

Socio-demographics and Post-Apartheid Medical Training at the Nelson R  
Mandela School of Medicine

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## ABSTRACT

The Nelson R Mandela School of Medicine (NRMSM) is an important stakeholder in the training of doctors. Like other South African medical schools, NRMSM's programmes and policies are guided by institutional and governmental legislation in response to a series of post-apartheid challenges such as transformation, redress, access and success. South Africa's health workforce is dependent on the number (and profile) of post-secondary school leavers who gain access to the medical training platform and achieve success therein. It is questioned whether NRMSM is achieving the legislated targets for the training of doctors in post-apartheid South Africa. The research reported in this dissertation documented the socio-demographic profiles of race, gender, age, educational qualifications, and background and geographic origins (and the changes therein) of applicants and admitted students to the MBChB programmes between 1995 and 2005. In addition, it documented the number of students admitted from disadvantaged educational backgrounds as well as their success rates. This quantitative, objectivist and positivist research study involved secondary data collection from existing databases from the University of KwaZulu-Natal, the Department of Basic Education and other sources. The data was cleaned and subjected to descriptive and correlational statistical analyses. The results from the analyses revealed that, between 1995 and 2005, there was an increase in the ratio of applicants to admitted students, and the majority of applicants and admitted students were Black, female, matriculants (aged between 18-21 years) and residents of KwaZulu-Natal from advantaged (fee-paying) schools. NRMSM has admitted a small number of applicants from non-fee paying schools. However, when compared to a first year failure-rate of 10.5% for admitted students from fee-paying schools, admitted students from non-fee paying schools experienced an average failure rate of 35%. At NRMSM, race continues to be an important admission criterion and higher numbers of females and matriculants from KwaZulu-Natal are admitted. These redress targets enhance gender and race representivity in the health workforce in the province, as students admitted from KZN are more likely to remain in KZN after qualification. Although increased access to medical higher education within the non-fee paying school cohort also contributes to national access and redress initiatives, the high failure rate among this cohort implies that additional resources should be provided to improve success in this group of students.

## DECLARATION

This dissertation is submitted in partial fulfilment of the requirements for the degree of:  
**Master of Education (Higher Education), MEd (Higher)**, the Graduate Programme in the  
School of Education, College of Humanities and Social Science, University of KwaZulu-Natal,  
Pietermaritzburg, South Africa.

I, **Navin Sunderlall**, declare that

1. The research reported in this dissertation, except where otherwise indicated, is my original research
2. This dissertation has not been submitted for any degree or examination at any other university.
3. This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.
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6. This dissertation has been checked for originality and the originality report is contained in Appendix 1 of this document.

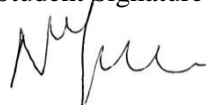
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## **DEDICATION**

This dissertation is dedicated to my wife, Prathna Bhola, and my children Kiaav and Shiuli for their understanding and patience during the writing of this document.

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## LIST OF ACRONYMS

1	APS	Academic Performance Score
2	CHS	College of Health Sciences
3	CSP	Community Service Professional
4	DBN	Durban
5	DET	Department of Education and Training
6	DHET	Department of Higher Education and Training
7	DMI	Division of Management Information
8	DoE	Department of Education
9	DoH	Department of Health
10	DoL	Department of Labour
11	EMIS	Education Management Information System
12	HPCSA	Health Professions Council of South Africa
13	HST	Health Systems Trust
14	HSPT	Health Sciences Placement Test
15	ITS	Integrated Tertiary Software
16	KZN	Province of KwaZulu-Natal
17	KZNHealth	KwaZulu-Natal Department of Health
18	MBChB	Bachelor of Medicine and Bachelor of Surgery
19	MBChB5	5-year MBChB degree (2001-2009)
20	MBChB6	6-year MBChB degree (-2000)
21	MS	Medical School
22	NSSSF	National Norms and Standards for School Funding
23	NRMSM	Nelson R Mandela School of Medicine
24	NSC-DEG	National Senior Certificate for Degree Studies
25	PMB	Pietermaritzburg
26	SMS	Student Management System
27	TRC	Truth and Reconciliation Committee
28	UCT	University of Cape Town
29	UK	United Kingdom
30	UKZN	University of KwaZulu-Natal
31	UL	University of Limpopo
32	UN	University of Natal
33	UNMS	University of Natal – Medical School
34	US	United States (of America)
35	WITS	University of Witwatersrand

# CONTENTS

ABSTRACT.....	i
DECLARATION .....	ii
DEDICATION .....	iii
ACKNOWLEDGEMENTS.....	iv
LIST OF ACRONYMS.....	v
<b>CONTENTS</b> .....	vi
LIST OF TABLES.....	xi
LIST OF FIGURES.....	xii
GLOSSARY.....	xiii
1. Access: exposure to higher education, gaining admission to, or, being admitted to higher education, from previously and currently (educationally) disadvantaged persons. This is related to non-fee paying schools.....	xiii
CHAPTER ONE: BACKGROUND AND CONTEXT .....	1
1.1. INTRODUCTION.....	1
1.2. BACKGROUND AND CONTEXT.....	2
1.2.1. Higher (Medical) Education and Healthcare Delivery in Post-Apartheid South Africa.....	2
1.2.2. The Platform for the Training of Doctors.....	3
1.2.3. A Brief History of the Nelson R Mandela School of Medicine (NRMSM).....	4
1.2.4. A Brief History of the Admission Policies at NRMSM.....	4
1.2.5. A Brief History of the Programmes (and Admission Criteria) offered at NRMSM.....	5
1.3. FOCUS AND SIGNIFICANCE.....	5
1.3.1. Access and Redress at NRMSM.....	5
1.4. RESEARCH QUESTIONS.....	7
1.5. CONCLUSIONS.....	7
CHAPTER TWO: LITERATURE REVIEW .....	9
2.1. INTRODUCTION.....	9
2.2. INTERNATIONAL EXPERIENCES and TRENDS IN APPLICANT PROFILES.....	9
2.2.1. Numbers and Ratios.....	10
2.2.2. Gender .....	10

2.2.3.	Age and Graduate Entry Programmes .....	11
2.3.	THE SOUTH AFRICAN EXPERIENCE .....	11
2.3.1.	Socio-demographic Profiles - The University of Cape Town Experience .....	12
2.3.2.	Measures of Disadvantage.....	12
2.3.3.	Access and Redress in South Africa.....	14
2.4.	HEALTH WORKFORCE DISTRIBUTION.....	15
2.4.1.	The Global Picture.....	15
2.4.2.	The South African Perspective .....	16
2.5.	THE SOUTH AFRICAN SCHOOLING SYSTEM and the PREDICTORS OF SUCCESS .....	18
2.6.	THEORETICAL FRAMEWORK .....	19
2.7.	CONCLUSION.....	20
CHAPTER THREE: RESEARCH METHODOLOGY .....		21
3.1.	INTRODUCTION .....	21
3.2.	THIS RESEARCH .....	21
3.3.	DATA COLLECTION .....	21
3.4.	DATA CLEANING and MANIPULATION .....	22
3.4.1.	DMI Databases .....	22
3.5.	VARIABLES, STATISTICS AND REPORTING .....	23
3.6.	DESIGN LIMITATIONS.....	24
3.7.	ETHICS .....	24
3.8.	CONCLUSION.....	25
CHAPTER FOUR: RESULTS .....		26
4.1.	INTRODUCTION.....	26
4.2.	APPLICANT PROFILES .....	27
4.2.1.	NUMBER OF APPLICANTS.....	27
4.2.1.1.	Overall Number of Applicants to the NRMSM.....	27
4.2.1.2.	Number of Applicants per Programme.....	27
4.2.1.3.	Number of Repeat Applicants.....	28
4.2.2.	RACE.....	29
4.2.2.1.	Overall Race Profile of Applicants.....	30
4.2.2.2.	Race Profile of Applicants per Year and Programme.....	30
4.2.3.	GENDER.....	31



4.2.3.1.	Overall Gender Profile of Applicants .....	31
4.2.3.2.	Gender Profile of Applicants per Year .....	32
4.2.4.	AGE.....	32
4.2.4.1.	Overall Age Profile .....	32
4.2.4.2.	Age Profile in 18-21 year Age Category .....	33
4.2.4.3.	Number of Matric and Mature Applicants in 18-21 year Age Category .....	33
4.2.5.	MATRIC and MATURE APPLICANTS.....	34
4.2.5.1.	Overall Number of Matric and Mature Applicants .....	34
4.2.5.2.	Matric and Mature Applicants per Year.....	35
4.2.6.	GEOGRAPHICAL ORIGINS OF APPLICANTS.....	36
4.2.6.1.	Provincial (KZN vs. non-KZN) Distribution of Applicants.....	36
4.2.6.2.	Racial Profile of Applicants by Provincial Origins.....	37
4.2.6.3.	Regional Origins of KZN Applicants.....	40
4.2.6.4.	Racial Profiles of Applicants from KZN by Regions. ....	41
4.2.7.	APPLICANTS FROM DISADVANTAGED (Non-Fee Paying) SCHOOLS.....	41
4.2.7.1.	KZN vs non-KZN Applicants from Non-Fee Schools .....	42
4.2.7.2.	Racial Profile of Applicants from Non-Fee Paying Schools .....	43
4.2.8.	SUMMARY OF APPLICANT DATA.....	43
4.3.	ADMITTED STUDENT PROFILES.....	44
4.3.1.	NUMBER OF ADMITTED STUDENTS .....	44
4.3.2.	RACE.....	45
4.3.2.1.	Overall Race Profile of Admitted Students .....	46
4.3.2.2.	Racial Profile per Year – Newly Admitted Students.....	47
4.3.3.	GENDER.....	47
4.3.3.1.	Overall Gender Profile.....	48
4.3.3.2.	Gender Profile per Year .....	48
4.3.4.	AGE.....	49
4.3.4.1.	Overall Age Profile of the (First Year) Student Population .....	49
4.3.4.2.	Matric and Mature First Year Students in 18-21 Age Category .....	50
4.3.5.	MATRIC and MATURE FIRST YEAR STUDENTS .....	50
4.3.5.1.	Overall Number of Matric and Mature Students Admitted.....	50
4.3.5.2.	The Quota of Matric and Mature Students .....	51

