth inequalities (Pillay-Van Wyk et al., 2016). This has resulted in an increased disease burden (Pillay-Van Wyk et al., 2016).

The laboratory diagnostic process includes three phases, which include pre-analytics, analytics and post-analytics. Diagnostic errors in any of the three phases can lead to incorrect results that may cause adverse outcomes for the patient. Accuracy in medical diagnostic laboratory is based on accreditation, quality control, monitoring and standard operational processes that minimise error (Hammerling, 2012).

The number of deaths caused by HIV/AIDS has declined since 2006 largely due to the roll-out of anti-retroviral therapy (ART) (Pillay-Van Wyk et al., 2016). However, the mortality rates from diabetes mellitus, renal disease, and nutritional blood disorders are increasing. These diseases will require additional monitoring programmes that include accurate and precise laboratory testing, as well as successful treatments. The increase seen in these particular diseases is most probably due to lifestyle changes and urbanisation. More and more South Africans are falling into the overweight and obese categories (Nojilana et al., 2016).

This increasing disease burden will without doubt require more laboratory testing services. The NHLS has implemented priority programmes, which include HIV and tuberculosis (TB) testing (National Health Laboratory Service, 2019c). These programmes provide accessible and sustainable healthcare system They have also changed the professional landscape and the role of the Biomedical Technologist (National Health Laboratory Service, 2019c). These programmes allow the NHLS to develop good relationships with healthcare providers involved in HIV care (NHLS, 2019c). These additional healthcare programmes require highly qualified personnel to handle increased volumes of diagnostic testing in a more automated environment.

The Medical Laboratory landscape includes different tiers of professionals. These different tiers provide quality diagnostic services within the laboratory environment in both the private laboratories and the NHLS. Figure 1.1 below shows these employment tiers (i.e. an organogram) within the private pathology laboratories. This includes the pathologists and their business partners who function on a management level. They are often equal partners, depending on the overall investment of these particular business partners. Medical Technologists, Medical Technicians and Laboratory Assistants are employed in different roles in private laboratories.

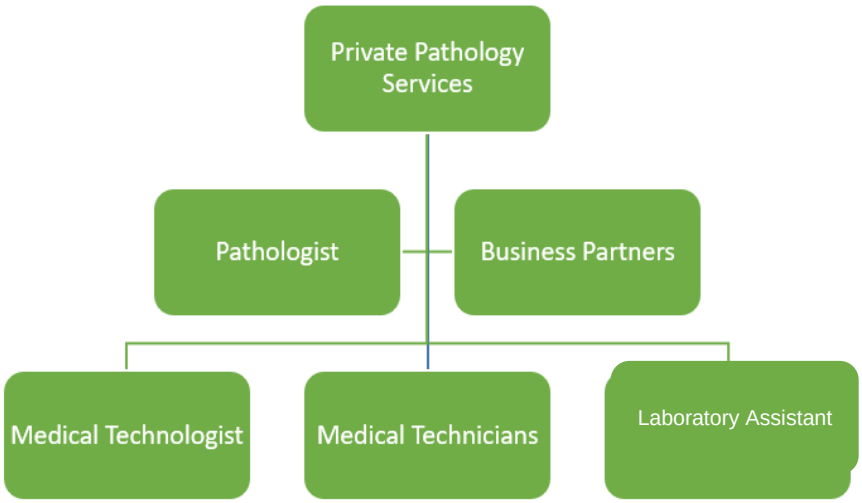

Figure 1.1: Employment tiers in a private pathology laboratory

Figure 1.2 below represents the tiers (organogram) of diagnostic laboratory services in the Department of Health (DOH). The DOH uses pathology diagnostic services through the NHLS, which was established in 2001 by an Act of Parliament to amalgamate the former

South African Institute for Medical Research (SAIMR), National Institute for Virology and National Centre for Occupational Health, and University and Provincial Pathology Laboratories.

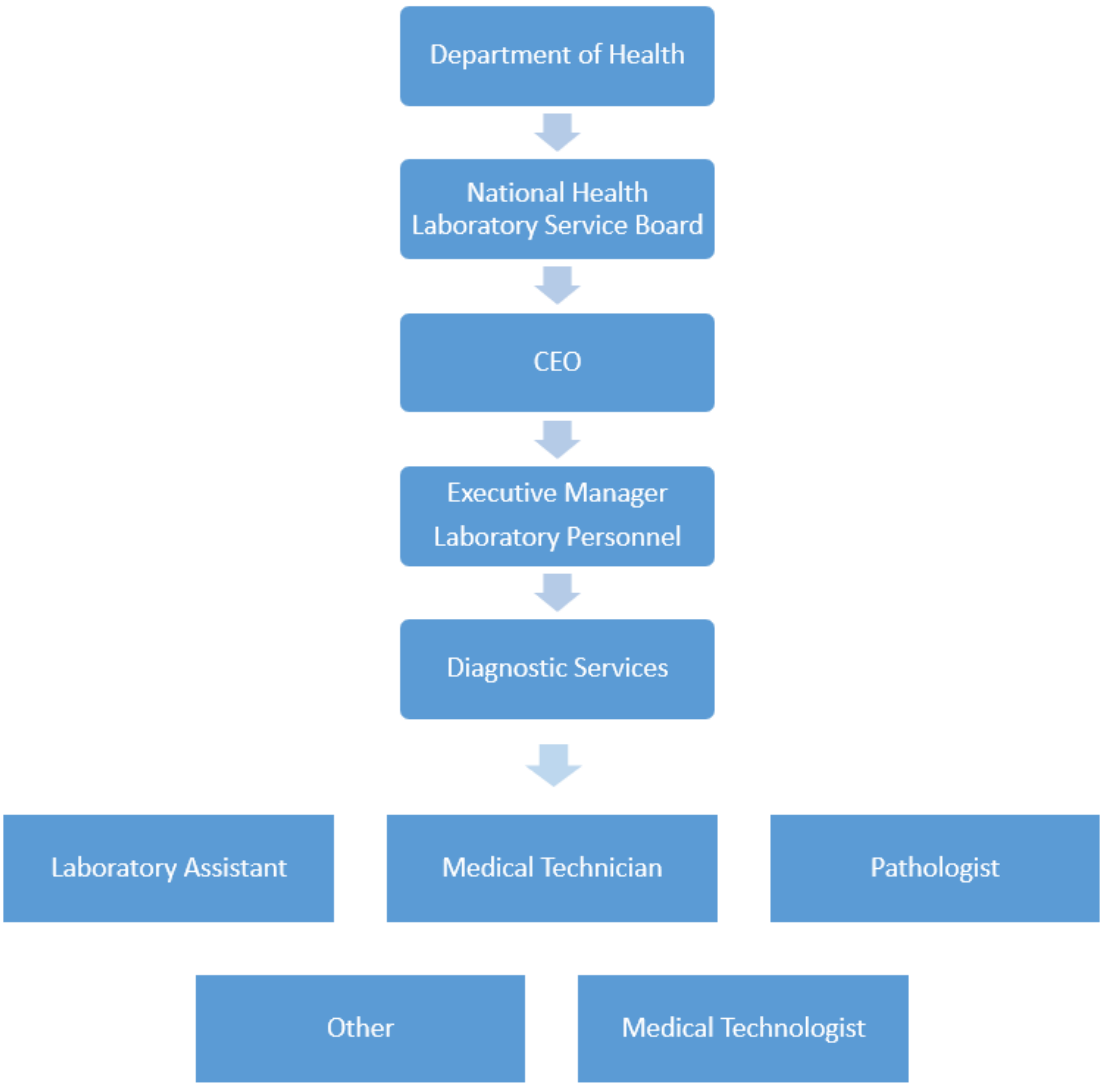

Figure 1.2: Employment tiers in the NHLS

1.1.1 National Diploma in Biomedical Technology Undergraduate Programmes, post 1994

There are very few studies related to the laboratory work environment and personnel perceptions within the medical technology profession in South Africa. The professional landscape for Biomedical Laboratory Technologist qualifications has undergone

fundamental changes. This qualification has transitioned from a National Diploma to a professional four-year degree.

In 1994, a new curriculum was introduced by all the Universities of Technology (UoT's). This consisted of 21 modules over a period of 30 months. A University of Technology offers technological career directed educational programmes, which focus on innovative problem solving that includes a component of work integrated learning (WIL). Table 1.1 below lists the subjects taught in the curriculum.

Table 1.1: National Diploma curriculum at UoT, post 1994

Year 1 Semester 1	**Year 2 Semester 1**	**Year 3 Semester 1**
Anatomy and Physiology 1aChemistry Physics Calculation and StatisticsIntroduction to Medical Technology	Cellular Pathology 2a Microbiology 2a Blood Transfusion Chemical Pathology 2a	Cellular Pathology 3a Microbiology 3a Haematology 3a Chemical Pathology 3a
Year 1 Semester 2	**Year 2 Semester 2**	**Year 3 Semester 2**
Anatomy and Physiology 1b Pathophysiology Biochemistry Immunology	Cellular Pathology 2b Microbiology 2b Haematology Chemical Pathology 2b	Work Integrated learning (WIL) in an HPCSA accredited laboratory

On completion of the above subjects, students are placed in training laboratories to complete the WIL. A minimum score of 50% is required in the WIL to pass the National Diploma. During the WIL, students rotate through a variety of disciplines to gain an understanding of each discipline. On completion of the National Diploma students apply for the internship programme, which involves working for 12 months in a discipline of their choice. The internship disciplines include Cytology, Histology, Cytogenetics, Microbiology, Haematology Chemical Pathology, Virology, Immunology and Clinical Pathology (Chemical Pathology, Microbiology and Haematology). On completion of their internship, students were then required to sit a board examination administered by the Society of Medical Laboratory Technologist of South Africa (SMLTSA). A minimum score of 50% was required to pass this examination.

1.1.2 The Bachelor of Health Sciences: Medical Laboratory Science (BHSc: MLS) programme

In keeping with International standards, a four-year professional degree was introduced called the Bachelor of Health Sciences: Medical Laboratory Science. The Department of Biomedical Sciences at the Cape Peninsula University of Technology

(CPUT), Western Cape, South Africa, was the first institution to offer this degree in 2011 (Van Niekerk, 2018). The first cohort of students graduated in 2014. The Nelson Mandela Metropolitan University (NMMU) in Port Elizabeth introduced the new degree in 2014. The Durban University of Technology (DUT) and the University of Johannesburg (UJ) will offer the BHSc degree in 2019 and 2020, respectively. It is hoped that the new degree will create professionals with graduate attributes beyond the disciplinary expertise or technical knowledge.

The new curriculum for the BHSc includes subjects from both the previous National Diploma and the Baccalaureus Technologiae commonly referred to as the Bachelor of Technology (BTech).

A total of 31 modules are completed in three years and a research project is completed during the fourth year. The BHSc degree is aligned to the National Qualifications Framework (NQF) level 8. As of 2018, students enrolled in this programme, and who successfully met all the requirements of the programme, undertook a final summative examination set by the UoT at which they were registered. Previously, the final assessment was referred to as the Board examination and was administered by SMLTSA on behalf of the HPCSA. However, this was amended when the HPCSA recognised the autonomy of the UoT's and instructed them to conduct and administer this final assessment according to University protocol.

1.1.3 Alternate pathways into the medical diagnostic laboratory

Laboratory Assistants, Medical Technicians, Medical Scientists and Pathologists registered with HPCSA are also employed in diagnostic laboratories. Laboratory Assistants register with the HPCSA as Student Laboratory Interns while completing a structured 12-month training programme under the supervision of a Medical Technologist in a registered training laboratory (Health Professions Council of South Africa, 2018a). After completing this training, the interns sit a board examination administered by SMLTSA, and if successful, register with the HPCSA.

Medical Technicians follow a similar route of registration as Student Intern Technicians but undergo a two-year internship within an accredited training laboratory. They register in one of the following categories: Immunohaematology, Chemical Pathology, Clinical Pathology, TB, Microbiology, Cytology, Haematology, Immunology, Histopathological Technique, Virology or Phlebotomy. Medical Technician interns complete their programme under supervision by either technologists or pathologists

registered in their chosen category of specialisation. After meeting the requirements, these interns take the appropriate board examination, and if successful, register with the HPCSA.

Students graduating with the BHSc from a UoT are now referred to as Medical Laboratory Scientist. This designation replaces the diplomat Biomedical Technologist as from the previous national diploma qualification. Because the designation, Biomedical Technologist still exists both Medical Laboratory Scientist and Biomedical Technologist are registered on different categories at the HPCSA. Adding to this is the entrance of graduates from the traditional academic universities, who obtain a Bachelor of Science (BSc) degree from these institutions and are not graduates from any UoT. These are referred to as Medical Scientists, and may join the laboratories as designated medical scientists where there are research focused positions available or may gain employment by registering as either a Medical Technician or Medical Technologist Intern with the HPCSA, and serve an internship at an accredited pathology laboratory. If this intern chooses to follow the medical technician route, the requirements for qualification and professional board registration will be the same as described above. However, if this intern decides to follow the Medical Technologist or Laboratory Scientist (BHSc) career path, they would need to approach a UoT approved to equate their qualification to that of either the National Diploma in Biomedical Technology or the BHSc in Medical Laboratory Science. This is necessary as most academic BSc programs do not offer the clinical subjects required for medical laboratory diagnostic work in their curriculum, and the candidate may be advised to register and attend classes in the missing subjects at a UoT, in order to meet the requirements for the BHSc degree. The final decision in this matter is taken by the HPCSA. Once all the requirements are met, the graduate will then be entitled to register as an Intern, complete the internship and finally write the medical technology board examination. This would not be as straightforward if the candidate chose to equate to the BHSc degree program as an internship is no longer applicable. In this case a 4th year registration at the UoT may be the only way forward, as the final examination for this program can only be undertaken at a UoT.

To work in medical diagnostic laboratories as a pathologist, the candidate would need to hold a degree in medicine and apply for specialisation to work as a registrar in a pathology department. As from the first year of medical studies, aspiring pathologists are obligated to register with the HPCSA and after completing the required time as a

registrar and successful examination (e.g. FRCPath) they qualify as a specialist and register with the HPCSA as a pathologist.

In South Africa Biomedical Technologists are allowed independently to open their own private practice. Those who wish to embark on that route are required to work for two years post board examination in a HPCSA-registered training laboratory, prior to establishing their own laboratory. Registration with the Board of Health Care Funders (BHF) is also compulsory for Medical Technologists planning on registering a private practice (HPCSA, 2018a). The BHF will issue a practice number to applicants intending to enter private practice. Biomedical Technologists working in private practice can only perform the relevant diagnostic testing in the category in which they are registered. If the Medical Technology Laboratory receives samples pertaining to other disciplines, they will need to forward these samples to a referral laboratory that are registered to test these samples.

To maintain registration with the Professional Board for Medical Technology (PBMT) and the HPCSA, a practitioner is required to accumulate a specified number of Continuing Education Units (CEU's) annually (HPCSA, 2018b). This is achieved by attending Continuing Professional Development (CPD) events, which are designed to ensure that healthcare professionals maintain and acquire updated knowledge, skills and ethical practice to guarantee optimal clinical and professional competence (Filipe, Silva, Stulting and Golnik, 2014).