4.3.6.	GEOGRAPHICAL ORIGINS of the STUDENT POPULATION .....	52
4.3.6.1.	The Provincial Residential Origins of the Student Population .....	52
4.3.6.2.	Racial Profile of Admitted Students by Province .....	53
4.3.6.3.	Profile (Race and Number) of Students who are Residents in KZN .....	54
4.3.7.	STUDENTS ADMITTED from DISADVANTAGED SCHOOLS .....	54
4.3.8.	SUMMARY of ADMITTED STUDENTS DATA .....	55
4.4.	SUCCESS RATES OF STUDENTS FROM DISADVANTAGED EDUCATIONAL BACKGROUNDS .....	56
4.4.1.	PROPORTION OF ADMITTED STUDENTS TO APPLICANTS per COHORT .....	56
4.4.2.	SUCCESS RATES OF STUDENTS FROM FEE PAYING AND NON-FEE PAYING SCHOOLS.....	57
4.4.3.	SUMMARY .....	58
4.5.	STATISTICAL CORRELATIONS.....	59
4.5.1.	NUMBERS AND RATIOS of APPLICANTS AND ADMITTED STUDENTS .....	59
4.5.2.	RACE .....	59
4.5.3.	GENDER.....	59
4.5.4.	AGE.....	60
4.5.5.	MATRIC and MATURE .....	60
4.5.6.	GEOGRAPHICAL ORIGINS .....	60
4.5.7.	FEE-PAYING vs. NON-FEE PAYING SCHOOLS.....	61
4.5.8.	FIRST YEAR RESULTS.....	61
CHAPTER FIVE: DISCUSSION.....		62
5.1	INTRODUCTION .....	62
5.2.	NUMBER OF APPLICANTS AND ADMITTED STUDENTS .....	62
5.2.1.	APPLICANT to ADMISSION RATIO .....	62
5.3.	RACE .....	65
5.4.	GENDER.....	66
5.5.	AGE.....	68
5.6.	MATRIC and MATURE .....	69
5.7.	GEOGRAPHICAL ORIGINS .....	70
5.8.	FEE-PAYING vs. Non-FEE SCHOOLS (DISADVANTAGED SCHOOLS) .....	70
5.9.	RESULTS OF FIRST YEAR MBChB STUDENTS .....	71
5.10.	CONCLUSION.....	72
CHAPTER SIX: SUMMARY, CONCLUSION and RECOMMENDATIONS.....		74

6.1. INTRODUCTION .....	74
6.2. SUMMARY .....	74
6.3. IMPLICATIONS AND RECOMMENDATIONS.....	76
6.4. FUTURE RESEARCH.....	78
6.5. CONCLUSION.....	79
REFERENCES.....	80
APPENDICES .....	82
Appendix 1: Turnitin Originality Report .....	82
Appendix 2: Gate Keepers Letter .....	83
Appendix 3: Ethics Approval .....	84

## LIST OF TABLES

Table	Description	Page
4.2.1	The Numbers and Percentages of Applicants per Year (1995-2005).....	27
4.2.2	Race Profile of Applicants per Year.....	30
4.2.3	Number of Applicants 18-21 year Age Category.....	33
4.2.4	Description of KZN Regions.....	40
4.2.5	Regional Origins of KZN Applicants.....	40
4.2.6	Racial Profile of Applicants from KZN.....	41
4.2.7	Applicants from “No-fee” Schools per Year (1995-2005).....	42
4.3.1	Enrolled students, New Admissions and Repeat Students per Year.....	44
4.3.2	The Number of Matric and Mature Students.....	51
4.3.3	The Distribution of Admitted Students by Provincial Origins.....	52
4.3.4	Racial profile of Students Admitted by Province.....	53
4.3.5	Number and Racial Profile of Students Admitted by KZN Region.....	54
4.3.6	Number of Students Admitted from “Non-Fee paying” Schools per Year.....	55
4.4.1	Admissions and Results of Students Admitted per Year.....	57
4.4.2	Students who Failed per Year from Fee-Paying and Non-Fee Paying schools.	57
4.4.3	Failure Rates per Programme.....	58
5.1.1	Distribution of Matric and Mature Students in the 18-21 Age Category.....	69

## LIST OF FIGURES

Figure	Description/Title of Figure	Page
4.2.1	The Number of Applicants per Programme .....	28
4.2.2	Percentage of Reapplications per Year (1995-2005).....	29
4.2.3	Race Profile of Applicants per Year (1995-2005).....	31
4.2.4	Overall Gender Profile of Applicants (1995-2005).....	31
4.2.5	Gender Profile of Applicants per Year (1995-2005).....	32
4.2.6	Age Profile of Applicants (1995-2005).....	33
4.2.7	Matric vs Mature Applicants in 18-21 Age Group.....	34
4.2.8	The Number of Matric vs Mature Applicants (1995-2005).....	35
4.2.9	The Number of Matric vs Mature Applicants per Year (1995-2005).....	35
4.2.10	The Geographical Origins of Applicants (1995-2000).....	37
4.2.11	The Geographical Origins of Applicants per non-KZN Province .....	37
4.2.12	Number of Applicants by Race per Region.....	39
4.2.13	The Number of Applicants from Non-Fee Paying Schools by Province...	43
4.3.1	The Racial Profile of Admitted Students (1995-2005) .....	46
4.3.2	Race Profile of Admitted Students by Year (1995-2005) .....	47
4.3.3	Gender Profile of Students Admitted to NRMSM (1995-2005).....	48
4.3.4	Gender Profile of Newly Admitted Students (1995-2005) .....	48
4.3.5	The Age Profiles of Admitted Students (1995-2005).....	49
4.3.6	The Number of Matric and Mature Students Admitted .....	50
4.3.7	The Percentage of Mature Students Admitted per Year (1995-2005).....	51
4.3.8	The Number of Students Admitted per non-KZN Province (1995-2005)	53
5.1.1	Ratio of Vacancies to Applicants per Year (1995-2005) .....	63
5.1.2	Number of Applicants and Students Admitted per Age Category (18-21)	68

## **GLOSSARY**

The following terms are used in the study and should be taken to mean:

1. Access: exposure to higher education, gaining admission to, or, being admitted to higher education, from previously and currently (educationally) disadvantaged persons. This is related to non-fee paying schools.
2. Redress: strategy to increase admission to higher education by previously disadvantaged (on racial grounds) groups.
3. Success: refers to progression through the various modules in the first year of the MBChB programme

# CHAPTER ONE: BACKGROUND AND CONTEXT

## 1.1. INTRODUCTION

The education and training of a doctor in South Africa is a process which involves the interaction of various national and provincial government departments, higher education institutions, health care facilities and communities. Each of these departments, institutions, facilities and communities experience a series of post-apartheid challenges such as transformation, access and success, attaining equitable socio-demographic profiles, and health workforce distribution. For individuals and families, becoming a doctor is a long, expensive and complex process, which commences in the secondary schooling phase and the challenges associated with gaining access to the medical schools. Once admitted to medical school the next challenge facing learners is their preparedness for the programmes and then the associated financial burden. For medical schools and universities the challenges include attracting, retaining and graduating the appropriate numbers of appropriately qualified learners from the appropriate groups in order to satisfy not only their own policies and requirements but that of the government. For the government departments that provide the legislative framework for the education and training, employment and deployment of doctors in South Africa the challenges include: funding, adequate staffing levels in the public sector as well as the appropriate deployment of suitably qualified doctors to all regions of the country. Despite these challenges, South Africa is producing doctors on an annual basis; however, it is questioned whether this process is efficient, equitable, and just. Does the number of doctors produced equate to the socio-demographic profiles of the country and is this sufficient to meet the growing demands of health care provision in the country?

In light of the above, the Nelson R Mandela School of Medicine (NRMSM) in the College of Health Sciences (CHS) at the University of KwaZulu-Natal (UKZN) is an important stakeholder in the education and training of doctors in KwaZulu-Natal (KZN) and in the South African context. Many of the challenges (as detailed above) experienced by the various departments, institutions, facilities, communities and individuals are relevant to and affect all stakeholders in varying degrees, and each stakeholder has sought answers and solutions to address the challenges.

The research reported in this dissertation however, explores only on one sector of the complex interaction of the various groups (i.e., NRMSM and the challenges it faces related to issues of access and redress and success). In this regard, Chapter 1 sets the scene for this research and describes the background and context as well as the focus and significance of the research. Chapter 2 reviews the relevant literature while Chapter 3 provides the methodology and methods employed. The results, a discussion of the results and the implications of these to the various stakeholders and the summary and conclusions are addressed in Chapters 4, 5, and 6 respectively.

## **1.2. BACKGROUND AND CONTEXT**

In section 1.1, some of the changes that affected higher education, medical education, and health-care delivery in South Africa in the post-apartheid era were explored. Furthermore, the interactions and requirements of the various government departments in the provision of education and training of doctors, the provision of a health workforce (doctors) and the health delivery needs of the country are explored. In addition, the medical training platform in South Africa, with particular reference to NRMSM in terms of its own institutional history as well as its history in the context of South Africa; its admissions policy (numbers, quotas, criteria) will be discussed. Finally, issues around access and redress affecting UKZN and NRMSM will be addressed. There will be a brief discussion on the classification of schools and the quintile system and finally, the focus and rationale for this study and the key research questions will be addressed.

### **1.2.1. Higher (Medical) Education and Healthcare Delivery in Post-Apartheid South Africa**

The South African socio-political and higher education landscape has undergone several significant changes since 1994. In particular, the transition to democracy brought to the fore the urgent need to address the history of inequities in resource distribution in the country, this being especially pertinent in the higher education and health care sectors. Since 1994, processes around redistribution, realignment, reorganisation and rebuilding of all domains of South African society have been embarked upon. These processes saw the implementation of several new policies, and a major overhaul in the delivery of higher education and healthcare in the country. Some of these included:

- 1) the mergers of several higher education institutions
- 2) increased access to higher education institutions by historically disadvantaged communities
- 3) the roll out of the district health system
- 4) the introduction of compulsory community service training for newly qualified doctors
- 5) the increase in the duration of internship training (two years) for medical graduates
- 6) the desire by government to increase the intake (and subsequently increase the number of graduates) of medical students to 2 400, nationally, per annum by 2014 (Breier, 2008).

However, despite the abovementioned changes, disparity still exists in the demographics of graduates from medical schools in South Africa as well as in the distribution of the medically qualified workforce between urban and rural environments (Breier & Wildschut, 2006; HST, 2007; KZNHealth, 2010).

In terms of providing a health workforce for the country, the Department of Health (DoH) (and Labour) provides the framework for the delivery and distribution of healthcare, while the DoH and Department of Education (DoE) provide the training platform for the maintenance and sustenance of the workforce. One of the greatest challenges facing these departments (apart from providing adequate numbers) is the equitable distribution of the workforce among all communities in South Africa. In this regard, a great disparity exists in, firstly, the number of



doctors in urban areas as compared to the rural areas and, secondly, in the number of appropriately qualified doctors in these areas (Breier & Wildschut, 2006; HST, 2007; KZNHealth, 2010). In addition, both departments (DoH and DoE) are responsible for ensuring that there is equitable access to this training platform by all South Africans in the appropriate proportions, ratios and quotas in order to serve the regional, provincial and national needs; while simultaneously and consciously ensuring redress of past inequalities experienced by disadvantaged communities in keeping within the framework of the DoL (in terms of equity).

### **1.2.2. The Platform for the Training of Doctors**

The platform for the training of doctors is provided by the medical schools aligned to the Universities of KwaZulu-Natal (UKZN), Cape Town (UCT), Stellenbosch (US), Pretoria (UPE), Free State (UFS), Witwatersrand (WITS), Walter Sisulu University (WSU) and the University of Limpopo (UL) through the former Medical University of South Africa (Medunsa). All are likely to be committed to redressing the disadvantages, inequities and imbalances of the past and to promote access to higher education that will expand educational and employment opportunities for the historically disadvantaged communities. Furthermore, the mission statements of the NRMSM and UKZN as well as the DoE's policy on undergraduate access and admission also states that they are committed to redressing the disadvantages, inequities and imbalances of the past and to promoting access to learning that will expand educational and employment opportunities for historically disadvantaged individuals (UKZN, 2005). More specifically, the NRMSM, in its policy statement on admissions (UKZN, 2013), is guided by the University's mission statement and aims to redress past racial inequalities in the production of doctors (James, Ferguson, Powis, Symonds, & Yates, 2008).