Registration with the HPCSA is a mandatory requirement for working in medical diagnostic laboratories as a Biomedical Technologist, Medical Technician or Laboratory Assistant in South Africa (HPCSA, 2018c). According to the September 2018 database of the PBMT there were 10840 qualified board-registered Biomedical Technologists, 5898 Medical Technicians and 958 Laboratory Assistants in South Africa.

SMLTSA represents professionals who fall under the HPCSA Professional Board for Medical Technology (PBMT). The aim of the SMLTSA is to promote and guide the Biomedical Technology profession in South Africa (SMLTSA, n.d.). Their objectives are to unite Biomedical Technology professionals under one body, provide a professional body to cater for the needs of Biomedical Technologists, and to advise and assist in their education and training (SMLTSA, n.d.). Membership of the SMLTSA organisation is voluntary. According to the SMLTSA offices records from September

2018, a total of 286 members are on the SMLTSA national database. Approximately 1.7% of the total number of registered Biomedical Technologists and Medical Technicians on the HPCSA database has a SMLTSA membership.

1.2 Study background

Laboratory personnel play a critical role in the diagnosis of diseases. Diagnostic laboratory results allow clinicians to better manage their patients. A study in the United States of America (USA) has reported that a lack of adequate staffing in hospitals has become a barrier to the efficient operation of clinical laboratories (Phipps, 2016). Moreover, increased demands in the workplace posed a problem with the retention of staff. Approximately 85.7% of surveyed Laboratory Directors stated that there was a need for more laboratory personnel as workplace demands have increased, due to competitiveness among laboratories (Slagle, 2013). In addition, researchers have found that the loss of skilled employers needs to be addressed by management in the laboratories (Phipps, 2016). Regular budget cuts in the USA affect the optimal functioning of laboratories to provide accurate and reliable laboratory services. These budget cuts have a direct impact on the quality of patient care, especially in rural and underserved areas in the USA (Panning, 2014).

1.3 Rationale

Similar competitive situations exist within the South African context, where increasing numbers of pathology laboratories have to compete with one another and additionally with Medical Technology laboratories that offer blood tests at reduced rates. A study in the USA found various reasons for staff shortages among Medical Laboratory Technologist staff (Small, 2013). There were variable factors, which individuals consider of importance that contribute to the work environment and retention of staff. These factors include: personal, lifestyle factors, financial matters, and working conditions. The latter includes: workplace safety, management styles, professional advancement opportunities and geographical location (Small, 2013).

The Theory of Work Adjustment (TWA) is a well-documented predictive model originally developed at the University of Minnesota in 1964 by Dawis, England and Lofquist. This theory is also known as the Person–Environment Correspondence Theory, as seen in Figure 1.3 below, representing the TWA as consisting of two parts. The first part focuses on an individual, which includes needs and skills. In a pathology

laboratory environment this would include the qualifications and length of work experience. The second part focuses on the work environment, which includes task requirements and needs.

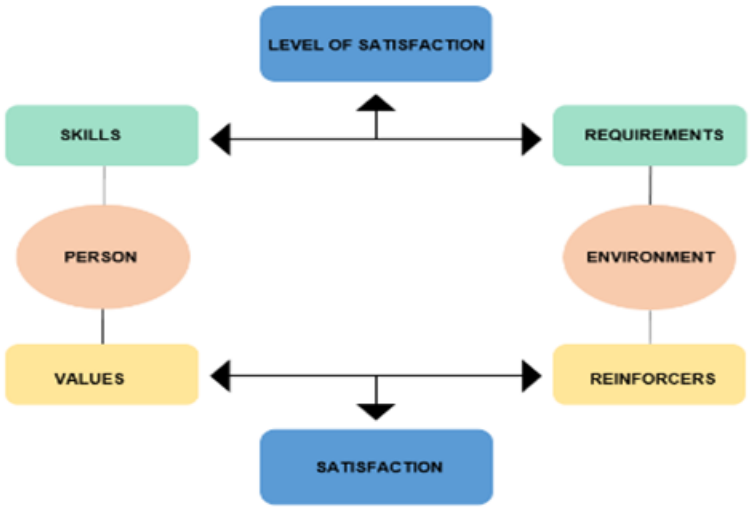

Figure 1.3: Theory of Work Adjustment (Dawis and Lofquist, 1984)

Studies have confirmed that there is a statistically significant relationship of motivational factors with remuneration, quality of work life, supervision, teamwork and job satisfaction (Mafini and Dlodlo, 2014). According to Ross and Van Eeden (2008), both tangible and intangible factors motivate individuals to remain with their employers. Studies show that acknowledging employee's efforts leads to increased motivation and performance (Sokro, 2012). In addition, the more closely that an individual's requirements are met by the rewards of an organisation, the more likely the person will perceive their job as satisfying (Dawis & Lofquist, 1984). Degree of job satisfaction is seen as a predictor of whether an individual is likely to continue working with an employer. While some studies have assessed Biomedical Technologist job satisfaction in South Africa, many other studies were performed within the nursing and other healthcare professions.

The South African government provides a framework for practicing as a Biomedical Technologist in the Scope of Practice of Medical Technology in South Africa (Government Gazette No R1733, repeated 15 April 2005). However, the regulations defining this scope have not undergone an update or amendment since the last published document. Similarly, there have been no updates from the HPCSA in over

a decade. There is also no formal documentation gazetted that clearly defines the scope of practice for the different laboratory personnel in South Africa. An additional complication of scope of practice within a discipline is that when there is a roll-out of new technological advances and developments in laboratory equipment, focusing on the fully automated laboratory. Manufacturers of such equipment train and certify Biomedical Technologists or Medical Technicians chosen by the employer irrespective of their HPCSA-registered qualification. This has led to an overlap in responsibilities among Biomedical Technologists and Medical Technicians in the laboratory.

1.4 Aims and objectives

This study aims to survey the perceptions of Biomedical Technologists and Medical Technicians regarding their professions. And to identify the areas of concern among these professionals with regards to: career choices, interpersonal relationships, scope of practice and compliance of membership with the various membership organisations within South Africa.

1.4.1 Research questions

The following questions guided the research for the study population:

- Are professionals in Medical Laboratories happy with their career choices?
- Are Biomedical Technologists and Medical Technicians CPD compliant?
- Are there good interpersonal relationships in the Medical Laboratory environment between the different tiers of qualified staff?
- Is there a perceived overlap of duties/scope in the diagnostic Medical Laboratory between Biomedical Technologists and Medical Technicians?
- What are the reasons why Biomedical Technologists have left (or are thinking of leaving) the profession?

1.4.2 Research objectives

To address the research questions further, five research objectives were formulated:

- To evaluate salary scales between Biomedical Technologists and Medical Technicians in relation to their employer type.

- To assess awareness, participation and barriers amongst the various laboratory personnel surrounding membership of various regulatory and professional stakeholders, together with CPD compliance.
- To investigate working relationships among the various laboratory personnel.
- To investigate perceived work ethic and scope of practice among the various laboratory personnel.
- To evaluate perceptions of Biomedical Technologists who have left (or are thinking of leaving) the profession.

CHAPTER TWO
LITERATURE REVIEW

This chapter provides a literature review of the disease burden, implications on laboratory staff together with the dynamic nature of technology impacting on the role of laboratory personnel as well as the requirements for qualifications. This includes both undergraduate and post graduate training, for Biomedical Technologists. The BHSc does not have post graduate training as the fourth year is now included in their under graduate degree. Included in this chapter is competency training around new instrumentation. This role of employers and the importance of quality assurance and quality control in the accurate diagnosis of laboratory results are highlighted. Furthermore, the quagmire surrounding the unaddressed issue of clarity regarding scope of practice and CPD adds to the lack of mandatory control by the regulatory body. Lastly, it reviews key occupational satisfaction indicators, and their application in the medical technology field, providing a basis for the arguments presented in Chapter 1.

The disease burden in South Africa has quadrupled with the increase in non-communicable diseases, diabetes and cancer as well as an aging population. (Pillay-Van Wyk et al., 2016 & Mayosi et al., 2009). Although mortality rates due to HIV in South Africa appear to have increased between 1997 and 2006, there has been a decline in HIV mortality due to the roll out of Anti-retroviral therapy. However, other disease burdens such as hypertension/cardiovascular disease, diabetes and cancer remain high (NHLS, 2019b). In the Eastern Cape Province, hypertensive heart disease has become the second most common cause of death, followed by diabetes which is the third most common cause of death. (Morris-Paxton, et al., 2018)

Disease control requires accurate and precise diagnostic medical laboratory testing to manage the non-communicable diseases better. In 2010, the NHLS established the National Priority Programmes (NPP) division which addressed the National Department of Health's requirements to provide increased access to patient testing and treatment. The priority programmes were divided into various units, which included: HIV viral load, CD4 enumeration, early infant diagnosis of HIV, HIV drug resistance and TB GeneXpert. The National Priority Programmes CD4 unit is involved with service and support to 62 labs through coordination and integration of functions.

2.1 Training and certification

2.1.1 Tertiary education

The training of Biomedical Technologists in South Africa is undertaken by tertiary institutions. The BHSc curriculum has replaced the National Diploma at most UOT's. Training of Medical Scientists can also be undertaken through the route of a BSc in South Africa at a comprehensive university. According to a study by Casna (2008), Biomedical Technology training in Italy has undergone changes to allow students to obtain improved knowledge and skills with the introduction in 2001 of a three-year Bachelor's degree with a practical placement. There is also an opportunity to pursue postgraduate studies, particularly the Master's programme, which is career advancement and allows an individual to gain specialised knowledge within their chosen field.

A needs analysis of post-graduate studies was undertaken in Uganda with a survey amongst stakeholders, and all members of that country's Allied Health Professional Council (AHPC) (Ezeala, 2011). Results of the study found that ninety-six percent (96%) of the respondents believed that postgraduate diploma programmes were an ideal way of improving Biomedical Sciences. They iterated that the programmes should be implemented immediately and indicated various ways in which they would like to see them being implemented. Among the recommendations were full time/part time programmes, distance learning and online learning. A few respondents to the same study in Uganda believed that postgraduate programmes didn't need to be introduced and that the undergraduate programmes that were offered should be strengthened. In contrast, a study in South Africa found that, although 19% of respondents were studying towards postgraduate qualifications, they indicated that post graduate studies are not taken into consideration by the employer during remuneration increases (Brand, 2006).

To reduce the dissatisfaction of graduates stemming from these challenges, career counselling and job shadowing should be made compulsory prior to student's commencement of studies. A study conducted in Namibia supports this sentiment, which was undertaken to assess the profile, perceptions and future expectations of Medical Laboratory Science students. Although Namibia had previously relied on South African Universities for medical laboratory training, the country's first training programme was introduced in January 2008. The four-year professional Bachelor's

degree incorporated Clinical Chemistry, Haematology, Microbiology and Molecular Diagnostics with other important subjects and a research project. Afterwards, students completed a one-year internship in the industry, prior to registering as Medical Laboratory Scientists. This programme, partnered with Cape Peninsula University of Technology (CPUT) in Cape Town, South Africa, was the first such programme in Southern Africa (Noden, et al.,2015). In the study conducted among Medical Laboratory Science students in Namibia, numerous challenges were reported by students. A high number of students (76%) indicated that if they had an opportunity to re-choose their careers, Biomedical Science would not be an option they would choose (Noden, et al., 2015).

2.1.2 Post-tertiary training and maintaining quality assurance and quality control

Professional training and development produce personnel who can effectively take on leadership positions. They are also able to work efficiently and provide an accurate diagnostic service in spite of having to deal with high workloads. (Small, 2013). In order to maintain this service which assists the clinicians in the treatment and management of disease, it is important to ensure that there is good laboratory practice (GLP), with a high level of quality management. Quality assurance aims to ensure that patients receive quality results. Quality control is a function of quality assurance which minimises laboratory errors. Both quality control and quality assurance play roles in accurate laboratory diagnostics. (Al Enezi et al., 2009). Medical laboratory personnel need to continuously participate in quality assurance and quality control programmes to ensure that patients receive accurate and precise diagnostic laboratory results.

In Australia, numerous strategies have been introduced to reduce laboratory errors. Among the steps included are in the development of written protocols that are clear, in enhancing healthcare professional training, monitoring laboratory indicators, automating laboratory functions, and improving quality (Mohammedsaleh and Mohammedsaleh, 2015).

Clinical Pathology Accreditation (CPA) in the United Kingdom is an accreditation body that determines strict guidelines for accuracy of laboratory procedures. The majority of the laboratories who participated in a survey felt that accreditation by CPA had resulted in better laboratory performance, additional documentation, and quality health, safety and training procedures. (Gough & Reynolds, 2000). The function of an accreditation system is to facilitate reliable laboratory results and maintain standards of good laboratory practice. The South African National Accreditation System (SANAS) is the

only national accreditation body involved in conformity assessments for medical laboratories. This accreditation for medical laboratories in South Africa is optional. Laboratories that are not SANAS accredited can continue to provide diagnostic medical services, however the practioner must be registered with HPCSA.

A study undertaken in Trinidad and Tobago (Ezenwaka, 2000) identified that there were no technical initiatives, including training programmes, to identify problems with quality assurance and quality control. Only 52% of the Technicians had learnt about quality assurance during their education. A further 35.7% had learnt about it while in the work place, and the remainder of respondents (33%) learnt about quality assurance by reading about it themselves. Although the majority (92.2%) of the Medical Technicians reported that they had practiced quality control, 35.7% could not specify what measures they actually took to ensure accurate and reliable results. Similarly, Marinucci et al. (2013) undertook research in seven Sub-Saharan African countries and found that professional development and training were rated highest for job satisfaction factors among 90% of the respondents. However, quality medical laboratory training programmes need to be implemented. These programmes are necessary in order to highlight, in particular, the introduction of new technologies for diagnostic purposes so that high levels of result accuracy can be maintained.

2.1.3 Continuing Professional Development (CPD)

Healthcare practitioners have a responsibility to continually update their professional knowledge and skills for the end benefit of the patient or client (HPCSA, 2018). Considering the importance of quality considerations in professional practice, as well as the ethics surrounding it, regulatory bodies typically implement a requirement to undergo lifelong learning in the professional's field of practice. In South Africa, professionals are required to gather Continuing education units (CEUs) for CPD after qualification and/or registration. CPD is considered a professional responsibility within the health sciences and it also enhances professional performance and competency. Compliance of CPD remains a key factor in maintaining active HPCSA registration. These guidelines are clearly stipulated in the Health Professions Act 56 of 1974 (Board Notice 29, Government Gazette 29716, 23 March 2007). Compliance includes a responsibility to continually update professional knowledge and skills for the end benefit of the patient or client. Practitioners are required to accumulate 30 CEUs over a twelve-month period, five of which must cover ethics, human rights and medical law. Each CEU will be valid for a 24-month period from the date of activity. According to the HPCSA, each practitioner should aim to accumulate 60 CEUs by the end of their

second year of practice, and thereafter top-up the balance through additional activities as each 24-month period expires.

A study undertaken in Kenya featuring Diagnostic Radiographers participating in CPD activities found that numerous barriers existed for CPD compliance (Kanamu, Van Dyk, Chipeya & Kilaha, 2017). Amongst the reasons given for non-participation in CPD activities were time constraints (62%), financial constraints (66%), lack of information (54%), organisational culture (47%), limited resources (58%) and difficulty in being selected by their organisation to attend CPD activities (42%). Similarly, studies undertaken in South Africa by Brand (2006) found that respondents' reasons for non-attendance included no invitation/not notified and unaffordable travelling costs.

Health professionals undergo extensive formal training in universities. In the USA, continuation of this formal training is maintained by Continuing Education (CE) (Institute of Medicine, 2010). The American Society for Clinical Pathology (ASCP) had registered 86% CPD certification among its members (Medical Laboratory Observer, 2013). No studies were found regarding CPD compliance among Medical Technologists and Medical Technicians. Studies involving other allied professionals in South Africa (e.g. Occupational Therapists) have shown that there was non-compliance with CPD, for unknown reasons (Van Vuuren & Nel, 2013).

2.2 Scope of practice

Scope of practice refers to all actions and procedures a practitioner is allowed to perform in keeping with his/her professional registration. The roles and responsibilities of Biomedical Technologists and Medical Technicians in South Africa are governed by scope of practice and regulated by the HPCSA. Biomedical Technologists and Medical Technicians are only permitted to practice in the category in which they have been trained and passed the relevant board examination. In addition, they need to have current HPCSA registration in the relevant category. Furthermore, a Medical Technician must work under supervision of a Biomedical Technologist or Pathologist registered in the same category.

Further clarification for scope of practice for Biomedical Technologists and Medical Technicians was provided in a HPCSA bulletin released by the Professional Board for Medical Technology during 2014-2015. This bulletin advised that Medical Technicians

may under stringent control and circumstances sign out automated work if verified by a Biomedical Technologist (Appendix E).

As there are no clear guidelines relating to the scope of practice for Biomedical Technologists and Medical Technicians in South Africa, SANAS released a newsletter in 2014 stating that Medical Technicians must not verify/authorise results (Appendix F). SANAS further clarified that the Medical Technician's supervisor may sign off analyser data (raw data) provided that the Biomedical Technologist signs all reports immediately after verification. This system must allow sufficient measures to minimise possible errors. Medical Technicians may enter test results on the Laboratory Interface System (LIS) provided the verification of the results is performed by a Biomedical Technologist. This newsletter further states that all medical laboratories need to comply with regulations in the SANAS newsletter (SANAS, 2014). There are no clear guidelines stipulated by HPCSA for Medical Technicians; and as such, there is overlap in the duties of Biomedical Technologists and Medical Technicians.

According to the ethical rules published as Government Notice No. R 717 of 4th August 2007. Medical Scientists with a BSc in Science shall be involved with the development, evaluation and practice of scientific procedures that involve humans or human biological material provided that such acts lead to or impact the treatment diagnosis and genetic counselling of humans. Medical Scientists have the option to work in research laboratories. However, those that are unable to secure a research position have an alternate pathway into medical diagnostic laboratories. In medical diagnostic laboratories these, Medical Scientists have the opportunity to either write a Medical Technology or Medical Technician board exam depending on the subject content of their undergraduate qualifications.

2.3 Employers in South Africa

Employment organisations for Biomedical Technologists and Medical Technicians who work in a diagnostic pathology service in South Africa include:

- National Health Laboratory Services (NHLS)
- Private pathology laboratories
- Private Biomedical technology laboratories
- Blood transfusion services.

2.4 Employer retention

High unemployment rates in the USA have created an additional shortage in the laboratory workforce (Slagle, 2013: 10). It is important that organisations maintain effective strategies in order to maintain efficient quality laboratory programmes (Marinucci, et al., 2013). Effective management and leadership skills with added incentives are required to prevent high staff turnover. A survey conducted in Sub-Saharan Africa among laboratory personnel evaluated job retention and job satisfaction. The survey showed that a lack of professional development was the main cause of employees leaving their previous employment, 57% changed employment at least once within a five-year period. (Marinucci et al., 2013).

The positive attitudes that people project towards their jobs is referred to as job satisfaction, which is multidimensional and influenced by self-motivation and salary. It has been shown that job satisfaction could directly impact on staff retention (Phipps ,2016)

According to Dixon (2008), a study performed in the USA found that the number of employed Medical Technologists and Medical Technicians were decreasing yearly, resulting in an increase in vacant positions. For every seven people that start to pursue a career in Medical Laboratory Science, only two will remain in the profession. Similarly, Bonenberger, et al., 2014) found that job satisfaction and effective management reduce the likelihood of staff turnover. The Medical Laboratory professionals who responded to the 2016 Medical Laboratory Observer (MLO) salary survey indicated high job security (90.6%) and job satisfaction (85.8%). Job satisfaction of health professionals was 41.46% in Addis Ababa, Ethiopia, suggesting that more than half of those surveyed were not satisfied with their current job. (Deriba et al., 2017). Similar studies were conducted in Al-Madinah Al-Munawwara, Saudi Arabia, in which the overall level of job satisfaction was 24.7% among nursing staff and 15% among physicians (Kishk & Al Juhani, 2006).

Job satisfaction can be measured as the difference between the value of rewards workers receive and the amount they believe they are supposed to receive (Deriba et al., 2017). In a study undertaken in Addis Ababa, Ethiopia, the salaries along with other incentives are strong predictors of job satisfaction. In addition, recognition by management, development opportunities and patient appreciation were equally strong predictors of health professionals' job satisfaction (Deriba et al., 2017). Similar studies

undertaken in Uganda indicated that salary incentives were a valuable predictor to the overall level of job satisfaction. In addition, studies from Turkey and Malaysia also reported that salary was a vital indicator of overall job satisfaction (Deriba et al., 2017). Adequate compensation for an employee's needs will result in a motivated employee with a high level of job satisfaction. According to Herzberg's hygiene theory, certain characteristics of a job, such as achievement and recognition, impact job satisfaction. The theory also indicated that unhappiness with salary level was a factor for dissatisfaction. A study undertaken among laboratory personnel recommended that organisations recognise and reward employees. These rewards could include promotion opportunities and enhanching training and development opportunities. (Phipps, 2016).

The 2015 MLO survey reported that the average salary in the USA increased from $71,086 to $80,985 over a one-year period. The survey however, did not indicate if the increased salaries resulted in greater job satisfaction. Significant increases in salaries were seen by respondents in a salary survey in the following year (MLO, 2016). The average salary for employees with a Bachelor's degree was $78,481 per annum. For those with a postgraduate degree, the average salary was $81,923. Males appeared to earn a higher salary than females. Some institutions paid bonuses and provided benefits such as health insurance, pension, life pension and child-care. The American Society for Clinical Pathology (ASCP) allowed participation in surveys every two years and have found staff who have certification earned higher salaries than staff without certification regardless of the position (Garcia and Fisher, 2013).

A survey undertaken in South Africa (Brand, 2006) found that majority of the respondents were employed at the NHLS. Most of the respondents had worked in the laboratory for twenty-six to thirty years and were employed full time. The upper limit of the Technicians salary scale was approximately R174000 per annum. Biomedical Technologists could exceed an annual salary of R200 000 per annum. In contrast, Nariansamy (2016) found that the remuneration offered in the private laboratories was superior to that offered in the public sector. According to Brand (2006), there was no relation between salaries and qualification.

2.5 Interpersonal relationships in an organisation

Interpersonal relationships at work constitute the daily interaction between employees and managers. Good organisational leadership combined with effective management

leads to decreased staff absenteeism (Soetzer, 2010: 36). A study in Turkey showed that nurses work output and psychological well-being is affected when working in stressful conditions with difficult interpersonal relationships (Tastan, 2017). Numerous factors can cause work stress due to dysfunctional relationships. Abusive supervision, (which is an example of a dysfunctional relationship) was found among more than 13% of individuals in a USA study between a diverse subject population (Pierotti, 2014).

2.6 Dissatisfaction with career choice and leaving a profession

Increased responsibilities in the workplace combined with no additional remuneration and poor work relationships are possible factors for staff to leave their chosen professions (Ramasodi, 2012). Retention of staff in an organisation is vital to ensure optimal functionality. Studies among nurses have shown that poor organisation retention policies can lead to compromised healthcare services (Ramasodi, 2012). Another study on why nurses had left the public sector in Namibia showed that job dissatisfaction was influenced by inadequate salaries, poor working conditions, lack of opportunity for development and management's poor skills (Washeya, 2018). Studies in Sub-Saharan Africa among laboratory personnel found that 57% of laboratory professionals switched jobs at least once during the past five years. And among those, only 22% indicating that this was due to relocation reasons (Marinucci et al., 2013). In addition, lack of professional development was indicated as a major motive for changing jobs.

Factors such as correct qualifications, fair remuneration, recognition of expertise, opportunities for personal development and good interpersonal relationships between employer and employee result in happy and compliant employees. These factors could influence job satisfaction amongst employees and thereby result in an effective and efficient laboratory service. It is evident from reviewing the literature that fair remuneration and interpersonal relationships result in satisfied employees, which employers are then better able to retain. (Deriba. 2017; Phipps, 2016, Marinucci, 2013).

Very few studies have been undertaken within the South African laboratory environment surrounding these factors. This study will therefore attempt to evaluate the perceptions of Biomedical Technologists and Medical Technicians with regard to their qualifications, career choices, scope of practice, CPD compliance and interpersonal relationships between themselves and the employer/s.

CHAPTER THREE
METHODOLOGY

While there are numerous methods that a researcher can include in their investigation, the methods chosen should allow the researcher to achieve the goals set out in the objectives. This chapter aims to provide the methodological approach used in this investigation. The study was an exploratory, mixed methods study, which included both qualitative and quantitative components.

3.1 Research design

A cross-sectional survey design was implemented to assess the perceptions of Medical Technologists and Medical Technicians with regards to their profession and professional environment. Quantitative questions were included in the survey to elucidate demographic characteristics. Both quantitative and qualitative research questions were used to evaluate respondents' perceptions and opinions. Open-ended qualitative questions were included to further contextualise findings from the quantitative data. An individual category was created to include laboratory workers who had left the profession.

3.2 Population and Sample

As stated previously, all qualified Medical Technologists and Medical Technicians have to be registered with the HPCSA. In order to obtain a mailing list of these professionals, permission was requested from the HPCSA to access their data base. Because of the possibility of a compromise in confidentiality of registrants and in accordance with the Protection of Personal Information (POPI) Act 2013, this request was denied by the Professional board of Medical Technology (PBMT). This unfortunately negated the opportunity to employ sampling of this particular population. Instead, a convenience sampling was used, and as such, results should be interpreted within this context ~~caution~~ as they do not represent the entire laboratory community and cannot be generalised to the broader population of Medical Technologists and Medical Technicians.

Study population

Permission was granted by SMLTSA to use the contact details captured in their database of participants attending the 23rd Medical Laboratory Professionals Congress in Port Elizabeth in 2015A study questionnaire was developed and sent to the full list of congress attendees via their captured email addresses. To maximise data collection, the snowball recruitment process was implemented where some participants provided email addresses of colleagues in the industry whom they felt might be interested in participating in the research.

Inclusion criteria

Qualified Medical Technologists or Medical Technicians who provided a valid email address were included in the study.

Exclusion criteria

Pathologists. BSc Medical Scientists and Laboratory Assistants were excluded from the study. Student Medical Technologists serving their internship were identified from their response to the demographic question included in the survey and excluded from the study.

3.3 Data collection instrument

A self-report questionnaire was created to fulfil the research objectives using both closed and open-ended questions. Permission was granted from the editor of the Medical Laboratory Observer, an online laboratory journal in the USA, to use some of their questions (Appendix one), demographic questions were adapted from the Medical Laboratory Observer Satisfaction Survey 2013). Additional questions were created that were relevant to the South African Medical Laboratory Professional environment.
The survey was divided into four sections:

Section one. The first twenty-two closed-ended questions dealt with demographics such as: qualification, employer, age, gender, number of years worked with employer, professional body registration, provinces worked in, and CPD activities.

Section two. This consisted of twelve five-point Likert-scale items that measured respondents' perceptions concerning their working relationships. Scale items were as follows: (1) very poor, (2) less than satisfactory, (3) satisfactory, (4) good, and (5)

excellent. Respondents who selected “poor” or “less than satisfactory” were prompted with an open-ended question to provide a reason for their rating.

Section three consisted of five questions where respondents were asked to provide their opinion on whether or not they, or their laboratory colleagues who were employed in different job titles, were working outside of their scope of practice. Those who responded with “Yes” to this question were prompted to elaborate on the reason for their response. If they answered ‘No’ it was assumed that the respondent felt that the profession type in question is working within their respective scope of practice.

Lastly, Section four contained a set of four Likert-scale questions asking respondents to rate the work ethic of Medical Technologists, Medical Technicians, Medical Scientists and Laboratory Assistants. Similarly, as above, scale items were (1) very poor, (2) less than satisfactory, (3) satisfactory, (4) good, and (5) excellent. Again, an open-ended prompt for low ratings (either “1”, or “2”) was provided.

A separate questionnaire was designed for individuals who had left the profession. It consisted of 10 quantitative research questions that dealt with demographics such as qualification, employer, age, gender, number of years worked with previous employer, professional body registration, provinces worked in, CPD activities and reasons for leaving the profession.

3.4 Data collection

An online version of the survey was created by the researcher using a cloud-based software service company called Survey Monkey. The Survey Monkey platform permits electronic administration and collection of responses. A link to the survey, along with a covering letter (Appendix G) was emailed to participants. A snowball recruitment process was also used where respondents contacted the researcher and provided additional email addresses of colleagues working in the laboratory industry, whom were thought to be interested or willing to participate in the survey. An email invitation was forwarded to all new participants, which included a web link to complete the survey. A covering page/letter was also included introducing the researcher as well as providing details and purpose of the study (Appendix A). After two weeks, an electronic follow-up reminder was sent to potential participants who had not responded to the survey via email. Additionally, after two weeks, an electronic reminder was sent

to all those who were invited but had not as yet completed the survey. Overall, the data collection process ran from 10 June 2015 to 01 June 2016.

3.5 Analysis

The IBM Statistical Package for the Social Sciences (SPSS) was used for all statistical investigations. Data was downloaded from Survey Monkey and imported into SPSS where it was cleaned and coded. The statistician at the centre for Postgraduate Statistics at CPUT was consulted regarding questionnaire design and statistical analysis of data.

To make sample groups more robust, employer groups were classified into five categories: Public Sector (NHLS), Private Sector (private pathology laboratories), Blood Transfusion Services (SANBS and WPBTS) and Independent Practice (Medical Technologists who were self-employed and registered with Board of Health Care funders). An 'other' category was included for respondents working in alternative Medical Laboratory contexts, other than those provided. The 'other' respondents could select the 'none of the above' option in the employer category if their employer was not listed.