Furthermore, the medical workforce should be able to address the need for doctors in all communities and areas and reflect the demographics of the region and the country. This can only be achieved through promoting and ensuring that student profiles reflect the demographic composition of South African society (Breier, 2008). In order for this to occur (i.e., for the workforce and student profiles to reflect the demographics of the South African society); an affirmative action policy has to be adopted. This needs to occur alongside the need for greater access to higher education, in general, and more specifically to medical training by groups and communities deemed to have been disadvantaged (educationally, financially and socially) in the oppressive apartheid era. To date, all institutions use race, and in particular, Black (denoting African, Coloured and Indian) as a measure of previous disadvantage and hence have adjusted their admission policies to increase access to these race groups. However, several institutions, have initiated debates around the justness and appropriateness of using race as a factor in determining "disadvantage". Specifically, it has been questioned whether there are any other measures of "disadvantage" in the South African context (Breier, 2008; Soudien, 2010)

Post-apartheid South Africa has inherited an unbalanced higher education landscape. There are institutions which were historically exclusively designated for White students and there were those which were historically "Black" and as such did not receive the same resources as their "White" counterparts and were deemed "disadvantaged". It is in the latter category the NRMSM finds itself. In order to appreciate this disparity, one needs to place the NRMSM in its socio-political context and the institution's submission to The Truth and Reconciliation Commission (TRC) in 1997 provides this. The following provides a brief summary of the document.

### **1.2.3. A Brief History of the Nelson R Mandela School of Medicine (NRMSM)**

The Nelson R Mandela School of Medicine was established in 1951 by Drs John McCord and Alan Taylor for the training of Black (non-White) doctors, who would, according to the Government, serve the Black population. This institution was aligned to the University of Natal (UN) and was initially called the “University of Natal Non-European Section”. The name changed to “University of Natal Black Section” and subsequently to “University of Natal Medical School”. In the post-apartheid era the Medical School adopted the name of the first democratically elected President and became known as “Nelson R Mandela School of Medicine”.

The newly established institution (which was solely for Black students) found it difficult to find an adequate number of suitably qualified Black Africans who met the stringent academic requirements for access into the medical school. This was probably due to the inferior and often inappropriate primary and secondary educational opportunities available to Blacks and hence their poor results in the matriculation examination (Myburgh, 2007). Furthermore, the admission requirements included Mathematics and sciences as compulsory subjects, and the performance in these two subjects were historically poor. Indian students on the other hand, performed better than African students in Mathematics and sciences and in the matriculation examination overall. This was attributable to the availability of resources in schools. As a result more Indian students were admitted per year into the MBChB programme and the student body became dominated by them. In order to increase the number of African students admitted to the programme, the University imposed a quota system, which made provision for an intake of 50% Black Africans and 50% Indian and Coloured students (University of Natal, 1997). Despite this, the student body was still dominated by Indian students partially because of the lack of suitably qualified Black African learner applicants and partly because of the high failure and drop-out rate among the Black Africans (University of Natal, 1997). In the post-apartheid era and after much debate the Medical School began accepting White students for admission in 1995 (University of Natal, 1994), and subsequently adopted a new quota, which was more representative of the demographics of the region (i.e., Black African 69%; Indian 19%; Coloured 9%; White 3%) (Sunderlall, 2012).

### **1.2.4. A Brief History of the Admission Policies at NRMSM**

With regard to current admission to NRMSM (UKZN, 2013), students gain entry into the first year either immediately after completing their secondary schooling (i.e., matriculation) or as “mature” students. A mature student is defined as those students who have completed matric/grade 12 and meet or exceed the minimum requirements for entry into medical school and who have undertaken a year or more of study at a higher education institution towards a relevant qualification. This group is further subdivided into three categories; those in the process of completing their degrees, those from access programmes, and graduates with health science degrees. Furthermore the admission policies and criteria have changed over the years. The initial use of the matric aggregate score and the points system was replaced by a more robust selection process which involved four parameters: matric score; biographical questionnaire; report by the school principle and an interview. This system was changed and the latter three parameters used in the selection were dropped in favour of the Health Sciences Placement Test (HSPT) or AARP (Alternative Access Research Project). The new system required a combination of the Matric

aggregate (70%) and the HSPT score (30%). Candidates were then ranked according to their race and competed within their race categories. The present<sup>1</sup> criteria requires the aggregate of at least 65% of six subjects, of which four (Mathematics, English, Physical Sciences and Life Sciences) are compulsory. This requirement has evolved from an era which considered only school leavers who had taken a science track with English and Mathematics; to an era that did not place any emphasis on the choice of subjects in secondary school to the present situation where the four compulsory subjects are stipulated.

It must be noted that during the period in which this study is focussed the selection process was blind to gender, age, regional origin and educational background.

### **1.2.5. A Brief History of the Programmes (and Admission Criteria) offered at NRMSM**

Prior to 2001, the NRMSM offered a traditional, teacher centred, didactically delivered six year programme (MBChB6). In this programme, first year modules included Chemistry, Physics, Biology, Community Health, Anatomy and Physiology. These modules were single discipline, stand-alone modules and students could not progress if they did not pass them. For this programme (MBChB6) the admission criteria required applicants to have obtained a matriculation exemption and a higher grade pass in English, Mathematics, Physical Science and Biology.

In 2001, the NRMSM changed its programme to an integrated, student-centred, problem-based learning (PBL) programme. The new programme was five years in duration (MBChB5) and the new modules were integrated, multi-disciplinary modules. The admission criteria for the MBChB5 programme changed as well. Physical Science and Biology were now no longer a requirement for entry into the programme.

## **1.3. FOCUS AND SIGNIFICANCE**

### **1.3.1. Access and Redress at NRMSM**

There has always been extremely fierce competition for the places at medical schools (Breier & Wildschut, 2006; Colborn, Kent, & Leon, 1995; Cuca, 1977) and hence there has never been a shortage of applicants for medical undergraduate programmes across the world. The NRMSM is no exception and filling all available vacancies in the medical undergraduate programme is not problematic. NRMSM has always attracted the academic elite (i.e., those students who performed well, academically in the matriculation examinations from both public and independent schools across South Africa). The implication of this was (and still is) that applicants from well-resourced schools have had a better chance of being admitted to the programme than those from schools in poor communities with poorly resourced schools. This is despite their racial categorisation, because of the link between available (and better) resources and improved results, coping skills, interviewing skills, and biographical information.

It is with this in mind that NRMSM and UKZN have acknowledged the need to widen access to include those students who have attended historically and presently disadvantaged schools.

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<sup>1</sup> From 2010 to present

Currently the only measure of disadvantage is race (i.e. Black African). In addition, NRMSM (and UKZN) has also acknowledged that widening access will only contribute to redress if it is linked to success (UKZN, 2005). In widening access the University has committed itself to not only admitting students who meet the stated criteria but also to students who demonstrate the potential to succeed in a rigorous undergraduate programme. The admission of these students, who show potential to succeed, is in essence widening access. However, the link between access and success can only be achieved by the provision of appropriate academic, psycho-social and economic support (Jama, Mapesela, & Beylefeld, 2008; Zewotir, North, & Murray, 2011) in order to ensure that the students who have been admitted from educationally disadvantaged schools are able to cope with the demands of being a student in an institution of higher education.

Therefore in order to link access to success NRMSM faces several challenges. The first challenge for NRMSM is to identify these students who will require academic development and support. The second challenge is to ensure that support programmes are designed, developed and implemented in a friendly and non-threatening environment. The third challenge is to ensure that the appropriate support is provided without the stigma of the support programme being developed and implemented along racial grounds and hence being labelled as a race-based (and therefore potentially racist) intervention. Finally, appropriate resources (funding) for such a programme must accompany any intervention. It is therefore difficult, if not impossible, for the institution to strike a balance between the need to provide improved access, which is not racially motivated and provide support programmes which do not have the racial stigma attached to it. The University and the NRMSM must accept that if it is increasing access by admitting students who are educationally disadvantaged from any population group then certainly the support programmes will focus on this group. A possible (indirect) outcome of the study reported in this dissertation is the identification of the need for additional academic support for students who enter the programme from educationally disadvantaged backgrounds. In addition, this potential outcome could also help in determining whether any aspect of the socio-demographic profiles of admitted students can be used to predict the need for academic support.

The question remains then as to whether the profile of applicants and successful admissions reflect the institutional and national redress requirements. While the setting of targets is essential for both access and redress, the NRMSM must explore the context in which it is currently used, in that, it addresses only one aspect related to past inequalities, *viz.* race; and the question remains as to whether this is still currently appropriate. Soudien (2010) asks whether social class can be used as a currency to measure disadvantage and in terms of this could the school from which the learner is admitted be used to measure disadvantage rather than race alone?

Apart from the racial quota/targets and matric vs. mature students, the NRMSM did not state that it would also set targets for other variables such as gender, ethnicity, socio-economic status, age, geographic origin (rural vs. urban; KwaZulu-Natal residents vs. non KwaZulu-Natal residents) and educational background of students. Therefore, this study aims to:

- 1) document the post-apartheid socio-demographic profiles of applicants and successful admissions to the MBChB programme at NRMSM;
- 2) determine the nature of the changes in the socio-demographic profiles (if any), with a particular focus on educational disadvantage and race;

- 3) theorise whether the possible changes in the profiles had any implications for the programme (and the institution) in terms of the provision of academic support;
- 4) make recommendations (based on findings in 1-3 above) to the administrators of the new College of Health Sciences (CHS) regarding the current admissions policy.

However, it must be noted that in 2012 the CHS indicated in its current admissions policy (UKZN, 2013) that it would admit approximately 20% of the students, in each race category, from no-fee schools. This is a step forward in addressing access to educationally disadvantaged populations of the country. However, it would be relevant to inquire about the implications for the CHS in terms of success of these students.

#### 1.4. RESEARCH QUESTIONS

The key questions that were asked in the study that informed this dissertation included

1. What was the socio-demographic profile of applicants to the NRMSM MBChB programme after 1994 (from 1995-2005)?
2. What was the socio-demographic profile of students admitted to the NRMSM MBChB programme after 1994 (from 1995-2005)?
3. What proportion of students admitted to the programme were from educationally disadvantaged backgrounds and what was the success rates of these students compared to those from “educationally advantaged” backgrounds?
4. How does the profile of the **applicants** to the NRMSM MBChB programme compare to the profile of **students admitted** to the NRMSM MBChB programme after 1994 (from 1995-2005), when considering educational disadvantage, race, gender, geographical origin, age and level of schooling (matric vs. mature)?

It is hoped that the findings from this research will assist the CHS in determining strategy for admissions of a next generation of medical students. The cohort admitted would be engineered to meet the demands placed on the higher educational institutes, the departments of health and labour in terms of access, redress, appropriate delivery of a suitably qualified health workforce to ensure equitable and appropriate healthcare to all South Africans.