Descriptive statistics were used to provide an overview of the respondents' demographics and their responses to employment, salary and CPD activities. The second stage of data analysis included inferential statistical analysis for non-parametric data. This form of data analysis was used when data violated the statistical assumptions of parametric tests. This included bivariate analysis using Spearman's rank-order correlation coefficient test. Thematic analysis was further applied to qualitative responses.

The first objective was addressed using Spearman's Rho correlation to identify relevant relationships between employer, length of service, age, education and salary. The Kruskal-Wallis one-way ANOVA test was used to identify and investigate significant differences in salaries between different employer groups. In addition, salaries were charted in stacked bar graphs for age groups within each employer type, for both Medical Technologists and Medical Technicians, to allow comparisons between these two groups.

To address the second objective, descriptive statistics were used to identify areas of CPD compliance. Further thematic analysis of qualitative responses was used to identify and evaluate challenges expressed by respondents in attaining CPD compliance.

Objective three, which investigated working relationships between laboratory personnel, was addressed by comparing mean scores of Medical Technologists and Medical Technicians for each of the scale items. Differences between the groups were investigated using the Mann-Whitney U test. Qualitative responses were further thematically analysed and grouped together.

The fourth objective, which investigated perceived work ethic and scope of practice, was addressed by comparing responses of Medical Technologists and Medical Technicians in two parts. Firstly, the respondents were asked to evaluate interpersonal relationships between the employees with different job titles and job description in a laboratory environment. Mean scores for each work ethic scale item were compared. This was followed by descriptive statistics for scope of practice items where respondents were asked if the different laboratory personnel worked within the scope of practice for the designated job category and description, as stipulated by HPCSA.

For the fifth objective, simple frequencies were used to investigate the responses of those who had left the profession. See figure 3.1 below which summarises the study objectives research model and analysis methods used.

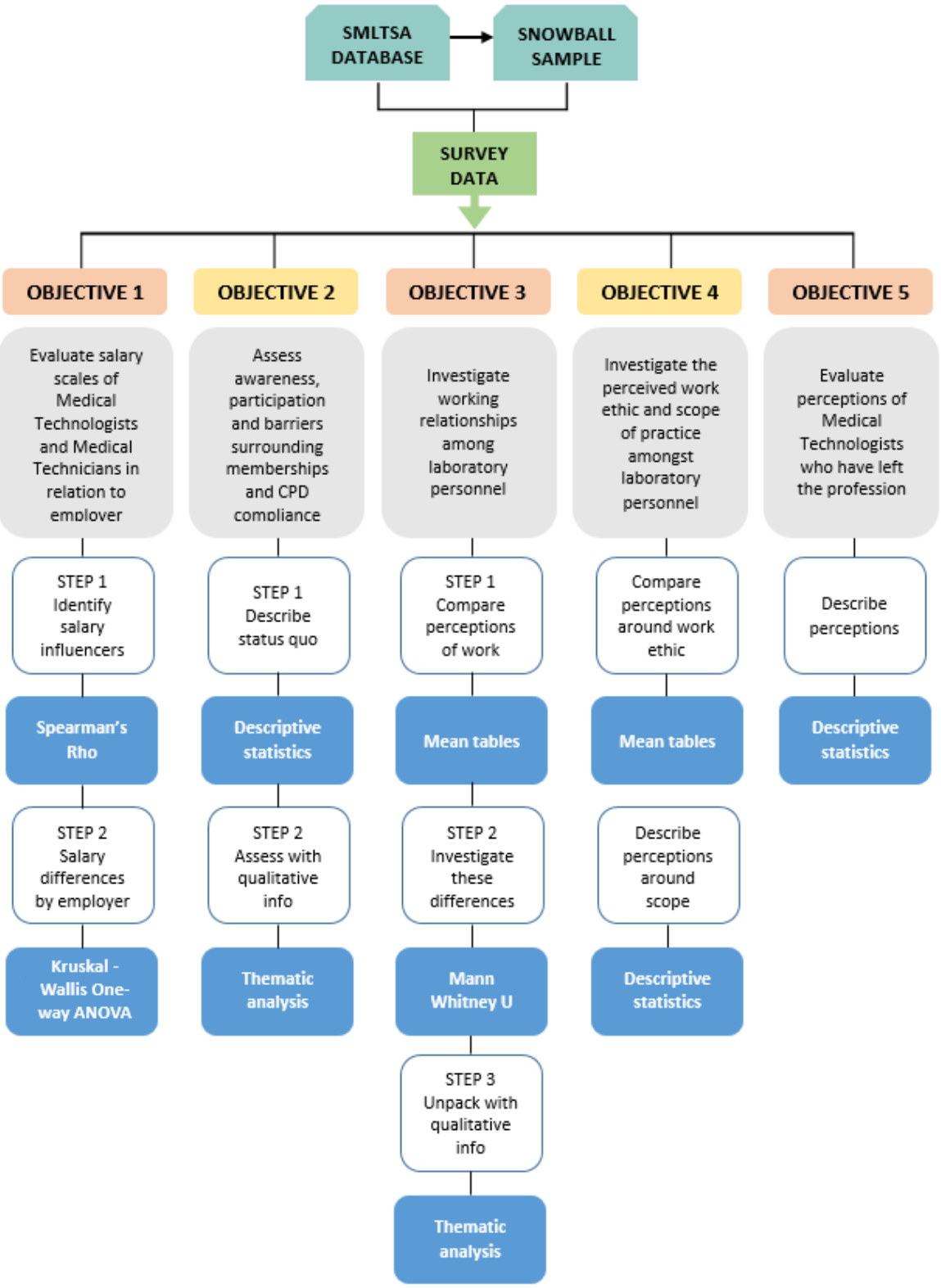

Figure 3.1 Objectives, research model and data analysis methods used

3.6 Reliability and validity

As this study included Likert-type scales questions, it was essential to calculate and report Cronbach's alpha coefficient for internal consistency and reliability (Gliem & Gliem, 2003). According to Tavakol et al., 2011, Cronbach's alpha is an important concept in questionnaire evaluation and there are different viewson acceptable alpha values, ranging from 0.70 to 0.95. Table 3.1 shows that the Likert-type scale questions in this study were highly reliable and valid, with scores of 0.839 and 0.863, respectively.

Table 3.1: Reliability and validity of questions using Cronbach alpha analysis

Scale	Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
Relationship perception scale	0.839	0.832	12
Work ethic perception scale	0.863	0.863	4

3.7 Ethics

Ethical approval for this study was obtained from the Health and Wellness Science Research Ethics committee (HWS-REC) (Appendix 4). The introductory letter of invitation to participate in the research assured confidentiality and anonymity and specified that the respondents had the option to withdraw from the study at any time. Permission was sought and granted from the HPCSA (Appendix 2) and SMLTSA (Appendix 3) to conduct this study. Due to unforeseen circumstances there was a lapse in the study and additional ethical clearance had to be sought from the CPUT research committee, which was granted (Appendix 5).

CHAPTER FOUR
RESULTS

The purpose of this study was to investigate the perceptions of Medical Technologists and Medical Technicians with regards to salary, interpersonal relationships, CPD compliance and perceptions in work ethic and scope of practice within the profession. The explorative nature of the study prevented the use of pre-defined analysis techniques as there were no specific hypotheses being tested. Exploration did however facilitate the development of research questions in order to understand the data, which led to the use of inferential statistics in these investigations. In this chapter, results were presented in line with the objectives of the study.

4.1 Response rate and demographics

Within each of the 475 Invitation emails a link was provided allowing the participant to access the survey. This included the invitations sent to participants from the snowballing recruitment. In total, 144 respondents completed the survey; a response rate of 30.3%.

Descriptive statistics were used to provide an overview of the sample demographics and their responses with regard to their employment, CPD activities, satisfaction of career choice, opinions on work ethic and scope of practice. The demographic characteristics of the surveyed respondents are displayed in Table 4.1 while the occupational details of respondents are shown in Table 4.2.

The vast majority of respondents identified themselves as female (113/143, 79%) and 53.8% (77/143) were aged 35 years or older. Just over half of respondents (63/120, 52.5%) indicated that they earned more than R20,000 per month. Most respondents indicated that their highest qualification was a National Diploma in Medical Technology (83/135, 61.5%) and only 17% (23/135) indicated that they had a postgraduate degree.

Only a small portion of respondents (11/140, 7.9%) indicated that they were board-registered Medical Technicians, while board-registered Medical Technologists had a much greater representation (129/144, 92.1%).

Slightly more respondents reported being employed in the private sector (48/141, 34%) than in the public sector (42/141, 29.8%). Only 5.6% (8/141) of respondents were self-

employed in their own medical technology practice registered with the Board of Health Care Funders (BHF). The 'other' category made up 20.1% (29/141) of respondents, which represented professionals working for a medical laboratory employer not listed in the survey.

Table 4.1: Demographic characteristics of the surveyed respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	30	20.8	21.0	21.0
	Female	113	78.5	79.0	100.0
	Total	143	99.3	100.0	
Missing	System	1	0.7		
Total		144	100.0		
Age	18 – 24	10	6.9	7.0	7.0
	25 – 34	56	38.9	39.2	46.2
	35 – 44	28	19.4	19.6	65.7
	45 – 54	25	17.4	17.5	83.2
	55 – 64	21	14.6	14.7	97.9
	65 – 74	3	2.1	2.1	100.0
	Total	143	99.3	100.0	
Missing	System	1	0.7		
Total		144	100.0		
Salary Bracket	<= R15 000	30	20.8	25.0	25.0
	R15 001 - R20 000	27	18.8	22.5	47.5
	R20 001 - R25 000	22	15.3	18.3	65.8
	R25 001 - R30 000	17	11.8	14.2	80.0
	R30 001 - R35 000	11	7.6	9.2	89.2
	R35 001 or more	13	9.0	10.8	100.0
	Total	120	83.3	100.0	
Missing	System	24	16.7		
Total		144	100.0		
Qualification	Technician	7	4.9	5.2	5.2
	National Diploma	83	57.6	61.5	66.7
	B.Tech Degree	22	15.3	16.3	83.0
	Postgraduate Degree	23	16.0	17.0	100.0
	Total	135	93.8	100.0	
Missing	System	9	6.3		
Total		144	100.0		

Table 4.2: Occupational characteristics of the surveyed respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Registration	Medical Technologists	129	89.6	92.1	92.1
	Medical Technicians	11	7.6	7.9	100.0
	Total	140	97.2	100.0	
Missing	System	4	2.8		
Total		144	100.0		
Employer	Public Lab [NHLS]	42	29.2	29.8	29.8
	Private Lab 1 [LANCET]	24	16.7	17.0	46.8
	Private Lab 2 [AMPATH]	4	2.8	2.8	49.6
	Private Lab 3 [PATHCARE]	20	13.9	14.2	63.8

	Blood Transfusion Lab 1 [SANBS]	11	7.6	7.8	71.6
	Blood Transfusion Lab 2 [WPBTS]	3	2.1	2.1	73.8
	Independent Practice-Self employed	8	5.6	5.7	79.4
	Other **	29	20.1	20.6	100.0
	Total	141	97.9	100.0	
Missing	System	3	2.1		
Total		144	100.0		
Years at current employer	< 2 years	24	16.7	16.9	16.9
	2 - under 5 years	32	22.2	22.5	39.4
	5 - under 7 years	19	13.2	13.4	52.8
	7 - under 9 years	16	11.1	11.3	64.1
	9 - under 12 years	12	8.3	8.5	72.5
	12 - under 15 years	5	3.5	3.5	76.1
	15 - under 20 years	10	6.9	7.0	83.1
	> 20 years	24	16.7	16.9	100.0
	Total	142	98.6	100.0	
Missing	System	2	1.4		
Total		144	100.0		
Membership	HPCSA	140	97.2	98.6	
	SMLTSA	77	53.5	54.2	
	Total	142	98.6	100.0	
Missing	System	2	1.4		
Total		144	100.0		
Happy with career choice	Yes	87	60.4	71.9	71.9
	No	34	23.6	28.1	100.0
	Total	121	84.0	100.0	
Missing	System	23	16.0		
Total		144	100.0		

** Those who indicated 'none of the above' in the employer category.

Of the 144 respondents, 142 completed the question regarding the length of time employed with their current employer. Of this group, 52% (75/142) indicated that they had worked less than seven years in their current position. Almost all (140/142, 98.6%) indicated they were HPCSA-registered and 54.2% (77/142) were active members of SMLTSA. Only 84% of respondents answered the 'Happy with career choice' question, of which 71.9% (87/121) indicated they were happy and more than a quarter (34/121, 28.1%) were not happy with their career choice.

Happiness of career choice was further categorised by age and employer. Table 4.3 below represents the combined results of Medical Technologists and Medical Technicians response to the question '**Are you currently happy with your career choice? and** showed that those professionals who were older than 35 years felt more positive about their career choice (63/70, 90%) compared to those aged between 18-34 years (24/50, 48%). Interestingly, the public sector had the highest proportion of

respondents indicating that they were not happy with their career choice (14/32, 43.8%).

Table 4.3: Are you currently happy with your career choice? illustrating that the older professionals >35 years of age are happier in their career choice that those < 35 years of age.

			Age Groups		Total
			18-34 years	35+ years	
Are you currently happy with your career choice?	Yes	Count	24	63	87
		%	48.0%	90.0%	72.5%
	No	Count	26	7	33
		%	52.0%	10.0%	27.5%
Total		Count	50	70	120
		%	100.0%	100.0%	100.0%

Overall, 72.5% (87/120) of respondents reported that they were happy with their career choice (Table 4.4). The majority of respondents answering this question were employed in private laboratories (31/41, 75.6%).

Table 4.4: Happiness with career choice for different employer groups

Employer		Are you currently happy with your career choice?		Total
		Yes	No	
Public Laboratory	Count	18	14	32
	%	56.3%	43.8%	100.0%
Private Laboratory	Count	31	10	41
	%	75.6%	24.4%	100.0%
Blood Transfusion Services	Count	10	4	14
	%	71.4%	28.6%	100.0%
Independent Practice	Count	6	1	7
	%	85.7%	14.3%	100.0%
Other **	Count	22	4	26
	%	84.6%	15.4%	100.0%
Total	Count	87	33	120
	%	72.5%	27.5%	100.0%

** Those who indicated 'none of the above' in the employer category.

4.2 Objective 1

The first objective of the study was to investigate the salary scales of respondents in relation to their current employer. As the data was not distributed normally, a Spearman's Rho correlation was used to investigate the relationship between salary bracket and probable influencers, which included number of years worked at current employer, age and education (Table 4.5 below). The Spearman correlation is a non-

parametric measure that denotes the strength and direction of a relationship between two variables either on an ordinal or continuous scale.

Significant correlations ($p < 0.01$) were seen with a strong positive relationship between salary and age ($r = 0.674$), and a moderately positive relationship between salary and years worked at current employer ($r = 0.533$). A positive relationship was found between salary and education level ($r = 0.195$; $p < 0.05$), although it was much weaker than the other two relationships.

Table 4.5: Spearman's rank-order correlations between salary brackets, age, years worked at current employer and education showing a positive relationship between salaries and years worked.