The research questions will be addressed in Chapter 4 of this document.

#### 1.5. CONCLUSIONS

This chapter introduced the background to and placed in context the education and training of doctors in the immediate years (1995-2005) in post-Apartheid South Africa. Some of the changes and challenges experienced by higher education and health have been contextualised and addressed. Furthermore, it places the NRMSM in the context of the training platform for doctors in South Africa and provides a brief insight into the history of the institution and its admission policies over the pre-Apartheid and post-Apartheid years. A brief discussion on the issues and challenges faced by the country and higher education institutions (and in particular NRMSM) in terms of access, redressed and success was provided. The Chapter also explored the question of whether race should continue being used as a measure of disadvantage to justify admission

targets in order to address the issues of access and redress. While the NRMSM uses racial targets in its admission policy, it does not actively consider other variables (i.e., age, gender, geographical origins, school background<sup>2</sup>, and socio-economic status). Therefore, this research explores the socio-demographic profiles of the applicants and admitted students and reflects on the success rates of students admitted from disadvantaged schools (Quintile 1 and 2). Finally, the main questions posed by this research were introduced.

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<sup>2</sup> From 2013 the College of Health Sciences made 20% of places available to persons from Quintile 1 and Quintile 2 schools (UKZN, 2013).



## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1. INTRODUCTION**

With an estimated vacancy rate of 29-34% for doctors in the public sector in South Africa (HST, 2007; KZNHealth, 2010), the South African government and medical schools need to strategise to change and improve the situation in order to ensure that healthcare provisions are equitably distributed and universally accessible. The country's eight medical schools play a pivotal role in these strategies. However, in ensuring that the deficit is overcome from a quantitative perspective, they need to take cognizance of the legislated and moral responsibility of improving access to higher education, redressing the inherited legacy of inequality from the Apartheid era and ensuring the success of the enrolled students. Therefore, it is imperative for medical schools (and universities) to have intimate knowledge of the profiles and socio-economic and educational backgrounds of both their prospective student population as well as that of their enrolled student population. This information is essential for the medical schools to keep track of their targets in terms of access and redress and in order to measure their success in achieving these targets.

The research that informed this dissertation focused on the socio-demographic profiles of applicants and admitted students at the Nelson R Mandela School of Medicine (NRMSM). Chapter 2 includes a review of the literature in relation to:

1. international experiences and trends in medical school applicant profiles, including the overall numbers and ratios, gender and ages distribution of applicants and admitted students;
2. the South African experience in terms of the number of applicants and admitted students socio-demographic profiles and ratios;
3. the implementation of race based admission criteria, for access and redress
4. the NRMSM experience in terms of admission policies, criteria and quotas/targets;
5. the health workforce (doctors) distribution and factors which influence the entry and exit from the profession as well as strategies employed to increase the number of graduates and retain staff in the profession from a global and South African perspective;
6. The South African school system, the classification for funding (quintiles) as a measure of disadvantage and the possible predictors of success in higher education in South Africa.

### **2.2. INTERNATIONAL EXPERIENCES and TRENDS IN APPLICANT PROFILES**

In terms of student socio-demographic profiles in higher education and in medical schools, more has been written in international journals regarding this than locally. The literature mainly describes trends in Europe, the United Kingdom, United States of America, New Zealand and Australia. While the trends in these regions may be inherently different from the trends found in South Africa, many similarities can be found and extrapolated.

This section explores the socio-demographic profiles in terms of number of applicants, admission to applicant ratios, gender, age and diversity as well as possible reasons for the identified trends in the regions identified above.

### **2.2.1. Numbers and Ratios**

A trend documented in the abovementioned countries was the decline in the applicant to enrolment ratios (McManus, 2002). In his editorial for the *British Medical Journal*, McManus (2002) reported a significant drop in the ratio of available places (enrolment) to applicants in the U.K. Between 1995 and 2000. In this time there was an overall decrease by 12% in the number of applicants to the medical schools. Subsequently, the ratio of the number of available places in medical schools to applicants dropped from 1:2.11 in 1995 to 1:1.55 in 2000. However, McManus (2002) indicated that there was going to be an expansion in the number of medical schools in the U.K. Five new medical schools were to open in the U.K. between 2000 and 2005. When this happened the overall enrolment at medical schools in the U.K. will have increased by 20%. The concern expressed by McManus (2002), however, was that if by 2005 the number of applicants remained the same as it was in 2000 then the ratio (of number of available places to applicants) would drop further to 1.18. This is a critical situation as it means that the UK would be barely able to meet the demand for doctors in the near future (if the trend continued) and would have to look abroad for doctors to fill their national requirements.

McManus (2002) also indicated that while there was a general increase in university enrolment, the ratio for medicine was worrisome as it seemed that fewer applicants met the criteria for entrance into medical school than in other disciplines. Interestingly only 5% of the school leavers achieved the required pass in Science and since this number is relatively low, he raised the possibility that medical schools lower their entrance requirements. He countered this (lowering entrance requirements to medical school) by arguing that “lowering entry requirements ... runs the short term risk of increased numbers of students dropping out of medical school, or the longer term risk of less well qualified medical entrants becoming less competent doctors” (p. 787). He also argued that while there had been an overall expansion of higher education in the UK, this had not been followed by a corresponding increase in students taking science subjects in schools. McManus (2002) also identified that there had been a trend of increasing number of women applicants (and enrolments) to medical schools.

Hall et. al. (2001) conducted a similar study where they considered the longitudinal trends in the applicant pool for all medical schools in the United States from 1974-1999. They identified a trend that is similar to that in the UK. They found that while the overall number of applicants to medical schools had decreased, there had been a corresponding increase in the number of women applicants (from all ethnic groups), and an increase in the number of applicants from ethnic minority groups. Significant increases were recorded for Black American women. Furthermore, they also found that the proportion of re-applicants increased when there was a general increase in the overall number of applicants.

### **2.2.2. Gender**

The trend toward an increase in the number of female applicants in UK is mirrored in the US. Specifically, Van der Reis (2004) indicated that in 2003, the total number of female applicants exceeded that of male applicants to US medical schools for the first time and similar trends had been present in Western Europe, Australia and New Zealand. Van der Reis (2004) also notes a gradual change in the gender ratio despite the overall decrease in the number of applicants. He provides the changed economics of medical practice and the duration of study as some of the reasons for the decrease in the number of men entering medicine as a profession and also reasons



for the corresponding increase in females. He suggests that women are more likely to spend a shorter time in the profession than men due to stereotypical gender ideologies (such as married women do not support the family financially; that women would sacrifice their careers to support their husbands while they perform the role of mother related to family responsibilities). Therefore female doctors are more likely to work part-time because of family commitments and the increase in the number of women doctors may result in an overall decrease in the number of doctors working full time. Hence the effects of this changed gender ratio (considering the shorter time spent in the profession by women) would imply the need for increasing the throughput rate for physicians in order to keep pace with the future needs of the country (van der Reis, 2004).

The effects of a change in the gender ratio in medicine is emphasised by Breier and Wildschut (2006), where they quote Professor Carol Black, President of the Royal College of Physicians, whose statement regarding the “feminization of medicine” appeared in a newspaper article. Professor Black stated that the medical profession was in danger of losing its power and influence as it was becoming dominated by women and women were less likely to sacrifice their personal lives to take on the commitments required to administer and lead the profession. In addition, women tend to be happier working in specialist fields which do not demand long working hours.

With reference to the above it can be assumed (using the male dominated discipline of surgery as an example of this), the changed gender ratios may see a flood of female surgeons or a severe shortage of surgeons may be experienced as females tend not to choose surgery as a specialist field because of their career choices.

### **2.2.3. Age and Graduate Entry Programmes**

James et.al. (2008) indicated that graduate entrants (i.e., mature students who have completed a primary degree prior to being admitted into medicine) to medicine widen academic and socio-demographic diversity in the medical student population. However, the graduate entrant socio-demographic profiles in US medical schools did not mirror that of the general population. James et.al. (2008) also indicated that in graduate entry programmes there is a shift in the age profiles of the enrolled students and these students being older than school leavers would in essence spend less time in the profession. This would in effect impact negatively on the workforce.

## **2.3. THE SOUTH AFRICAN EXPERIENCE**

The South African situation is different to the experiences of the UK, Europe and the US (Section 2.2) as the country struggles with the legacies of Apartheid, and its related social injustices. Affirmative action is implemented for the majority, and the Government has not been able to overcome the backlog in access for the racial majority since the end of apartheid in 1994. In section 2.3 published literature related to socio-demographic profiles of South African medical schools and the evolution thereof in the South African context is discussed. In addition, issues pertaining access and redress as well as measures of disadvantage other than race (i.e., social class) are explored as is some discussion on admission policies and racial quotas.

### **2.3.1. Socio-demographic Profiles - The University of Cape Town Experience**

On a national level, very little material related to socio-demographic profiles of applicants and admitted students exist in the literature. While Medical Schools in the country may have undertaken such studies for their own purposes very little has been published. Breier and Wildschut (2006) and Colborn, Kent, and Leon (1995) both quote data from UCT. The researchers looked at the composition of applicants and students admitted to the medical school (at UCT) and noted that the profiles of the students had changed over a period. Colborn, Kent and Leon, (1995) conducted a retrospective analysis of the actual data from each annual intake and the trends determined. While they acknowledge the shortcomings of their admission policy in light of the legacy of apartheid, i.e., the prevailing government policy prevented Black Africans from gaining entry to the School prior to 1986, they reaffirm the University's opposition to discrimination. They report that there was an overall increase in both the number of applications as well as the total number of students admitted between 1981 and 1994. While there was no legislation preventing women from being admitted to medical school and despite the selection process being blind to gender, it was only in 1992 and 1993 when the number of females admitted first exceeded the number of men. Furthermore, since the admission of Black students to the faculty in 1986 there has been an increase in the numbers of this group with a corresponding decrease in the number of White students. However, when compared to White females (who constitute the majority of the White student population) Black females only constitute 39% of the Black student population in the medical school. The researchers found that 44% of the Black cohort admitted had tertiary academic experience (i.e. mature students, which permitted them to be admitted into the 2<sup>nd</sup> year of the MBChB programme). The remainder were school leavers who were selected mainly from Department of Education and Training (DET) and Transkei Education Department schools. The article infers that Black students with these education backgrounds have, historically, performed poorly. However, it also informs institutions of higher education of the mechanisms that have been employed to overcome this problem (e.g. academic support programmes have been implemented within the school). The implementation of academic support programmes was essential in linking success with access and redress.

More recently, Breier and Wildschut (2006) described profiles of students admitted to UCT between 1999 and 2003. They describe the changes over this period in time and refers to similar issues regarding racial and gender profiles described by Colborn, Kent and Leon (1995).

### **2.3.2. Measures of Disadvantage**

Mpofu (2012), explored the dynamics of disadvantage and academic success at the University of KwaZulu-Natal and used the school origins of students as a definition of disadvantage. The students were deemed to be disadvantaged if they attended no-fee paying schools, despite there being many definitions of the term in sociological and educational literature. This research will also use Mpofu's (2012) definition of disadvantage in order to compare the success rates of the two cohorts of students fee-paying and non-fee paying students.

Favish and Hendry (2010) also analysed data from UCT between 1994 and 2009. The analysis reflected the changes in demographic profiles of all students and first-time entering students in the entire institution. The study was a response to the request by the University Senate to the Vice Chancellor "to determine whether race continued to be an adequate proxy for disadvantage"

(p. 268). The article reports that between 1994 and 2009 there was an overall increase in the intake by 39.5%; of which the African intake had increased by 3% to 33% in the time period. In the same time period, Coloured and White student intakes had also increased overall. Coloured student intake had shown a 38% increase and White students a 17% increase; however, there was a drop in the actual proportions of Coloured and White students between 1994 and 2009 by 0.2% and 7%, respectively. They acknowledge that while the increase in admission of Black students is welcomed it is insufficient and “UCT is still far from approximating the demographics of the South African population” (Favish & Hendry, 2010, p. 268).

Favish and Hendry (2010) also analysed the origins of the Black student applicants and enrolments in terms of the ex-matriculation authority and the poverty quintiles of the schools they originated from. They found that while in 1994, only 10.8% (71) of the enrolled African students were from ex-House of Assembly and independent schools; in 2009 36.7% of the African student intake was from all other schools (ex-Model C) and 40.9% of students came from ex-DET schools. This means that almost a third of the African admissions to UCT in 2009 came from advantaged schools. The inference from this is that there is another factor, other than race (e.g. class or socio-economic status) to be considered in measuring disadvantage. The article warns, however, that only assumptions can be made about the class origin of African students from ex-Model C schools as many of them may in fact be from working class families. Some of these are children of domestic workers who live in middle class suburbs and others may commute daily from working class communities to the schools. While the school may be advantaged, the pupils may not be as they may not have the same access to resources at home as their White counterparts. Therefore it is impossible to say what proportion of this intake from advantaged schools actually comes from middle class family backgrounds.

An analysis of the schools poverty index (i.e., quintile index) demonstrated that the schools quintile index could not provide an accurate assessment on all students for the following reasons. Firstly, the number of applicants where the school’s quintile index was unknown was significantly high (approx. 43% for African applicants). Secondly, there were several anomalies in the data (e.g., in their interview with school principals they were alerted to the fact that schools in the same geographical area with similar resources and in close proximity to each other were classified differently). Given the large number of unknown school quintile indices and the unreliable data the study demonstrated that of the applicants, offers made and enrolled cohorts, those who attended quintile 1 schools were 9.3%, 9.6% and 10.25% respectively. Finally, Favish and Hendry (2010) concluded that there was no empirical evidence to suggest that race should not be used as an indicator of disadvantage and neither could the quintile data be used reliably to supplement the race-based criteria for measuring disadvantage. Favish and Hendry’s (2010) stance was reiterated by Soudien (2010). He stated that UCT

...accepted the position that apartheid had discriminated against Black people on racial grounds and that their schooling, in particular, was marked by inferior provision. Their teachers were often less qualified than they would have been in more privileged White schools. Many students who had the potential to study at university level were, as a consequence, denied the opportunity (p. 221).

Soudien (2010) further maintained that because of the race-based history, UCT adopted a position to use race as an indicator to acknowledge and redress the past disadvantages and discrimination experienced by Black (Africans, Indians and Coloureds) South Africans. However, despite this acknowledgement, debate was initiated as to whether this approach is justified given the context of the changing socio-economic environment. “[W]as it not a case, for example, that “class” had become a more meaningful indicator of the disadvantaged experienced by learners?” (Soudien, 2010, p. 222). He concludes that currently race remains the most reliable indicator to measure disadvantage. While he distinguishes the inherent difference between redress and disadvantage; he maintains that the term “race” is used, in the South African context, as the indicator by which redress and disadvantage is addressed, together. The complexity of separating the demands of redress from disadvantage is difficult and cannot be easily and quickly managed.

### **2.3.3. Access and Redress in South Africa**

In contrast to the historically “White” universities, the University of Natal’s Medical School, has historically been a “Black University”. It was established in 1951 to provide training for Blacks, mostly Africans. However, the Medical School had difficulty finding an adequate number of Black Africans who qualified for entrance into the School due to inferior secondary education (University of Natal, 1997). As a result the Medical School’s administration introduced a quota system to allow for the admission of Coloured and Indian (50%) students and African (50%) students. Over the years, however, the proportion of the student body had become dominated by Indians. This proportion had gradually changed to favour the African students. The current proportions are 69% African; 19% Indian, 9% Coloured and 3% White and other. These proportions were first mooted in 1994 and it was indicated that it would be implemented at an “academically acceptable” pace (Sunderlall, 2012). The NRMSM has implemented and maintained the quota system to address the severe shortage of Black African doctors faced at a national level, while also taking cognisance of the local KZN population. Hence despite the national numbers reflecting the Indian population to be only 2.5%; the local KZN proportion is approximately 8.1% (Statssa, 2012). Due to the higher local (KZN) proportion of the Indian population it was decided to retain the 19% quota for Indian students.

With only two other universities admitting mainly African students (WSU<sup>3</sup> and Medunsa<sup>4</sup>), the national average for African students admitted to medical schools in South Africa was 45% in 2005; while that of White, Indian and Coloured students were 32%, 15% and 8% respectively (Breier, 2008). Despite the national average for African student admissions being 45%, the overall average of African admissions at the other five historically White universities was only 27.2% (Breier, 2008). Therefore, the proportion of African students admitted to medical undergraduate programmes currently lags behind the national population proportions.

In the absence of legislation and stern/rigid policy implementation the default would be to maintain the status quo, which means that access to higher education by the previously disadvantaged racial majority would be severely compromised. To illustrate the point, using an example from the US, Baringa (1997) reported that a Federal court ruling in the US banned

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<sup>3</sup> WSU – formerly University of Transkei (UNITRA)

<sup>4</sup> MEDUNSA – now University of Limpopo

affirmative action for the admission of students. The result was between a 50-80% drop in the admission of Black and Hispanic students to law schools and between 51-73% drop in the admission of the same race groups to medical schools (Baringa, 1997).

Despite its' targets, it is evident from the Census statistics and admission data that NRMSM's admission quotas have changed to meet the targets set. However, while the targets are not completely representative of the proportions of the population in KZN and South Africa, the Medical School's administration felt that it would serve the purposes of the local community to retain the targets as quoted. However, much needs to be done on at national level to adequately address the issues of redress and access.

## **2.4. HEALTH WORKFORCE DISTRIBUTION**

### **2.4.1. The Global Picture**

The World Health Organisation's World Health Report-2006 "Working Together for Health"<sup>5</sup>, considers the global health workforce and defines a health worker as "all people primarily engaged in actions with the primary intent of enhancing health" (p. 1). While the report considers all calibers of health workers, the statistics for doctors only will be considered in the next section.

The report looks at the numbers of doctors globally and estimates that there is a global deficit of 2.4 million doctors; with the greatest proportion of this shortfall being in Sub-Saharan Africa. South Africa, Botswana and Namibia are a few of the countries (worldwide) which do not fall into the category of countries with critical shortage. It further considers various factors which influence entry into and exit from the profession on a global basis. It acknowledges that on a global scale there are fewer people entering the profession (because of decrease in number of graduates - the world's 1600 medical school are not producing sufficient numbers of graduates) and a large number of people leaving the profession (due to illness, death, retirement, other employment). Despite measures by individual governments (e.g. capped public sector employment, cf. community service in South Africa) to retain staff (e.g. as part of the national human resources for health plans in South Africa) in the public sector, the shortage of doctors persists. The report cites HIV/AIDS, long duration of training, financial difficulties, poor remuneration, government policies and personal safety as possible reasons for the overall decrease in the number of graduates. The report calls for a review of curricular content and pedagogical learning methods, support for teaching staff (improved compensation and advance planning for retirement and succession) and quality assurance.

The report further states that the challenges to the health systems related to the overall decrease in the number of graduates could be overcome by increasing class sizes, decreasing training time, developing new institutions and increasing regional cooperation. In addition, students must be selected from underserved areas/communities and a part of the training must be located in the

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<sup>5</sup> <http://www.who.int/whr/2006/en> [accessed 01/10/2006]



same underserved areas as part of the outreach to communities and in an effort to improve basic services.

The report also considers the effects of age and gender on the health workforce and notes that there is still a male dominance by 70% in the numbers of doctors globally. This is despite the previously quoted articles citing an increase in the number of women graduates over the last 2 decades. Age does not play a significant role in the number of people entering the profession with the average age being in the 25-30 year age group and apart from normal retirement there is no other predictable age for exit from the profession.

#### **2.4.2. The South African Perspective**

Further to the shortage of Black African doctors, is the overall shortage of doctors servicing the rural areas (Breier, 2008). The provision of healthcare is a basic human right and in its efforts to deliver this service the South African government should engage with all relevant role players. A crucial part of this engagement has to be with country's medical schools as they function to deliver the required number of qualified personnel (Breier, 2008). Furthermore, the countries medical schools need to embrace the principles of social accountability (THEnet, 2011) and ensure that their students are prepared and equipped to serve in the areas where the need for doctors is most.

There was a vacancy rate of 29% of medical practitioners in the public sector in 1999, and an increase in this to 34% in 2006/2007 (HST, 2007). Furthermore, only 41% of the registered medical practitioners in South Africa serve 85% of the population in the public sector (HST, 2007). In KwaZulu-Natal, which has 21.2% of the country's population, 54% of the population are in rural areas (KZNHealth, 2010).

The challenges facing health care delivery, from a human resources perspective, is that there are only 2.75 medical practitioners per 10 000 people in the public service in KZN. Furthermore, there is a vacancy rate of 62.6% in medical specialists in KwaZulu-Natal (KZNhealth, 2010).

The high vacancy rate of doctors in the rural areas and the general shortage of qualified medical personnel require an operational plan to improve the human resource capital in order to meet the healthcare delivery targets. This plan should also take into consideration the post-apartheid government policies which are underpinned by the commitment to equity and redress in terms of race and gender. In this regard, in 2007, 60.8% of medical practitioners were White with a predominance of males (70%) (Breier, 2008).

In response to this, the previously predominantly "White" medical schools have made a conscious effort to increase the admission of Black students as well as increase the overall number of students admitted (Breier, 2008). However, as indicated earlier the national average of African students admitted to medical schools in 2005 was only 27.2% (Breier, 2008). While no conscious effort has been made to redress the previous gender differences in the medical personnel, the socio-demographic profiles of all schools reflect a definite shift to a female predominance (Breier & Wildschut, 2006). Medical schools have also, over the past years, unconsciously shifted the average age of medical graduates by admitting older, "mature" students with post-secondary experiences and qualifications into the programmes (Breier, 2008).

This is further illustrated in the NRMSM report on the 1998 admissions process (Sunderlall, 2012). The reason for this as indicated in the same document was the poor results from the matriculation examinations of 1997 (Myburgh, 2007).