		Salary Bracket	Age	Years worked at current employer	Education
Salary Bracket	Correlation Coefficient	1.000	0.674**	0.533**	0.195*
	Sig. (2-tailed)	.	0.000	0.000	0.040
	N	120	119	119	111
Age	Correlation Coefficient	0.674**	1.000	0.605**	0.191*
	Sig. (2-tailed)	0.000	.	0.000	0.026
	N	119	143	142	135
Years worked at current employer	Correlation Coefficient	0.533**	0.605**	1.000	0.048
	Sig. (2-tailed)	0.000	0.000	.	0.582
	N	119	142	142	134
Education	Correlation Coefficient	0.195*	0.191*	0.048	1.000
	Sig. (2-tailed)	0.040	0.026	0.582	.
	N	111	135	134	135

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

The Kruskal-Wallis one-way ANOVA test was used to analyse differences in salary level between employers. This is a nonparametric test that uses rank comparisons to determine differences between independent groups on a non-categorical dependent variable. The ranks were averaged across observations within each group to obtain a mean rank that was used to calculate the Kruskal-Wallis test statistic. Results shown in Table 4.6 below, indicate that there was a significant difference in salary groups between the employers ($H(2) = 25.038$, $p < 0.05$).

Table 4.6: Kruskal-Wallis test indicating differences in mean rank in salary brackets for employer groups

Total N	119
Test Statistic	25.038
Degrees of Freedom	4
Asymptotic Significance (2-sided test)	0.000*

Figure 4.1 provides a diagrammatic representation of the Kruskal-Wallis test for the different employer groups, with significance in rank indicated by yellow lines. While those employed in "other" medical fields ranked highest, the research did not provide enough data to contextualise this. In addition, those who were employed in blood transfusion services reported higher remuneration than other groups, with a mean rank of 73.35. Notably, those in public laboratories had a much lower mean ranking in salary (36.00) compared to other employer groups.

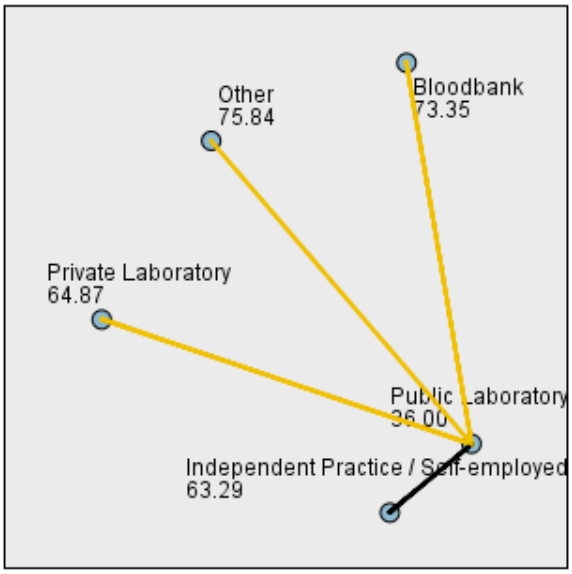

Figure 4.1: Pairwise comparisons of salary between employer groups indicating higher remuneration in Blood Transfusion Services than in Public laboratories

The following Table 4.7 below, shows that the NHLS (public lab) employees reported significantly lower salary levels than those in the private sector ($p = 0.03$), blood banks ($p = 0.007$) and "other" ($p < 0.001$). NHLS employees were also lower earners compared to those in independent practice, although this was not significant ($p > 0.05$),

Table 4.7: Post-hoc results for mean rank of employer groups compared on salary levels

Employer group comparison	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.
Public Lab vs Independent Practice	-27.286	14.074	-1.939	0.053*	0.525
Public Lab vs Private Lab	-28.866	7.910	-3.649	0.000*	0.003*
Public Lab vs Blood bank	-37.346	11.075	-3.372	0.001*	0.007*
Public Lab vs Other	-39.840	8.968	-4.442	0.000*	0.000*
Independent practice vs Private Lab	1.580	13.832	0.114	0.909	1.000
Independent practice vs Blood Bank	10.060	16.856	0.634	0.626	1.000
Independent practice vs Other	-12.554	14.463	-0.868	0.395	1.000
Private Lab vs Blood Bank	-8.460	10.766	-0.788	0.431	1.000
Private Lab vs Other	-10.974	8.583	-1.279	0.201	1.000
Blood Bank vs Other	-2.494	11.565	-0.216	0.829	1.000

* Significant at the 0.05 level (2-tailed).

An overview of the earnings for Medical Technologists and Medical Technicians within the various age groups, for the various employer types, are presented in Figures 4.2-4.6. These have been outlined by employer type for ease of comparison.

As shown in Figure 4.2, the majority of Medical Technologists employed by the NHLS reported earning less than R15,000 per month (57.1%). The largest proportion (70.6%) of those Medical Technologist earning below R15,000 were in the 25-34 age group. Figure 4.3 shows that Medical Technicians employed at the NHLS occupy this salary bracket at an older age group (ages 35-44) while Medical Technologists only fall in this salary bracket in their younger years (ages 18-34).

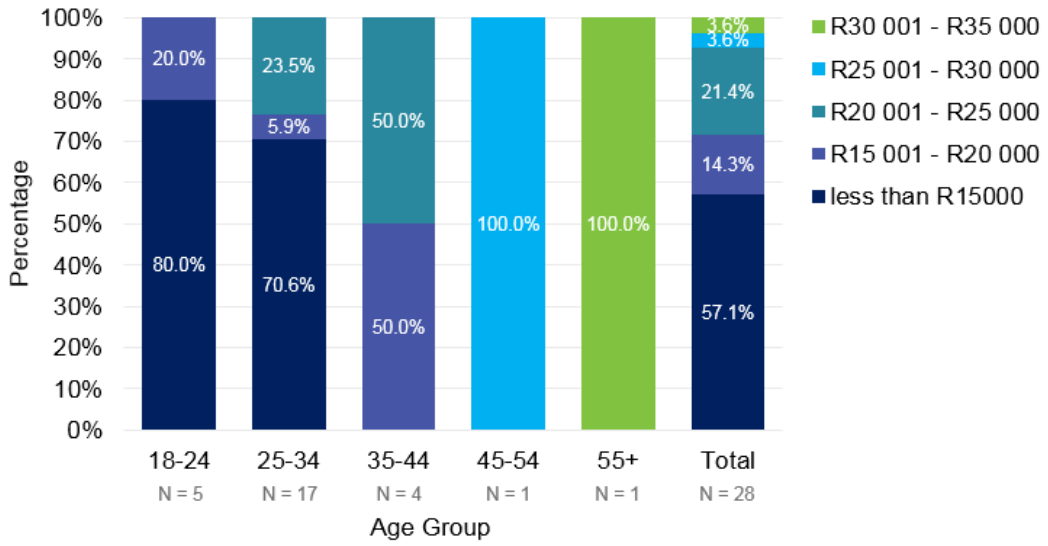

Figure 1.2: Salary distribution of Medical Technologists working in NHLS laboratories for different age groups, indicating lower salaries for younger employees

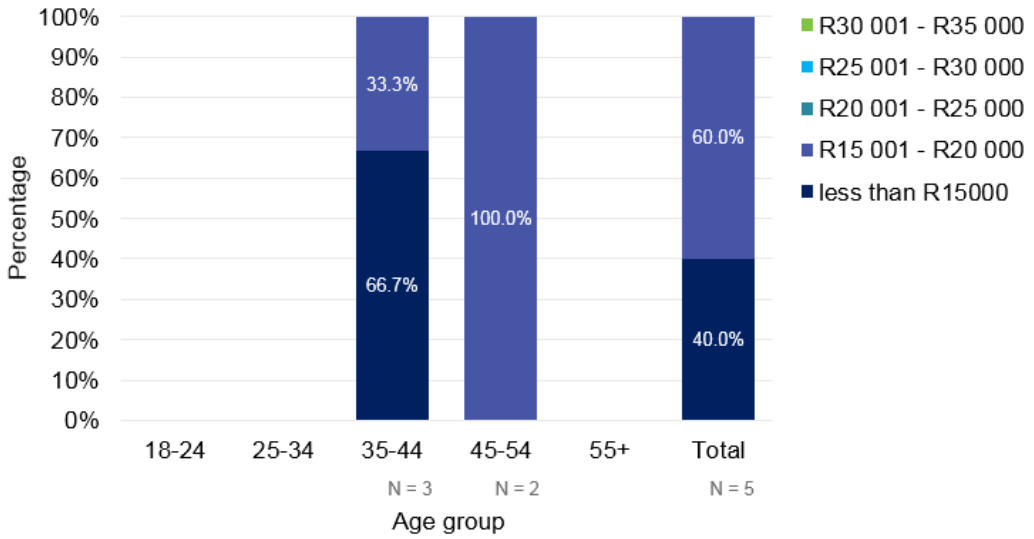

Figure 4.3: Salary distribution of Medical Technicians working in the NHLS laboratories for different age groups, indicating lower salaries in higher age groups when compared to Figure 4.2

In the private sector (Figure 4.4 below) the largest portion of Medical Technologists (28.2%) indicated that they earned between R15,001-R20,000, primarily by respondents in the 25-34 age group. There were five Medical Technologists in the 45-54 age group, of which two (40%) reported earnings in the salary bracket of R25,001-R30,000.

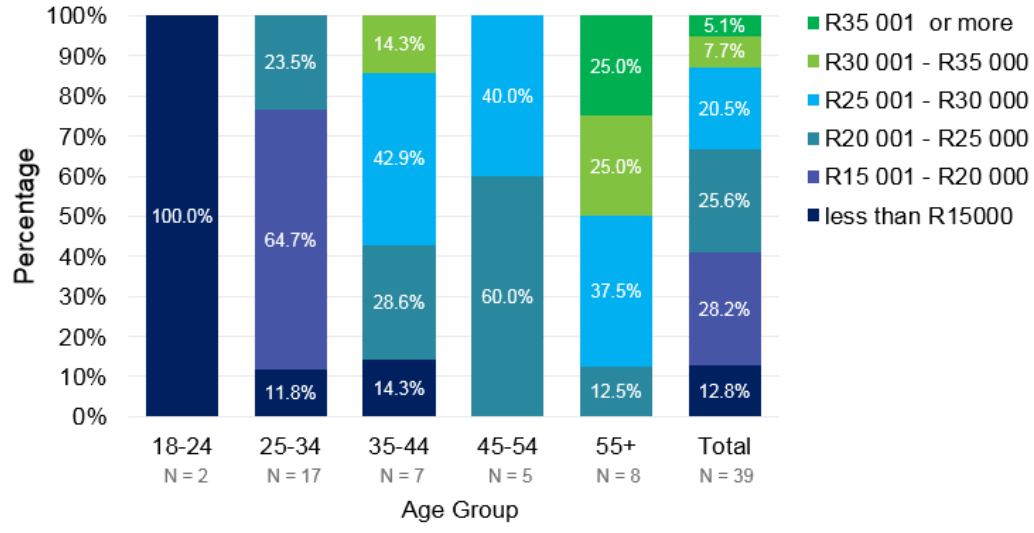

Figure 4.4: Salary distribution of Medical Technologists working in private laboratories for different age groups, indicating higher salaries compared to the same age groups in the public sector

Referring to Figure 4.5 below, the largest proportion of Medical Technologists working in blood transfusion services reported earning salaries of R25000 and above (66.6%). There were two Medical Technologists (Figure 4.5) in the 35-44 age group, of which one (50%) reported earnings in the salary bracket of R20,001-R25,000. Similarly, one Medical Technician employed in blood transfusion services (seen in Figure 4.6 below) in the same age category (35-44 years) also reported earnings in the R20,001-R25,000 bracket.

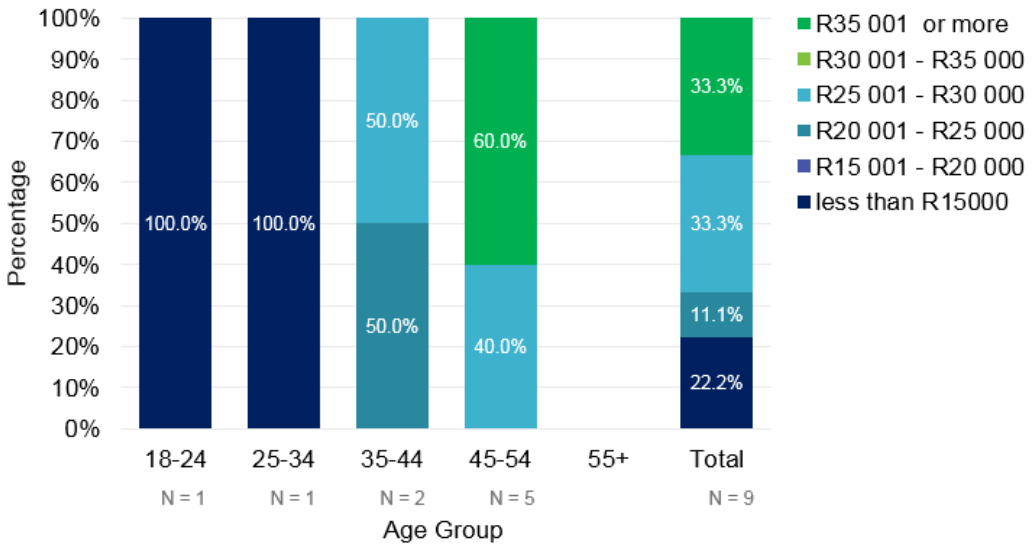

Figure 4.5: Salary distribution of Medical Technologists working in blood transfusion services for different age groups, where overall salary reports were higher compared to other employers

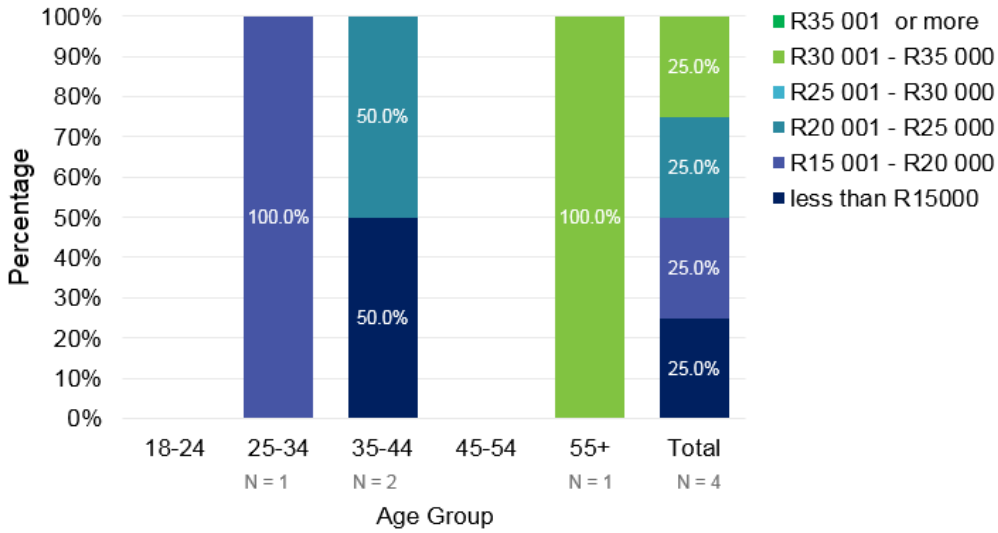

Figure 4.6: Salary distribution of Medical Technicians working in blood transfusion services for different age groups

4.3 Objective 2

The second objective aimed to assess awareness, participation and barriers among laboratory personnel regarding membership to various organisations and professional bodies. This included participation in CPD activities and compliance as per HPCSA requirements. General descriptive statistics were used to investigate the composition of responses as shown previously in Table 4.2**.** Of the 144 respondents sampled, 98.6% (140/142) indicated that they were HPCSA-registered whereas only 54.2% (77/142) were active members of the SMLTSA. The challenges expressed by respondents in attaining CPD compliance were identified and examples of thematic analysis of qualitative responses are shown in Table 4.8 below.

Table 4.8: Qualitative analysis of expressed reasons for non-attendance of CPD activities

Reason	Example Verbatim
Unable to attend due to work responsibilities	"Night shift"
Employer does not allow me to attend	"Employer does not give me special leave and does not pay for me"
Family Responsibilities	"Family responsibilities (small children - not always possible to get someone to look after them)" "It sometimes clashed with my responsibility as a single mom"
Not a suitable time	"Prior arrangements made or out of town" "Hours not suitable"
Far away/Travel difficulties	"Can't drive at night" "There is no SMLTSA branch in my city so no activities are local and the expense is too great to travel" "Venues too far"
Other	"I didn't know about them" "I am not a member of the society" "I do not need to participate, I have enough CEU's"

4.4 Objective 3

This objective investigated working relationships among personnel in the medical laboratory environment. Mean relationship scores were compared for Medical Technicians and Medical Technologists to make comparisons in how these two groups relate to their colleagues as well as to rate their perceptions of the relationships existing between other laboratory staff. Where there appeared to be differences in mean scores, the Mann-Whitney U test was used to investigate whether these differences were statistically significant, complying with non-parametric assumptions. The Mann-Whitney U test measures the likelihood that two independent groups come from the same population, based on the ranked distribution of a dependent variable. The survey

requested qualitative feedback on low ratings, which was thematically analysed to determine possible reasons for the differences in ratings and describe the nature of detractors from these relationships.

Table 4.9: Mean ratings for perceived interpersonal laboratory relationships as provided by Medical Technologists and Medical Technicians, where lower ratings for relationships with pathologists indicates more negative perceptions

What is your perception of the day to day professional relationship of the following groups towards each other?	Overall			Technologists			Technicians		
	Mean	N	Std. Dev.	Mean	N	Std. Dev.	Mean	N	Std. Dev.
Pathologists towards Medical Technologists	2.53	120	1.053	2.45	108	1.054	3.40	10	0.699
Pathologists towards Medical Technicians	2.49	114	1.066	2.37	102	1.033	3.40	10	0.699
Pathologists towards Medical Scientists	3.25	106	0.829	3.25	95	0.850	3.30	10	0.675
Medical Technologists towards Medical Technicians	3.38	120	0.851	3.37	107	0.864	3.45	11	0.688
Medical Technicians towards Medical Technologists	3.37	118	0.865	3.37	105	0.891	3.36	11	0.674
Medical Scientists towards Medical Technologists	2.98	109	0.850	2.95	98	0.866	3.20	10	0.632
Medical Scientists towards Medical Technicians	2.91	109	0.823	2.88	98	0.841	3.20	10	0.632
Medical Technologists towards Medical Scientists	3.14	113	0.811	3.12	102	0.824	3.30	10	0.675
Medical Technicians towards Medical Scientists	3.05	111	0.706	3.03	100	0.717	3.20	10	0.632
Medical Technologists towards Pathologists	3.11	115	0.971	3.11	104	1.004	3.30	10	0.483
Medical Technicians towards Pathologists	3.07	114	0.900	3.07	103	0.921	3.20	10	0.632
Medical Scientists towards Pathologists	3.41	105	0.675	3.43	94	0.695	3.30	10	0.483

As shown in Table 4.9 above, the overall mean score was highest for the relationship of Medical Scientists towards Pathologists (M = 3.41). That is, ratings for this relationship place perceptions between ‘satisfactory’ and ‘good’. However, the relationship of Pathologists towards Medical Technologists was perceived and rated the lowest overall (M = 2.53). That is, ratings for this relationship place respondent’s perceptions between ‘poor’ and ‘satisfactory’.

Technologists rated the relationship of Pathologists towards Medical Technologists (M = 2.45) and Medical Technicians (M = 2.37) the lowest. Thus, both of these relationships were

perceived to lean towards the 'poor' side between 'poor' and 'satisfactory'. In contrast, Medical Technicians rated these relationships among the highest (M = 3.4 in both cases) after the relationship of Medical Technologists towards Medical Technicians (M = 3.45). That is, Medical Technicians rated these relationships between 'satisfactory' and 'good'. Notably, mean scores for the various laboratory interpersonal relationships were all perceived and rated below the 'good' level (M < 4).

The data did not meet assumptions for the independent t-test because normality and/or homogeneity assumptions were violated. Assumptions were met for the Mann-Whitney U test and this was used as a non-parametric alternative (Table 4.10 below).

Table 4.10: Mann-Whitney U test for evaluating the differences in Medical Technologists and Medical Technicians perceptions and ratings of the various interpersonal laboratory relationships indicating significant differences in how the two groups perceived relationships with pathologists

What is your perception of the day to day professional relationship of the following groups towards each other?	Mann-Whitney U	Asymp. Sig. (2-tailed)
Pathologists towards Medical Technologists	260.500	0.005*
Pathologists towards Medical Technicians	230.000	0.003*
Pathologists towards Medical Scientists	461.000	0.869
Medical Technologists towards Medical Technicians	564.000	0.806
Medical Technicians towards Medical Technologists	554.500	0.814
Medical Scientists towards Medical Technologists	404.500	0.330
Medical Scientists towards Medical Technicians	387.000	0.236
Medical Technologists towards Medical Scientists	445.500	0.476
Medical Technicians towards Medical Scientists	437.500	0.464
Medical Technologists towards Pathologists	468.500	0.586
Medical Technicians towards Pathologists	487.500	0.764
Medical Scientists towards Pathologists	419.500	0.535

*****Significant at the 0.05 level (2-tailed)

As shown in Table 4.11 below, there were significant differences in how Medical Technologists and Medical Technicians evaluated the Pathologists' relationship toward Medical Technologists (U = 260.5, p < 0.05) and Medical Technicians (U = 230.0, p < 0.05). In both cases (see Table 4.10 above) the mean ranking for Medical Technologists (57.55 and 54.65) were lower than for Medical Technicians (80.60 and 75.40). No significant differences (p > 0.05) were found between the ratings provided by these respondents with regard to their perceptions of any other laboratory relationships.

Table 4.11: Mean Ranks for Mann Whitney U test indicating that Medical Technologists perceived relationships of pathologists towards themselves and Medical Technicians more negatively than did Medical Technicians

	Are you a board-registered Medical Technologist or Medical Technician?	N	Mean Rank	Sum of Ranks
Pathologist's relationship towards Medical Technologists	Medical Technologists	108	57.55	6215.00
	Medical Technicians	10	80.60	806.00
	Total	118		
Pathologist's relationship towards Medical Technicians	Medical Technologists	102	54.65	5574.00
	Medical Technicians	10	75.40	754.00
	Total	112		

Respondents were requested to comment on their opinion of laboratory relationships where they provided low ratings. Thematic qualitative analysis was used to further analyse possible reasons for the opinions of relationships (Tables 4.12–4.14).

Table 4.12: Summary of reasons for providing a low relationship rating given by respondents

Pathologists' relationship towards Medical Technologists	Frequency	Percent	Valid Percent	Cumulative Percent
Not enough interaction/communication	7	4.9	16.3	16.3
Lack of respect from Pathologists towards Medical Technologists	19	13.2	44.2	60.5
Recognition of Qualification	8	5.6	18.6	79.1
Pathologists' relationship towards Medical Technicians	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Not enough interaction/communication	7	4.9	21.9	21.9
Lack of respect from Pathologists towards Medical Technologists.	11	7.6	34.4	56.3
Recognition of Qualification	10	6.9	31.3	87.5

Both Medical Technologists (44.2%) and Medical Technicians (34.4%) perceived that they did not receive the respect they deserve from Pathologists in their working relationship. In addition, 18.6% of Medical Technologists and 31.3% of Medical Technicians perceived that their roles were regarded as of a lesser value and that their knowledge, training and attained qualifications were not recognised by the Pathologists.

Table 4.13: Qualitative reasons for the low rating of the relationship of 'Pathologists towards Medical Technologists'

Reason	Example Verbatim
Not enough interaction/ communication	"We don't get to interact or even see a Pathologist on a daily basis so no relationship can be formed" "They don't communicate with junior staff"
Lack of respect from Pathologists to Medical Technologists	"We are regarded as non-entities just mere workers" "Look down on Medical technologists" "Paths have no respect for med techs" "Med Techs do all the work and even advise but are not valued by Pathologists"

Difference in level of qualification	“They don’t associate with med tech... They take us as if we’re not educated.” “Pathologist think Technologists are stupids” “They treat us like illiterates”
Other	“They are in ivory towers and don’t understand the working environment” “Competition is rife”

Table 4.14: Qualitative reasons for the low rating of the relationship of 'Pathologists towards Medical Technicians'

Reason	Example Verbatim
Not enough interaction/ communication	“In private sector we hardly see them but at NHLS we at least can interact with them.” “Pathologists do not freely engage with Technicians”
Lack of respect from Pathologists towards Medical Technologists	“Pathologist do not even acknowledge Technicians roles in obtaining a result” “Not enough respect from Path towards Tech” “They don’t even take them seriously” “Pathologists have a condescending attitude towards Med Technologists”
Recognition of qualification	“Pathologist feel that Technicians are the lowest qualified in the lab because they don’t have a more substantial qualification than a Med Technologist does and therefore Pathologist would liaise with a Technologist than a Technician.” “They still undermine Technicians. Technologists and Technicians are treated as if they do not know anything, especially in cytology.” “Qualification not recognised”
Other	“Cheap labour and exploited” “There's a huge gap”

4.5 Objective 4

This objective was to investigate the perceived work ethic and scope of practice of various individuals according to the various job titles and job descriptions. Respondents were asked to indicate if they felt that the different laboratory professionals were working within and according to their scope of practice. No prompting or definitions of ethical behaviour or scope of practice were provided by the researcher and respondents were expected to report on their own professional understanding and interpretation of the question. Frequencies are reported in Table 4.15 below and provide a descriptive overview of their perceptions surrounding the adherence of each group of laboratory professionals to their scope of practice.

Analysis of the respondents’ opinion regarding adherence to the scope of practice for each laboratory job-title showed that Pathologists were perceived as the least likely to work outside of their scope of practice (19/115, 16.5%). However, the majority of respondents (65/113, 57.5%) felt that Medical Technicians worked outside of their

scope of practice. Further analysis found that regardless of where respondents worked, the perceptions around scope of practice remained the same. That is, respondents from different employers did not report different perceptions regarding scope of practice.

Table 4.15: Perceptions of the adherence to the scope of practice of the different laboratory personnel groups However, the majority of respondents (65/113, 57.5%) felt that Medical Technicians worked outside of their scope of practice

		Frequency	Percent	Valid Percent
Medical Technologists	Yes	34	23.6	28.8
	No	84	58.3	71.2
	Total	118	81.9	100.0
Medical Technicians	Yes	65	45.1	57.5
	No	48	33.3	42.5
	Total	113	78.5	100.0
Pathologists	Yes	19	13.2	16.5
	No	96	66.7	83.5
	Total	115	79.9	100.0
Medical Scientists	Yes	35	24.3	31.5
	No	76	52.8	68.5
	Total	111	77.1	100.0
Laboratory Assistants	Yes	50	34.7	43.5
	No	65	45.1	56.5
	Total	115	79.9	100.0

Yes = regard this group of laboratory professionals as working **outside** the professional scope of practice
No = regard this group of laboratory professionals as working **within** the professional scope of practice

Mean scores were used to evaluate the work ethic of laboratory personnel. The mean ratings for work ethic of the various laboratory workers are presented in Table 4.16. Overall, respondents rated Medical Technologists as having the highest work ethic (M = 3.48). That is, they perceived their work ethic to be between ‘satisfactory’ and ‘good’. Laboratory Assistants were rated as having the lowest work ethic (M = 3.18) but this was still in the range between ‘satisfactory’ and ‘good’.

Table 4.16: Mean scores of perceived work ethic of the different laboratory personnel by occupational type highlighting positive work ethic

What in your opinion is the work ethic of:	Overall			Technologists			Technicians		
	Mean	N	Std. Dev.	Mean	N	Std. Dev.	Mean	N	Std. Dev.
Medical Technologists	3.48	120	0.860	3.53	108	0.837	3.10	10	0.994
Medical Technicians	3.23	115	0.787	3.23	104	0.791	3.33	9	0.866
Medical Scientists	3.39	109	0.769	3.39	99	0.780	3.33	9	0.707
Laboratory Assistants	3.18	114	0.744	3.17	104	0.743	3.22	9	0.833

Both Medical Technicians and Medical Technologists showed a positive bias toward rating the work ethic of their own group. When Medical Technicians were asked to evaluate the work ethic of Medical Technologists, the Medical Technicians rated themselves as having the highest work ethic (M = 3.33) and Medical Technologists as having lower work ethic (M = 3.10). Similarly, Medical Technologists rated themselves as having the highest work ethic (M = 3.53) and Medical Technicians as having lower work ethic (M = 3.23).

The Kruskal-Wallis one-way ANOVA test was used to determine differences in work ethic ratings reported by respondents from the various laboratory employers (NHLS, private laboratories and blood transfusion services). All respondents, irrespective of employer, felt that Medical Technologists had the greatest work ethic and that Laboratory Assistants had the least. No differences were shown to be significant between employer groups. However, because of a respondent bias that is more favourable toward their own group, mean scores could be skewed.

4.6 Objective 5

The final objective was to evaluate perceptions of Medical Technologists who have left the profession; however, only a small number of respondents completed this section. Because of a lack of data, only a brief overview is presented in Table 4.17 below.

Most respondents had a National Diploma in Biomedical Technology (N = 6) and reported that salaries were the main reason for leaving the profession (N = 6). The highest number of respondents who left the profession were relatively young and belonged to the 25-34 old age group. This ties in with the age group analysis in this study which shows those who are unhappy with their career choices are also between the 25-34-year-old age group.