Apart from race, and post-secondary school qualifications, the NRMSM's admissions policies do not consider other socio-demographic profiles of medical students. For example, the geographical location of students in terms of origins, training and deployment has not specifically been addressed. This is related specifically to the shortage of doctors in rural areas. While the NRMSM acknowledges that it needs to increase access to students from disadvantaged communities, no conscious effort has been made to recruit students from the rural areas. These (rural) students, it has been found, by Curran and Rourke (2004) are more likely to return to their communities to work and are more likely to enter a rural primary care practice. However, they also identified other factors, such as, rural-oriented medical curriculum (community-based medical education), rural practice learning experiences, faculty values and attitudes, and advanced procedural skills training; which have been shown to influence the likelihood of medical graduates returning to a rural primary care practise. The National Human Resources for Plan for Health report (Department of Health, 2006) found that the staffing of rural hospitals remained a problem despite the introduction of community service (CS) and suggests a renewed consideration of strategies to attract and retain professionals in rural areas, including targeted recruitment of students from rural areas and increased exposure of students to rural practice during their training. Although with hindsight many CS Professionals (CSPs) described their experience (specifically obtained in rural areas) as positive, few were willing to change their career plans which was to seek employment in urban health facilities or even to practice outside the public health service. However, the report quotes "...around 20% of CS doctors would voluntarily consider working in a rural or underserved area in the future, a cohort that could potentially fill the staffing needs of these hospitals, given the right incentives..."(Department of Health, 2006, p. 28).

The National Human Resources for Plan for Health report (Department of Health, 2006) also speaks specifically of CSP's returning to the rural primary care practices and this can be extrapolated to actively recruiting medical students from the rural areas, with the hope that many of them would return to their areas of origin once they have graduated. The National Health HR plan further quotes,

...the health system faces the task of attracting health professionals to rural and other under-served areas. The location of almost all health education and training institutions in urban areas influences the choices made regarding their employment by young professionals. Even though provinces have tended to focus on providing study assistance to students from rural communities, there are conflicting views concerning whether this strategy ensures that such students willingly return to work in their communities after graduation. (Department of Health, 2006, p. 22).

Furthermore, as suggested by Curran and Rourke (2004), medical faculties and the medical curriculum must support the initiative by exposing students to the rural primary care practice, by improving the skills and procedures taught to be more in line with the actual requirements of the primary rural practice. They also suggest a decentralised medical school situated in the rural

area, and make provisions for the active and selective recruitment from rural areas. The reason they forward for the active recruitment is that rural students are inherently disadvantaged due to the lack of career counselling and resources. They also say that academic outreach programmes to stimulate interest in medicine as a career followed by active recruitment may be a better mechanism. McLachlan (2005) also suggests that outreach is better than selection for increasing diversity at medical schools.

Wilson et. al. (2009) found that geographical origins of students, gender, career intent and post-vocational fellowships were strongly associated with students returning to work in rural areas. Rural exposure during undergraduate training; financial compensation and provision of bursaries were deemed moderate factors while coercion (i.e., CS) was viewed as a weak intervention strategy in addressing the mismatch in staffing in rural and remote areas. (Wilson et al., 2009).

## **2.5. THE SOUTH AFRICAN SCHOOLING SYSTEM and the PREDICTORS OF SUCCESS**

The degree to which schools have been /are disadvantaged has been measured and published by the Education Management Information System (EMIS). A decile list was compiled by a private company EduAction and the higher the decile the more advantaged the school (Jackson, 2006; Mpofu, 2012). However, in 2007 the situation changed with the implementation of a new funding policy (The National Norms and Standards for School Funding - NNSSF) in which the poorest 40% of schools were granted no-fee status (K. Hall & Giese, 2009). These schools may not charge fees and would derive their funding from the state. The no-fee status was derived from national poverty rankings and divides schools into quintiles (quintile 1 and 2 schools being the poorest and quintile 5 schools being the least poor). It must be noted however, that the quintile level indicates the level of poverty of the catchment area of the school and not the schools infrastructure (Mpofu, 2012). The purpose of the quintile ranking is primarily for resource allocation with 60% of the resources being allocated to 40% of learners in quintile 1 and quintile 2 schools (K. Hall & Giese, 2009). However, as reported by Favish and Hendry (2010), and confirmed by Mpofu; the quintile rankings were inherently problematic (Favish & Hendry, 2010; K. Hall & Giese, 2009; Mpofu, 2012).

It is therefore given that South African universities, in general, and medical schools in particular need to increase their intake of African students and in addition, students from catchment areas with high poverty indices as well as the rural and underserved areas. In addition, their curriculae need to have a significant proportion dedicated to exposure to rural medicine and health. However, are these students adequately prepared to cope in a higher education environment and are there factors which can predict their success or failure? Zewotir, North, and Murray (2011) explored student success rates in entry level modules at UKZN between 2005 and 2009. One of the major challenges facing higher education institutions is in improving pass rates while simultaneously maintaining an equitable standard, despite the increase in access to students with poor educational qualifications from disadvantaged backgrounds. Furthermore, the authors indicate that the Grade-12 result which is the measure of entry into university is an unreliable predictor of future performance and success at university. The study looked at factors which contributed to the success rates of new students on a faculty by faculty basis.



In terms of the reported findings, the researchers found that there is a rise in the overall number of Africans entering university and a decline in the number of White students. Gender ratios have remained relatively constant with a female predominance (57-60%). In general, the odds of an African student failing the first year are significantly higher than the equivalent White student for most faculties. Being female has no significant effect on the failure rate. The odds of failing the first year are significantly increased if they are not staying in residences in most faculties. The medical school featured in the section that reported on the failure rate which decreased on an annual basis by a factor of 0.44; while those students (at medical school) who were not in an academic support programme were at a higher risk of failing the first year. No results were reported on the Maths and English results and first year failures in medical school. In conclusion the researchers reported that repeating students were the most likely cohort to drop out of university and those students in off campus accommodation and those without financial aid are more likely to drop out while African students in general are more likely to fail at university. They also report that trends differ between faculties and there is no “one size fits all” for the university and that intervention strategies need to be designed according to the risk profiles of a particular faculty.

The implication for medicine is the essence of this study (i.e., are we admitting students with poor educational backgrounds and is this a predictor of their success/failure rates?). Furthermore, are there other factors in the socio-demographic profiles of applicants and admitted students that will assist in addressing the challenges related to access, redress, and success and workforce distribution?

## **2.6. THEORETICAL FRAMEWORK**

The University of KwaZulu-Natal, through the College of Health Sciences and NRMSM, acknowledges the need for access and redress in the selection and placement of applicants to the MBChB programme. Furthermore, the institutions admissions policy stipulates clear racial targets aligned to the demographics of the province and from 2012 admission targets for disadvantaged students. However, with the increase in number and diversity of disadvantaged students accessing this platform, is the NRMSM prepared for and does it know what to expect from this cohort of socially and educationally disadvantaged students in terms of their real-life situation and their preparedness for higher education? In this regard Jama, Mapesela and Beylefeld (2008) proposed a theoretical model describing the “circles of progression” (p. 992) of university student in South Africa. More specifically, reference is made to the “non-traditional” university student, who in the South African context refers to Black students from disadvantaged family and school backgrounds. The circles of progression (Jama et al., 2008) is a theoretical model that describes the progression of a student from pre-entry (school and family background) to university (the first circle) to the initial entry (the first few weeks, i.e. the second circle) and through the various years of study (the teaching and learning environment, i.e. the third circle) to ongoing social and academic integration in preparation for their roles as professionals or specialists in their fields (the fourth circle). This model can be applied to medical students in general and more specifically in the context of this research to the students who attended no-fee schools (i.e. disadvantaged educational backgrounds) and track their progress through the various circles. While this research focuses on the socio-demographic

profiles of the applicants and the admitted students, it in essence is analysing the progression of a sub-cohort of students within the first two circles. In this regard, it is necessary to know who these students are and where they come from in order to anticipate the factors responsible for/affecting their academic progress and to plan appropriate for their successful progress through all the circles. In analysing the success rates of these students in the first year is in essence analyzing their progression through the third circle and their ability to engage with the teaching and learning environment. Further research is needed to determine their progress through the fourth circle.

## **2.7. CONCLUSION**

This chapter reviewed the relevant literature related to the trends in socio-demographic profiles in terms of overall numbers, gender and age of applicants and admitted students both internationally and in South Africa. The chapter highlighted how, in the South African context, race has been used as a measure of disadvantage and has informed and influenced policies on access and redress. Questions have been raised on the validity and justification for the continued use of race as a measure of disadvantage. The classification of schools into quintiles based on the poverty indices of catchment communities has been forwarded as an alternative measure of disadvantage, however, this has been proven to be unreliable and as a result race will continue to be a measure of disadvantage in South Africa. Furthermore, access and redress should also be linked with success and the chapter raised questions around whether there were any factors in the socio-demographic profiles of students that could be reliably used to predict success in higher education. Furthermore, factors which influenced the retention of students within the higher education system as well as their progression through the programmes were explored.

Both global and local perspectives on the health workforce distribution have been explored and the challenge faced by the country is the continued shortage of doctors in the rural areas. Furthermore, are medical schools socially accountable and producing sufficient numbers of personnel who, after graduating, work in the rural and underserved areas of the country? Several authors report that the geographical origin of students influence where they work (Curran & Rourke, 2004; Wilson et al., 2009) and other retention strategies have been explored.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1. INTRODUCTION**

This chapter describes the type of research, the methodology, the research paradigm adopted, and the methods employed in this study. In addition, there will be some discussion around the data collection process, the sources and types of data, data cleaning and associated problems, limitations and challenges in the data collection process, analysis of the data and the reporting thereof. Finally the limitations of the research and ethical considerations will be discussed.

### **3.2. THIS RESEARCH**

This research was essentially quantitative (gathering numerical data analysed by statistical, mathematical or computational methods), objectivist (vs. subjective), epistemologically positivist and the methodologically nomothetic (“an approach characterized by procedures and methods designed to discover general laws”) (Cohen, Manion, & Morrison, 2011, p. 6). This means that the study used quantifiable, empirical data (e.g., biographical information) and subjected the data to a series of analyses (descriptive and correlative statistics) in order to discover general laws related to the cohorts of applicants, admitted students and students from disadvantaged educational backgrounds. Therefore, in the context of this research the knowledge obtained from the analysis of the empirical data will be used to effect change (improve) in the lives of the subjects of the study (i.e., students from disadvantaged schooling backgrounds).

In the positivist paradigm the researcher is attempting to understand the nature of the populations studied by observation of the data. Positivism is steeped in the scientific method and the processes follow logical steps of empirical science in order to uncover and understand the causal links of events. In general, the 5 steps to follow in empirical science are: experience, classification, quantification, discovery of relationships and approximation to the truth (Cohen et al., 2011). [The researcher has discovered that these steps were essentially followed through the research process]. It must be stated, however, that while the researcher is in no way attempting to address individual reasons, individuality, moral responsibilities and other social issues in this research even though these issues have been addressed/mentioned in the sections on the background and context as well as in the discussion.