Table 4.17: Demographics for Medical Technologists who have left the profession

		Freq.	Percent	Valid Percent	Cumulative Percent
Gender	Male	6	66.7	66.7	66.7
	Female	3	33.3	33.3	100.0
	Total	9	100.0	100.0	
Age	25 to 34	5	55.6	55.6	55.6
	45 to 54	2	22.2	22.2	77.8
	55 to 64	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Qualification	N.Dip in Biomedical Technology	6	66.7	66.7	66.7
	B.Tech Biomedical Technology	2	22.2	22.2	88.9
	MSc	1	11.1	11.1	100.0
	Total	9	100.0	100.0	
Who was your previous employer?	NHLS	6	66.7	66.7	66.7
	Lancet Laboratories	1	11.1	11.1	77.8
	Other	2	22.2	22.2	100.0
	Total	9	100.0	100.0	
Years worked in laboratory	2- under 5 years	2	22.2	22.2	22.2
	5- under 7 years	3	33.3	33.3	55.5
	7- under 9 years	1	11.1	11.1	66.7
	12- under 15 years	1	11.1	11.1	77.8
	15- under 20 years	2	22.2	22.2	100.0
	Total	9	100.0	100.0	
Membership	HPCSA	4	44.4	44.4	
	SMLTSA	3	33.3	33.3	
Reasons for leaving the profession	Salary	4	44.4	44.4	44.4
	No opportunity for development	2	22.2	22.2	66.7
	Other	3	33.3	33.3	100.0
	Total	9	100.0	100.0	
Provinces worked	Gauteng	8	88.9		
	KZN	1	11.1		
	Western Cape	1	11.1		
	Total	9	110.1		

CHAPTER FIVE

DISCUSSION

The study aimed to investigate the Perceptions of the Profession of Medical Technology. Five objectives were set to satisfy the aims, namely to evaluate:

- Aim 1: salary scales between expert groups of Medical Technologists and Medical Technicians in relation to age groups and employers
- Aim 2: awareness, participation and barriers amongst laboratory personnel surrounding membership of various stakeholders and CPD compliance
- Aim 3: inter personal relationships in the laboratory environment
- Aim 4: the work ethic and scope of practice of the various job titles of laboratory professionals
- Aim 5: the perceptions of Medical Technologists who have left the profession.

5.1 Demographic characteristics

This study achieved a response rate of 30.3%. This demonstrates a positive response from the Medical technologists and Medical Technicians demonstrating a willingness to participate resulting in an above expected response rate. This is similar to a survey conducted for a web-based survey of specialist physicians that yielded a response rate of 35% (Cunningham et al., 2015). This survey exceeded the response rate of a study conducted by Brand (2007), which yielded a response of only 16.6% using the South African postal services.

The majority of respondents in the present study were female. This compares to a study by Brand (2007), where 72% of respondents were female Medical Technologists and Medical Technicians. A study of Laboratory Science workers in the USA (Bennett et al., 2014) found that the profession was dominated by females. In contrast, Deriba et al. (2017) found that in developing countries such as those in West Africa, health care professionals across all disciplines (including laboratory workers) were collectively male dominated.

A study predominantly among PhD educated scientists in cancer prevention, reported 61% of the respondents were satisfied with their careers (Faupel-Badger et al. 2017). Our study reported 71.9% of respondents were happy with their career choices. However, these respondents were older than 35 years of age. Younger respondents

(under 35 years) reported a far lower level of happiness with their career choice than older respondents (35 years and older). To establish if this was a general finding or associated with a particular type of employer, further analysis was undertaken. This found no differences in happiness or in age groups between the different employer groups. Results from social studies relating to work wellbeing (Duffy et al., 2014) over time, suggested that individuals who were committed to their careers derive more meaning from their work, are more likely to experience job satisfaction, and feel that they are living a 'calling'. This could possibly explain why the older age group in this study were happier within the profession.

Research conducted by Brand (2007) found that in South African, 37% of Medical Technologists who responded to the study were employed by the NHLS. However, in the present research, the largest proportions of respondents (34%) were employed in the private pathology sector (i.e. Ampath, Lancet and Pathcare). Only 29.8% of respondents to this survey worked at the NHLS. As many of the respondents were in private practice the results might not be representative of the entire Medical Technology population. These findings are in line with a previous report from Sub-Saharan Africa, where Marinucci et al. (2013) found that only 29% of respondents were employed in the public sector. One of the possible reasons for the higher response rate from the private sector was that more Medical Technologists from private pathology laboratories were able to attend the SMLTSA, 23rd Medical Laboratory Professionals Congress in Port Elizabeth in 2015. Another possible reason for NHLS staff members not attending congresses is the NHLS is sometimes unable to fund Medical Technologist to attend the congress due to limited funding

5.2 Salary scales between the different age groups and employers

The largest proportion of Medical Technologists in the public sector (NHLS) reported earning less than R15,000 per month and primarily consisted of Medical Technologists in the 25-34-year-age group. In contrast, Medical Technologists in the same age group who worked in the private sector earned between R15,000-R20,000. Statistical analysis showed that employees in the NHLS earned significantly lower salaries than those in the private sector ($p<0.01$). These findings were in line with a previous South African study where private laboratory staff reported a higher remuneration rate than those in public sector laboratories (Narainsamy et al., 2014).

Medical Technicians at the NHLS appeared to earn less than R15,000 amongst a much older age group (35-54 years-old). This could be due to training and writing board examinations later in their careers. Medical Technician training is limited to the workplace with very little theoretical learning. The Medical Technician programme is approved by the HPCSA; however, it is not a formal qualification and is not registered with the South African Qualifications Authority (SAQA).

It should be noted that there has been an increase in remuneration for Medical Technologists at the NHLS since the survey data for this survey was collected between 10 June 2015 and 01 June 2016. These differences may therefore not be reflective of the current (2018) salary scales at the NHLS.

The lifespan model of career progression is well established. As an individual progress through the various stages of their careers, their earnings increase in relation to their experience (Young et al., 2014). This study reported a positive relationship between age or years of service and salary. That is, the greater an employee's years of service or experience, the higher the salary. There was a much weaker relationship with educational qualifications than years of service, suggesting that a higher qualification is a less accurate measurement for predicting salary. The BHSc degree is aligned to NQF level 8. Hopefully, BHSc graduates with this new qualification will add value to the diagnostic process with a much greater emphasis on the application of knowledge, the solving of complex problems and critical thinking skills. With any luck, these enhanced skills that are developed through the new curriculum will be an incentive for employers to improve salaries. However, it remains a concern that educational expertise is not remunerated in the industry, and therefore does not motivate people to continue their studies. This stands in contrast to the USA salary survey from MLO (2013 to 2018), which showed that the higher the qualification, the higher the salary (i.e. Medical Technologists earn more than Medical Technicians due to the differences in qualifications). In addition, Brand (2007) found that the salary for Medical Technicians was much lower than that for Medical Technologists. In this current study however, there was one Medical Technician who was in the same salary bracket as a Medical Technologist. However, it must be noted that the number of Medical Technician responses in this particular survey were limited.

In Blood Transfusion services, a Medical Technologist and a Medical Technician from the same age category (35-44 years) were also placed in the same salary range (R25,001-R30,000). This is in contrast to the study by Brand (2006) who indicated that

Medical Technicians reach a plateau in their earnings and overall Medical Technologists earn higher salaries to that of Medical Technicians. A possible reason for this is that Medical Technicians have no choice but to remain with the same employer because of their training and thus enjoy the yearly increase.

5.3 CPD awareness, participation and compliance

High CPD compliance was found among the respondents of this study (94.2%). Although the database was obtained from SMLTSA congress attendees, the high compliance was not achieved through all of SMLTSA's activities. Only 61.1% of respondents were aware that SMLTSA arranged such CPD activities, and less than half of these (45.5%) indicated that they attended such activities. The primary reason cited by the respondents as to why they did not attend these activities was because of work responsibilities (54.8%), followed by travel difficulties (13.7%) and it being too expensive (12.3%). Similarly, Brand (2007) found that respondents had given similar logistical reasons for non-attendance to CPD activities arranged by the SMLTSA, sighting financial constraints as the main reason for non-attendance. Van Vuuren and Nel (2010) also found that there was non-compliance with CPD among allied health professionals in South Africa.

CPD is vital in ensuring that professionals remain competent in their field of expertise showing that their skills and knowledge are current and that they continually demonstrate good professional practice. It is positive that most respondents to this survey were CPD compliant, possibly by participation in online CPD activities. Non-attendance of activities arranged by SMLTSA remains an issue as many of the reasons cited for non-attendance are avoidable, i.e. logistical causes such as travel and timing.

SMLTSA is one of the organisations in South Africa that Medical Technologists and Medical Technicians can obtain membership, however membership of this organisation remains very low because it is voluntary. According to the SMLTSA database (2017), only 10% of the HPCSA-registered Medical Technologists and Medical Technicians were active members. SMLTSA is also a member of the International Federation of Biomedical Laboratory Science (IFBLS), which allows the profession of Medical Laboratory Science in South Africa to have international exposure. Only 54.2% of respondents to this survey were active members of SMLTSA. In fact, membership of the SMLTSA seems to have decreased since the 2007 study by Brand (2007) where 58% of respondents were active members The majority of

respondents in this survey were from Gauteng. However, one of the possible reasons for poor membership could be the lack of branches in some provinces. Currently, SMLTSA has branches in the Western Cape, Eastern Cape, Kwa Zulu Natal, Gauteng (limited to a branch on the East Rand—Johannesburg) and Free State. Branches in the Boland, Umtata, North West and Mpumalanga closed down because of a lack of membership.

5.4 Working relationships among laboratory personnel in a work environment

Multiple factors such as compensation, organisational culture, training opportunities, ~~and~~ leadership and management styles play key roles in staff retention (Kossivi, 2016: 261). Organisational culture includes the ability of an organisation to foster good relationships between employees to allow them to develop their full potential. Positive interpersonal relationships refer to a strong association between employees working together in the same organisation.

Pathology-owned practices play a key role in the employment of both Medical Technicians and Medical Technologists in South Africa. Yet, the lowest relationship rating was found between Pathologists and Medical Technicians. (M =2.37). Accurate laboratory diagnoses are optimised if the knowledge and skills of all personnel in a diagnostic environment are integrated. This integration will only be achieved through frequent, respectful interaction and communication. Respondents were asked to provide feedback in their response to relationships in the laboratory environment. Both Medical Technologists and Medical Technicians stated that there was a perceived lack of respect from Pathologists ("*Pathologists think Technologists are stupid"*) and a lack of interaction or integration ("*In the private sector we hardly see them but at NHLS we at least can interact with them". "Pathologists do not freely engage with Technicians". "There is a feeling of us and them…not a team*.").

Comments from respondents indicated a lack of communication and teamwork among Medical Technologists, Medical Technicians and Pathologists in some laboratories. Respondents in this study only included Medical Technologists and Medical Technicians and therefore the study did not measure Pathologists' perception towards laboratory staff. Evaluating toxic work environments in Turkey, Tastan (2017) found that the same factors, such as passive-aggressive leadership, negativity, abusive leadership and unfair policies had a negative impact on the quality of work and lives of nursing staff. Relationships need to be strengthened to motivate the younger

generation and allow for capacity building and mentoring of juniors in order to achieve organisational effectiveness and interpersonal relationships.

5.5 Perceived work ethic and scope of practice in a laboratory environment

As technical responsibilities between Medical Technologists and Medical Technicians overlap, it may be understandable for certain Technicians to perform work initially expected of Medical Technologists. For this reason, guidelines were published by the HPCSA and SANAS locally and abroad (Harmening, 1995). In 2014/2015, the Professional Board for Medical Technology released a bulletin advising that Medical Technicians could occasionally sign out automated work if it was verified by a Medical Technologist (Appendix 6). In addition, SANAS in 2015 released a bulletin (Appendix 7) with the requirement, “Technicians may enter test results on the IT system provided the verification of the results is done by a Technologist. Medical Technicians must not verify/authorise results.” The guidelines by SANAS state that a person is allowed to undertake a task if they have been trained and deemed competent for that task. There are therefore no clear and deterministic guidelines in place regarding scope of practice and this may lead to a point of confusion for many Medical Technologists, Medical Technicians and employers.

In this study, analysis of respondents’ opinion of scope of practice, it was found that pathologists were least likely to be regarded as working outside of their scope while the majority of respondents agreed that Medical Technicians worked outside of their scope of practice. No other studies could be accessed that assessed the scope of practice in the Medical Laboratory environment. However, scope of practice has been studied among nursing professionals where respondents disclosed they often had to work outside their scope of practice in order to fulfil the needs of critically ill patients, making the scope of practice irrelevant to critical care (Bell, 2011). Similarly, Medical Technicians may after many years of experience become competent and capable of performing tasks and hence work outside their scope of practice.

In 2014, The College of Medical Laboratory Technologists of Ontario, Canada, engaged its members to evaluate their understanding of scope of practice in a survey and found that more than two-thirds of respondents were not aware of their scope of practice. Education around these matters is vital to ensure compliance (HPRAC, 2008). Although the HPCSA has defined scope of practice broadly, implementation is not monitored. Personnel in the laboratory environment may not be aware of the

limitations surrounding scope of practice and this could be a possible reason for its abuse.

In the questionnaire of this study, no definition was given to respondents on work ethic and the researcher relied on the respondents' own interpretation of this. Respondents felt that Medical Technologists had the best work ethic this remained below the "good" level. Respondents deemed Laboratory Assistants to have the poorest work ethic. It should be noted that most respondents to this survey were Medical Technologists and hence were rating their own work ethic. It is of great concern that work ethic was perceived to be below the "good" level among Medical Technologists in the laboratory. Guidelines surrounding work ethic in the laboratory should form part of the University curriculum for Medical Technology students. This is now addressed in the new BHSc degree curriculum.

5.6 Medical Technologists who have left the profession

This category assessed respondents who had ventured into alternate careers and the reasons surrounding the reasons for leaving. One of the limitations of this study was the small numbers of respondents who answered this section. Respondents cited "poor salaries" as the main reason for leaving the profession. According to Odubajo (2015), dissatisfaction of monetary benefits had caused staff to leave organisations or to not go to work. The highest number of professionals who left the profession belonged to the 25-34 age group, which also included the highest number of respondents unhappy with their career choice Young people sometimes have unreal job expectation and then realise what it really is about and become disillusioned Multiple studies in the nursing profession have shown that young nurses were the most willing to leave their job and the nursing profession (Flinkman, et al., 2013).

5.7 Limitations

Due to the Protection of Personal Information Act, (POPi Act). the HPCSA could not provide email addresses of members of the Professional Board for Medical Technology. As a result of this limitation a database was obtained from the SMLTSA, 23rd Medical Laboratory Professionals Congress in Port Elizabeth in 2015. When the database was received, the survey was sent to all congress attendees. The database did not indicate which participants of the congress were Medical Technologists or

Medical Technicians. This study had a response rate of 30.3% and the opinions of the respondents might not be representative of the entire profession.

In addition, the majority of the respondents were based in Gauteng. At the time of the study, Lancet and Ampath were in Gauteng, but not in the Western Cape. Similarly, Pathcare Laboratories operated in the Western Cape. During 2016/2017, Lancet Laboratories opened branches in Western Cape and Pathcare Laboratories are now situated in Gauteng. This might have created a bias with regards to employment in these particular provinces.

Limited access to computers in laboratories could have been a limitation in respondents downloading the surveys and responding. This was partially overcome by emailing links to private email addresses.

The delayed period of data collection should be taken into account in interpreting the results. The NHLS had a salary review in 2016 and the results of this study may not be a true reflection of current salaries; however, the results hold true for the time the research was undertaken.

Some aspects of this study relied on the respondent's interpretation of the different variables in the Likert scale questions. The nature of the Likert scale response options could also have led to various interpretations (for example, of- "satisfactory"). Literature on trends and perceptions of Medical Technologists and Medical Technicians in South Africa and elsewhere in the world, is deficient. This limited the researcher from gathering such information both in South Africa and the rest of the world.

5.8 Directions for future research

The research findings in this study provide a better understanding of the working environment through the perspective of Medical Technologists and Medical Technicians. Additional research is required to further investigate the work relationships in the industry as well as limitations within scope of practice. The findings of this study serve as a strong foundation for additional research on the topic of career happiness versus job satisfaction, salaries and retention of staff in medical laboratories. As pathology practices remain the biggest employers of Medical Laboratory personnel in South Africa, a survey considering the opinions of all laboratory personnel in the profession of Biomedical Laboratory Sciences in South

Africa should be considered. This may assist in strengthening working relationships in order to create a unified diagnostic service.

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APPENDIX
Appendix A: ETHICAL CLEARANCE

Cape Peninsula
University of Technology

HEALTH AND WELLNESS SCIENCES RESEARCH ETHICS COMMITTEE (HW-REC)
Registration Number NHREC: REC- 230408-014

P.O. Box 1906 • Bellville 7535 South Africa
Symphony Road Bellville 7535
•Tel: +27 21 959 6352 • Fax +27 21 953 8490
Email: danielso@cput.ac.za

27 June 2014
REC-230408-014-RA Level 01
H08

Biomedical Sciences Department

Dear Ms Moonira Mullah

APPLICATION TO THE HW-REC FOR ETHICAL CLEARANCE EXTENSION

Approval was granted by the Health and Wellness Sciences-REC on 11 June 2014 to Moonira Mullah for ethical clearance pending corrections that have been received and reviewed. This approval is for research activities related to an MTech: Biomedical Technology qualification at this institution.

TITLE: Global perspectives of the profession of Medical Laboratory Sciences.

Internal Supervisor: **Prof AJ Esterhuyse**

Internal Co-supervisor: **Ms J Hind**

Comment:
Approval will not extend beyond 27 June 2015. An extension should be applied for 6 weeks before this expiry date should data collection and use/analysis of data, information and/or samples for this study continue beyond this date.

The investigator(s) should understand the conditions under which they are authorized to carry out this study and they should be compliant with these conditions. **It is required that the investigator(s) complete an annual progress report with their application for an extension and a final report on completion of the study.**

Kind Regards

CHAIRPERSON – ETHICS RESEARCH COMMITTEE
FACULTY OF HEALTH AND WELLNESS SCIENCES

APPENDIX B: SMLTSA PERMISSION

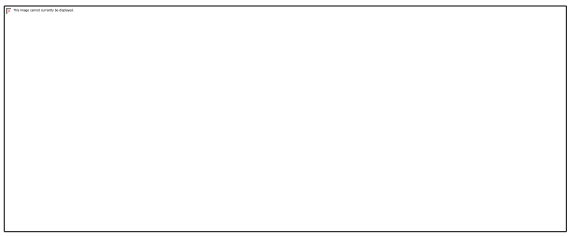
Society of Medical Laboratory Technologists of South Africa
P.O.Box 505, Howard Place, Pinelands, 7450
Unit B44, Pinelands Business Park, New Mill road, Pinelands, 7405
Phone: 021- 531 1231 Fax: 021-531 1233 e-mail: dalexander@iafrica.com

To whom it may concern

This serves to notify interested parties that the Society of Medical Laboratory Technologists of South Africa (SMLTSA) fully supports Ms. Moonira Mullah in her proposal to conduct research through her project entitled “Global Perspectives of the Profession of Medical Laboratory Sciences”. Her intention to embark on a review of the profession, its’ associated professional body and perceptions of its’ members regarding the profession, to evaluate the current state of Biomedical Laboratory Sciences in South Africa should prove to be of great value not only to the Society but to the medical laboratory services in the country. It is the view of the SMLTSA that Ms. Mullah be permitted to proceed with her Master’s Degree in this field.

President
Society of Medical Laboratory Technologists of South Africa
Pinelands
Cape Town

APPENDIX C: HPCSA PERMISSION



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Email: EmmanuelC@hpcsa.co.za
Website: www.hpcsa.co.za

Professional Board for Medical Technology

Chairperson
Education
Committee

J.V. Hind

Ms M. Mullah
Postgraduate student
Student No. 213300443
c/o Prof J Esterhuyse
Department of Biosciences
Faculty of Health and Wellness Sciences
CPUT,
Bellville
Western Cape

REFERENCE:

1. **Permission to conduct a master's project entitled "Global Perspectives of the Profession of Medical Laboratory Sciences" by Moonira Mullah.**

2. **Permission to be granted access to the PBMT HPCSA database.**

1. The Education Committee of the Professional Board for Medical Technology, at its meeting in November 2013, resolved that permission to conduct this research project is **not required** from the PBMT HPCSA. The Board wishes Ms Mullah well with this interesting project.

2. However, the request for access to the HPCSA PBMT database cannot be granted. The information in the database is confidential.

   Ms Mullah is welcome to avail herself of the HPCSA website from which she can obtain information on registration status of professionals under this Board. This will require fore knowledge of the professional's full names and/or registration number.

The PBMT again wishes you well in your research.
Please contact the PBMT administrator, Mr S Nhlapo if you need any further assistance.
Regards
(Mrs) J. Hind. MT (HPCSA) SHP; M. Tech. (Biomed. Tech.)
Chairperson
Education Committee

APPENDIX D: ETHICAL CLEARANCE 2

Cape Peninsula
University of Technology

HEALTH AND WELLNESS SCIENCES RESEARCH ETHICS COMMITTEE (HW-REC)
Registration Number NHREC: REC- 230408-014

P.O. Box 1906 • Bellville 7535 South Africa
Symphony Road Bellville 7535
Tel: +27 21 959 6917
Email: sethn@cput.ac.za

7 August 2018
REC Approval Reference No:
CPUT/HW-REC 2018/H18

Faculty of Health and Wellness Sciences – Nursing

Dear Ms Moonira Mullah

Re: APPLICATION TO THE HW-REC FOR ETHICS CLEARANCE

Approval was granted by the Health and Wellness Sciences-REC to Ms Mullah for ethical clearance. This approval is for research activities related to student research in the Department of Biomedical Technology at this Institution.

NB: The certificate had a very long lapse period, and therefore this is not retrospective approval.

TITLE: Global Perspectives of the Profession of Medical Laboratory Sciences

Supervisor: Dr K Grant

Comment:

Data collection permission is required and has been obtained.

Approval will not extend beyond 8 August 2019. An extension should be applied for 6 weeks before this expiry date should data collection and use/analysis of data, information and/or samples for this study continue beyond this date.

The investigator(s) should understand the ethical conditions under which they are authorized to carry out this study and they should be compliant to these conditions. It is required that the investigator(s) complete an **annual progress report** that should be submitted to the HWS-REC in December of that particular year, for the HWS-REC to be kept informed of the progress and of any problems you may have encountered.

Kind Regards

Dr Navindhra Naidoo
Chairperson – Research Ethics Committee
Faculty of Health and Wellness Sciences

APPENDIX E: RULES OF CONDUCT

RULES OF CONDUCT PERTAINING SPECIFICALLY TO THE PROFESSION OF MEDICAL TECHNOLOGY

A Medical Technologist, Medical Technician, an Intern Medical technologist and a student in biomedical technology shall adhere to the following rules of conduct in addition to the rules of conduct referred to in Rules 2 to 27. Failure by such Medical Technologist, Medical Technician, Intern Medical Technologist and student in biomedical technology to comply with the rules of conduct listed herein shall constitute an act or omission in respect of which the Board may take disciplinary steps in terms of Chapter IV of the Act.

1. Performance of professional acts by medical technologists

A Medical Technologist -

- Shall confine himself or herself to practising in the specific discipline of medical technology in which he or she was educated, trained and registered;
- Shall not conduct a private practice without obtaining –
- Postgraduate experience of at least two years and
- Prior written approval from the Board; and
- Shall, if he or she does not comply with the provisions of the regulations, perform professional Acts only under the direction of a medical practitioner or a medical technologist who complies with the provisions of the regulations and is registered in the relevant discipline, provided that this prohibition shall apply only to the acts excluded by the board.

2. Performance of professional acts by medical technician

A Medical Technician-

- Shall confine himself or herself to practising in the specific discipline of medical technology in which he or she was educated, trained and registered
- Shall perform professional acts only under the supervision of a medical practitioner or Medical Technologist who is registered in the relevant discipline; and
- Shall not conduct a private practice

3. Performance of professional acts by intern medical technologists

An Intern Medical Technologist -

- Shall perform professional acts only under the supervision of a practitioner who is registered in the relevant discipline;
- Shall limit the acts referred to in above paragraph to acts directly related to his or her education and training as part of the formal internship in his or her discipline of study;
- Shall not conduct a private practice; and
- If he or she has completed his or her internship, shall not perform any professional acts until he or she has satisfied all the academic requirements for registration as a Medical Technologist and has been registered as such.

4. Performance of acts by students in medical technology

A student in medical technology -

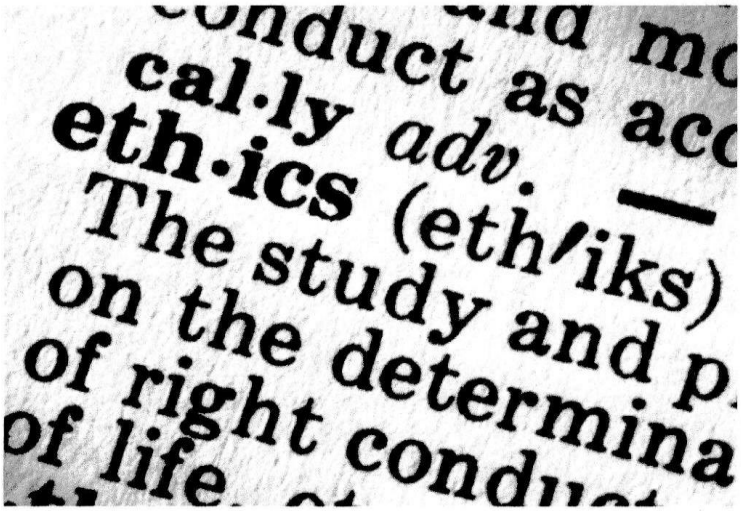
- Shall perform professional acts only under the supervision of a practitioner who is registered in the relevant discipline; and
- Shall limit the acts referred to in the above paragraph to acts directly related to his or her education and training in his or her discipline of study.

5. Performance of professional acts by Laboratory Assistants

A laboratory assistant -

- Shall confine himself or herself to performing acts in the specific discipline of Medical Technology in which he or she was educated, trained and registered;
- Shall perform professional acts only under the supervision of a Medical Practitioner or Medical Technologist who is registered in the relevant discipline; and
- Shall not conduct a private practice

Practitioners are urged to familiarise themselves with all the rules and regulations pertaining to their respective professions. These are available on the HPCSA website.



APPENDIX F: SCOPE OF PRACTICE (SANAS)

The Bulletin
sanas South African National Accreditation System
Newsletter of the South African National Accreditation System
Issue 9 December 2014

SCOPE OF PRACTICE
FOR MEDICAL TECHNICIANS

There has been confusion over the years regarding the scope of practice for medical Technicians, according to Medical Technician Qualifications, a Medical Technician needs to work under supervision.

SANAS assessors and accredited facilities have different interpretation of what 'working under supervision' means, as a result SANAS consulted the Health Professions Council of South Africa (HPCSA) to seek clarity on this matter. The following points were highlighted by HPCSA to clarify the scope of practice for a medical technician:

a) With regard to Medical Technicians working as Laboratory Supervisors: the Board advises that it is not acceptable for a Technician to "supervise" a Training Laboratory. A Medical Technologist can supervise intern trainee medical technicians in preparation for the Board Examinations: i.e. A Medical Technologist may be appointed as the Training Officer. However, a Medical Technician can supervise/manage the Administration components of the Laboratory including the duty rosters etc. but not the Technical Component of the Laboratory.

b) The Technician Supervisor may sign off case sheets containing laboratory data (raw data) provided a Medical Technologist signs all reports immediately after verification. This system must allow sufficient measures to minimize possible errors.

c) Technicians may enter test results on the IT system provided the verification of the results is done by a Technologist. Medical Technicians must not verify/authorize results.

d) If a Technologist works in a laboratory supervised by a Technician, it is acceptable for a Technologist to report to a Technician on administrative issues only but not on SOP related tasks/interpretation of results or any Technical related issues.

e) Student Technicians are required to indicate a category of choice at the time of registration. This requirement was not the case for students who registered before the Board approved the new form 53. The previous form did not require student technicians to indicate their chosen category and this led to instances where some students Technicians were registered without a category. The HPCSA Board has undertaken to correct this error.

f) The scope of practice of a Technician is determined by the education and training outcomes which the Technician was exposed to.

All medical laboratories need to comply by these guidelines, correspondence received from Mr E Chanza, Professional Board Manager at the HPCSA.

SANAS offices will be closed from 24 December 2014 and open on 05 January 2015.

CONTACT INFORMATION
SANAS website: www.sanas.co.za | **Main Switchboard No:** +27 (0) 12 394-3760 | **General Fax No:** +27 (0) 12 394-0526 | **Physical Addresses: the dti** Campus, Block G, Ground Floor | 77 Meintjies Street, Sunnyside, Pretoria | **SANAS Knowledge Transfer Centre:** 121 Muckleneuck Street Nieuw Muckleneuk | Pretoria | 0002 | Private Bag X23 | Sunnyside | Pretoria | 0132

APPENDIX G: QUESTIONNAIRE INVITATION/COVERING LETTER

I currently hold a BTech Degree in Biomedical Technology and am registered as a master's postgraduate student at the Cape Peninsula University of Technology.

I am conducting research on the status of the medical technology profession in South Africa, in an attempt to provide guidelines to professional bodies. The outcome of this study will be compared internationally.

Participation in this study is voluntary; however your participation will benefit the outcomes of this study and our profession in South Africa.
Participants can withdraw from the study at any time if they wish.
If you wish to participate in this study please answer the attached questionnaire as honestly as possible.

All details in this study are confidential, and your questionnaire will be allocated a research number, your name will not be used in this study and only group data will be reported.

Any queries with regard to this study can be emailed to mullahm@telkomsa.net.
or
Project Supervisor
Jenny Hind
0833255308

Ethics inquiries can be addressed to
Chairperson: Research Ethics Committee
Health and Wellness Sciences
Bellville Campus, CPUT, Cape Town, South Africa
Tel: 0219596570

Thank you
Moonira Mullah
0828202870 (+27 82820 2870)