### **3.3. DATA COLLECTION**

Secondary data collection was used. This involved the use of data already available in the University of KwaZulu-Natal and NRMSM databases pertaining to applicants and successful admission to NRMSM. This information was sourced through the Division of Management Information (DMI) at UKZN. Furthermore, first year results are also available from the Student Management System (SMS) and the Integrated Tertiary Software (ITS) systems employed by UKZN, however DMI was able to source this data from ITS and provide it in a consolidated spreadsheet format. In addition, data from both the National Department of Education and the KZN DoE pertaining to the secondary schools, their physical location and quintile ratings has been sourced. Finally data relating to the classification of post codes (students and school

residential addresses) was sourced from a private courier company and the South African Post Office's website.

Data from these databases reflects information on the applicant pool, successful admissions to NRMSM, first year results, no fee schools and post-codes. This data was analysed using SPSS® (statistical analysis software).

### **3.4. DATA CLEANING and MANIPULATION**

Data cleaning deals with detecting and removing errors and inconsistencies from data in order to improve its quality. Data quality may be due to “single source problems” or “multi-source problems”. A single source problem is usually a single file, spreadsheet or database while a multi-source problem occurs when multiple single sources need to be consolidated, merged or integrated and each source may contain errors (“dirty data”) and individual records in each source may overlap, be represented differently or contradict each other (Rahm & Do, 2000). At each source the errors may be due to a schema level or an instance level problem. A schema level problem relates to the way in which a database is constructed and the rules provided for the construction of the database. An instance level error relates to errors and inconsistencies that cannot be predicted or prevented (e.g., spelling and typographical errors).

Due to the wide range of possible data problems and the volume of data Rahm and Do (2000), suggest that data cleaning be done using commercially available software, however, in general a significant proportion of cleaning has to be done manually (Rahm & Do, 2000).

In the context of this research, a retrospective analysis was conducted on the actual data accumulated at each annual application and admission cycle over an 11 year period at the NRMSM as well as that of the first year results of students admitted to the MBCHB programme. The following describes some of the challenges encountered in acquiring secondary data already available in the DMI databases. Furthermore, challenges encountered in the cleaning, manipulation and analysis of the data, as well as the solutions utilised in addressing the challenges and limitations are discussed.

#### **3.4.1. DMI Databases**

The data obtained from DMI databases was in the format of large excel® files. These files contained applicant and admitted students socio-demographic profiles and the results of all first year students. The captured data demonstrated several inaccuracies and inconsistencies.

1. Of the total number of applicants there were several duplicated records. The duplicated records were in 2 categories: firstly they were truly duplicated (appeared in the same year cycle) and secondly, they represented reapplications. The database did not make the distinction and these had to be manually separated (Rahm & Do, 2000). Truly duplicated records were omitted
2. Some of the variables had missing or incorrect data; e.g., age, educational qualifications and geographic origins. Where these could not be manually corrected, the relevant records were omitted from the analysis.
3. With regard to the first year results and admitted student records the database contained the records of all enrolled students (year 1 to 5/6) per year. The number of newly admitted students

had to be extracted by matching the records from both files. Some of this had to be done manually.

4. First year results were presented per student and per module. Each student had several records according to the number of modules they took in a semester and a year. This means that a student may have had as many as 16 records per year (including supplementary modules). This had to be consolidated into a single record and the modules failed extracted.

5. School names and codes were different from that of the DoE. This made correlation with the non-fee paying schools list from the DoE difficult. Some schools had multiple codes assigned to different spellings of its names (this was cross checked with the DoE list of schools to ensure that they were truly incorrectly spelt and that a second school with a similar name did not exist). These had to be manually sorted and adjusted (this was extremely time consuming – considering almost 20000 records).

6. Post codes were provided for the residential addresses of the applicants and admitted students. However, a search of the South African Post Office website for the location of the postcode revealed only the name of the town/suburb and not the province. A second list was obtained from City Couriers and this assisted in identifying the provincial and regional origins of the applicants and admitted students. This however, divided the province into 4 regions which represented the City Courier's distribution centres and delivery routes and the classification used is not based on the socio-political/geographical regional classification. Furthermore, the system used could not distinguish between an urban, semi-urban or rural area. The inability to distinguish whether the area was rural or urban is cited as a major limitation of this research.

The list above illustrates several examples of single and multi-source problems as well as instance level and schema level errors. It was unfortunate that the corrections and adjustments had to be done manually, as data cleaning software was unavailable.

### **3.5. VARIABLES, STATISTICS AND REPORTING**

The first part of this study describes the socio-demographic profiles of two cohorts. The first cohort is a cohort of people who applied for a place in the MBChB programme at the NRMSM and the second cohort is a subset of the first, i.e., the number of people admitted to the programme. Each cohort constituted a data set and each data set was analysed using mainly descriptive statistics for the nominal and ordinal variables contained therein. Descriptive statistics was used to enumerate and organise the data (Cohen et al., 2011). The main descriptive statistical tools utilised were frequencies, means, percentages and cross-tabulations and the results were reported in bar charts, pie charts and tables.

Inferential and correlative statistics were then used to compare the data sets for each of the nominal and ordinal variables in order to determine whether any statistically significant relationship existed between the variables in the data sets. The inferential statistical tests used in the analysis of the non-parametric data and included  $\chi^2$  tests, Fisher's exact test, the Mann-Whitney U test and a prediction test, i.e., simple linear regression. (Cohen et al., 2011)

Furthermore, for these tests the significance level of ( $p$ ) 0.05 was selected (Dancey & Reidy, 2011).

### 3.6. DESIGN LIMITATIONS

While the research questions and the motivation for the study may imply a comprehensive analysis of the data/parameters/profiles, the study was limited by data in the data base. Furthermore, while it is assumed the data is accurate, the accuracy of the data could not be verified or validated as it is a secondary data source. The researcher had no direct control over the collection or capture of the data.

### 3.7. ETHICS

No questionnaires or interviews with subjects have been used in this study. Secondary data was used and this was accessed from the university databases. The data accessed contained personal information of the applicants and admitted students. Biographical information contained names, student numbers and residential addresses. This meant that each applicant and admitted student was identifiable on a personal basis. While this may be a cause of concern, from an ethical perspective, every care was taken not to use names or student numbers in the analysis and reporting. However, the use of names and student numbers was essential when confirming the number of persons who failed first year modules as well as identifying repeat applicants. From research ethics perspective this may pose a problem as the individuals had not been informed that their biographical details will be used for research purposes and neither did they give their consent for the use of personal information (especially addresses).<sup>6</sup>

It is therefore the duty of the researcher to ensure that the nature of the research is such that the information contained is protected and secured and that in the analysis and reporting that the individual's anonymity is assured.

A second issue of concern in the use of secondary data is the ownership of the data. Permission had to be sought from the university, the owner of the database, and the custodian of all applicant details and admission and financial data as well as students' academic records. The "Gatekeeper letter" was provided by the Registrar granting permission for the researcher to access university owned information and data. Furthermore, the "Gatekeeper" letter was essential for the ethical clearance for this research. The research was granted ethical clearance. The gatekeeper letter as well as the letter indicating ethical approval being granted is contained in appendix 2<sup>7</sup> and appendix 3<sup>8</sup> respectively.

The databases contained personal and confidential information of applicants and admitted students, i.e., individuals were identified by name, student number and first year results. While (as indicated in paragraph 1 of this sub-section) this data (i.e., name, student number and addresses) has been utilised in the analysis none of the personal biographical information was used in the reporting of this research. The anonymity of all applicants and admitted students is assured and maintained. No names were used in the reporting or recording of the analysis. Where results related to the geographic origins were analysed, only the school attended was considered

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<sup>6</sup> [web.up.ac.za/site\\_files/file/43/Circular09-03.pdf](http://web.up.ac.za/site_files/file/43/Circular09-03.pdf) [accessed on 15/09/2014]

<sup>7</sup> Gatekeepers letter

<sup>8</sup> Ethics approval

and the actual names and student numbers were omitted and did not contribute to the analyses in any way.

All files are stored electronically. This includes the original data files and all new files created after the initial manipulation and cleaning of the data are also available electronically. All tables and output reports after analyses conducted in SPSS<sup>®</sup> as well as reports subsequently exported to WORD<sup>®</sup> and EXEL<sup>®</sup> files are also stored electronically and are available for perusal. These have been stored on the computer's internal memory and backed up on an external hard drive and a CD. The external hard drive and the CD are secured in a locked cupboard.

### **3.8. CONCLUSION**

This chapter described the placement of this of research within the theoretical framework in terms of the methodology, epistemology and the paradigm adopted in this study and the methods employed. In addition, the data collection process, the sources and types of data, data cleaning and associated problems, limitations and challenges in the data collection process, analysis of the data and the reporting thereof have been discussed. Finally the limitations of the research and ethical considerations have been discussed.

Chapter 4 presents the results and in chapter 5 the results of the research are discussed.



## CHAPTER FOUR: RESULTS

### 4.1. INTRODUCTION

In this chapter the results of the study are presented. The chapter is divided into four sections and each addresses a research question. The research questions which guided the study reported in this dissertation were:

1. What was the socio-demographic profile of applicants to the NRMSM's MBChB programme after 1994 (from 1995-2005)?
2. What was the socio-demographic profile of students admitted to the NRMSM's MBChB programme after 1994 (from 1995-2005)?
3. What proportion of students admitted to the programme are from educationally disadvantaged backgrounds and what is the success rates of these students compared to those from "educationally advantaged" backgrounds?
4. How does the profile of the applicants to the NRMSM MBChB compare to the profile of the students admitted to the NRMSM MBChB programme after 1994 (from 1995-2005), when considering educational disadvantage, race, gender, geographical origin, age, level of schooling (matric vs. mature) and quality of schooling (fee vs non-fee schools)?

Sections 4.2 and 4.3 will address questions 1 (Applicant Profiles) and 2 (Admitted Students' Profiles), and within these sections, seven sub-sections are used to report data for the following variables:

1. Number
2. Race
3. Gender
4. Age
5. Matric vs. Mature (School leaving and post-secondary academic engagement)
6. KZN vs. Non-KZN (geographic origin)
7. Fee Paying vs. Non-Fee paying schools (Educational background)

Section 4.4 addresses research question 3 and considers the correlational statistics related to the success rates of students from disadvantaged (non-fee) backgrounds.

Section 4.5 describes the correlational statistics of the variables between the two cohorts of students and address question 4 (of the research questions).



## 4.2. APPLICANT PROFILES

### Research Question 1:

What was the socio-demographic profile of applicants to the NRMSM's MBChB programme after 1994 (from 1995-2005)?

This section explores the socio-demographic profiles of all applications for places in the MBChB programme at the Medical School in the post-apartheid (1995-2005) period.

#### 4.2.1. NUMBER OF APPLICANTS

In sub-section 4.2.1 the overall number of applicants, the number of applicants per year between 1995 and 2005, the number of applicants per programme (i.e. MBChB5 and MBChB6), and the number of repeat applicants per year are explored.

##### 4.2.1.1. Overall Number of Applicants to the NRMSM

The overall number of applicants between 1995 and 2005 was 19945. This number included 1174 records of students who reapplied to read medicine after their first application was unsuccessful.

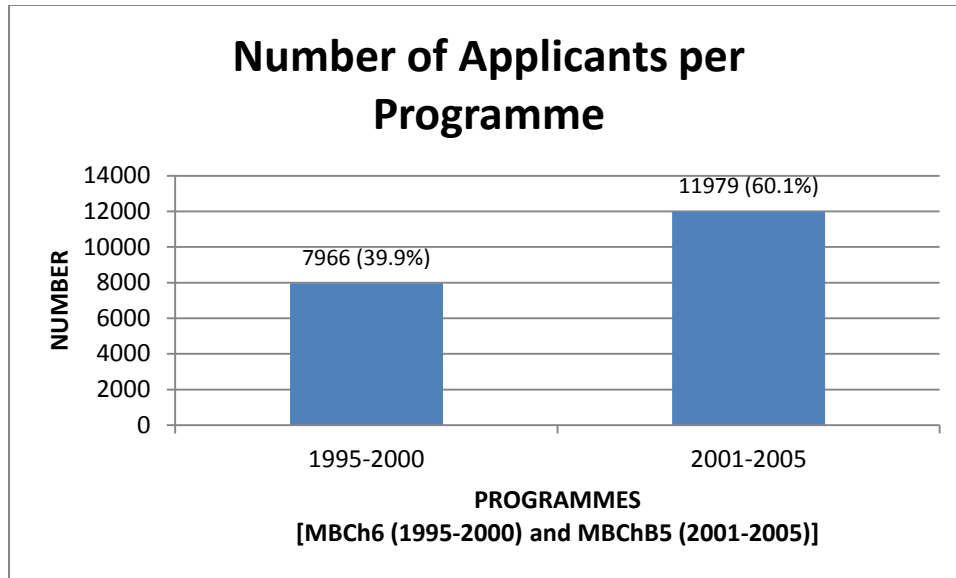
**Table 4.2.1: The Numbers and Percentages of Applicants per Year (1995-2005)**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Number	1266	1310	1220	1408	1444	1318	1763	1778	2267	2792	3379
Percentage	6.3	6.6	6.1	7.1	7.2	6.6	8.8	8.9	11.4	14	16.9

Table 4.2.1 describes the number of applicants to the MBChB programme at NRMSM between 1995 and 2005 as well as the percentage this number contributed per year to the overall number of applicants over the 11 year period. It is evident that during this period the number of applicants has grown steadily, with an overall increase of 10.3%. In contrast to the upward trend, the years 1997 and 2000 saw a drop in the number of applicants when compared to the previous years.

##### 4.2.1.2. Number of Applicants per Programme

In 2001, there was a change in the programme from the MBChB6 (1995-2000) programme to the MBChB5 (2001-2005) programme. This change also came with a change in the admission criteria. The graph (Figure 4.2.1.) overleaf demonstrates the increase in the number of applicants between the two programmes. The reason for this distinction is to illustrate the effect a change in the admission criteria may have had on the overall number of applicants.



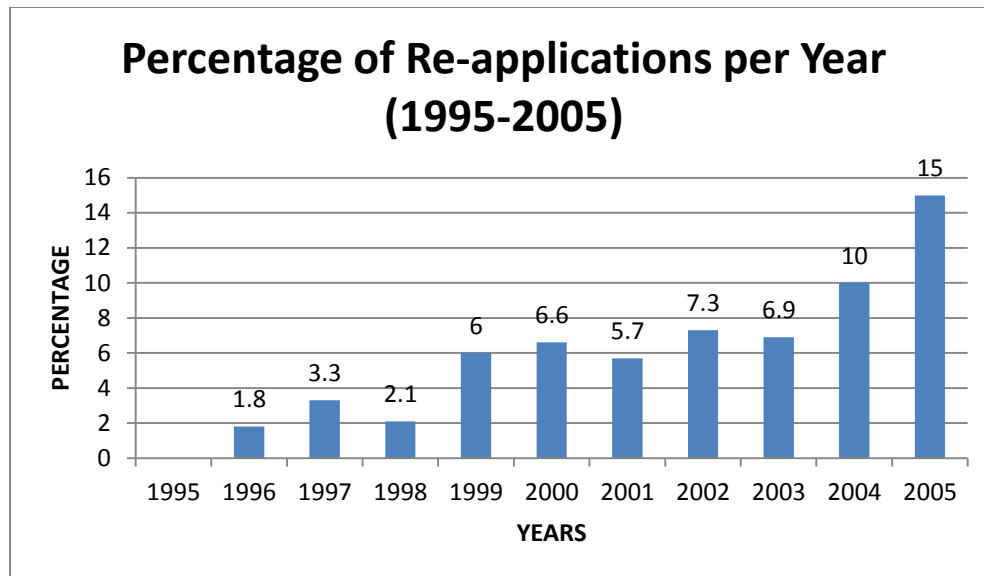
**Figure 4.2.1: The Number of Applicants per Programme**

Another interesting feature of this phenomenon (i.e., the increase in overall number of applicants) is the increase in the number of re-applicants or repeat applications over the years. This is demonstrated in Figure 4.2.2.

#### **4.2.1.3. Number of Repeat Applicants**

As described by McManus (2002); there is a trend in the United Kingdom of an increasing number of reapplications to medicine. Between 1995 and 2005 at NRMSM there was an increase in the number of re-applications from 23 (1.8%) in 1995 to 506 (15%) in 2005.

This represents an average increase of 6.4% in the number of repeat applications to the programme between 1995-2000 (MBChB6) and 2001-2005 (MBChB5). During the former period, the average reapplications made up only 3.4% of the applicant pool; however, between 2001 and 2005 the proportion increased to 9.8%. In 2005 repeat applications accounted for approximately 15% of the applicant pool.



**Figure 4.2.2: The Percentage of Re-applications per year (1995-2005)**

#### **4.2.2. RACE**

In South Africa, racial quotas are a contentious point of discussion in terms of equity, access and redress issues. It is important to consider why the issue of race is so topical in South Africa in terms of higher education, in general, and in medicine, in particular (Soudien, 2010).

In South Africa, being Black African is generally equated with educational and socio-economic disadvantage, hence the need for (redress) and greater access to higher education by this racial group (Soudien, 2010). The demographic landscape of the country's higher education institutions, however, relates a different story altogether, hence the need for redress. It is therefore logical that the NRMSM (and all other institutions) should have a demographic profile of their student population that mirrors the demographic profile of the province and the country. What is the racial profile of the applicants to the programme and does this mirror the demographics of the province or country?

The following sub-sections describes the overall racial profile of all applicants to the NRMSM and further breaks down the description to include the profile of the applicants per year from 1995-2005 as well as the number of applicants per programme (MBChB6 and MBChB5).

#### 4.2.2.1. Overall Race Profile of Applicants

**Table 4.2.2: Race Profile of Applicants per Year**

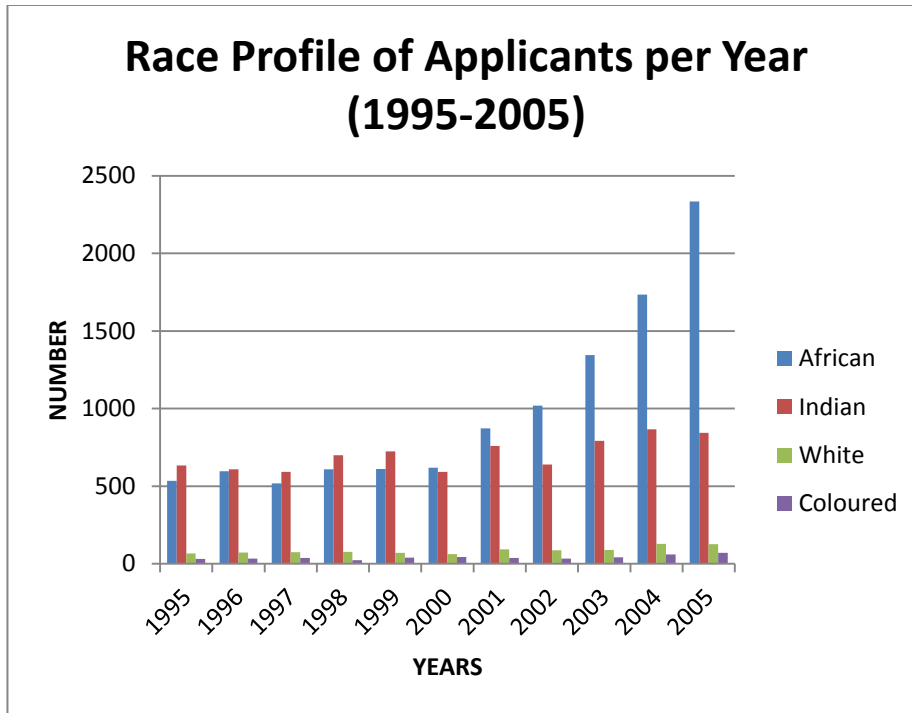
year	Race (Numbers and Percentages )								Total
	African		Indian		White		Coloured		
	Num	%	Num	%	Num	%	Num	%	
<b>1995</b>	534	42.2	633	50	67	5.3	32	2.5	1266
<b>1996</b>	596	45.5	608	46.4	73	5.6	33	2.5	1310
<b>1997</b>	517	42.4	592	48.5	74	6.1	37	3	1220
<b>1998</b>	608	43.2	700	49.7	77	5.5	23	1.6	1408
<b>1999</b>	610	42.2	725	50.2	70	4.8	39	2.7	1444
<b>2000</b>	619	47	593	45	63	4.8	43	3.3	1318
<b>2001</b>	873	49.5	760	43.1	92	5.2	38	2.2	1763
<b>2002</b>	1018	57.3	639	35.9	86	4.8	33	1.9	1778
<b>2003</b>	1344	59.3	793	35	88	3.9	42	1.9	2267
<b>2004</b>	1735	62.1	867	31.1	128	4.6	59	2.1	2792
<b>2005</b>	2335	69.1	844	25	125	3.7	71	2.1	3379
<b>Total</b>	<b>10789</b>	<b>54.1</b>	<b>7754</b>	<b>38.9</b>	<b>943</b>	<b>4.7</b>	<b>450</b>	<b>2.3</b>	19945

It is evident from Table 4.2.2 that Africans constitute the majority of applicants (i.e., 54.1% of all applicants). Indians made up 38.9%; Whites 4.7% and Coloured persons 2.3% of all applicants.

In a country where approximately 79% of the population is African (Statssa, 2012) the applicant profile for NRMSM for the period indicated is an average of 54.1%. During this period the percentage of African applicants to NRMSM increased from 42.2% in 1995 to 69.1% in 2005. While this is not optimum, it is encouraging in the context of the racial profiles of other similar institutions in South Africa (Breier, 2008; Breier & Wildschut, 2006).

#### 4.2.2.2. Race Profile of Applicants per Year and Programme

The number of applicants per race group per year is described in Figure 4.2.3 (see below). The graph shows the racial distribution of applicants per year. It can be noted that year-on-year the number of African applicants has increased substantially. However, the increase in the number of African applicants seemed to occur from the year 2001 onwards. In addition, it was from this time that the number of African applicants exceeded that of Indians. The percentage of Indian, White and Coloured applicants in the 2001-2005 period dropped. The percentage drop was most substantial for the Indian population (18.1%). This may be attributable to the prevailing admissions policies of the time, however, the number of people admitted each year should not influence the number of applicants for that year, indicating that the admissions policy alone was not the sole contributor of this phenomenon.

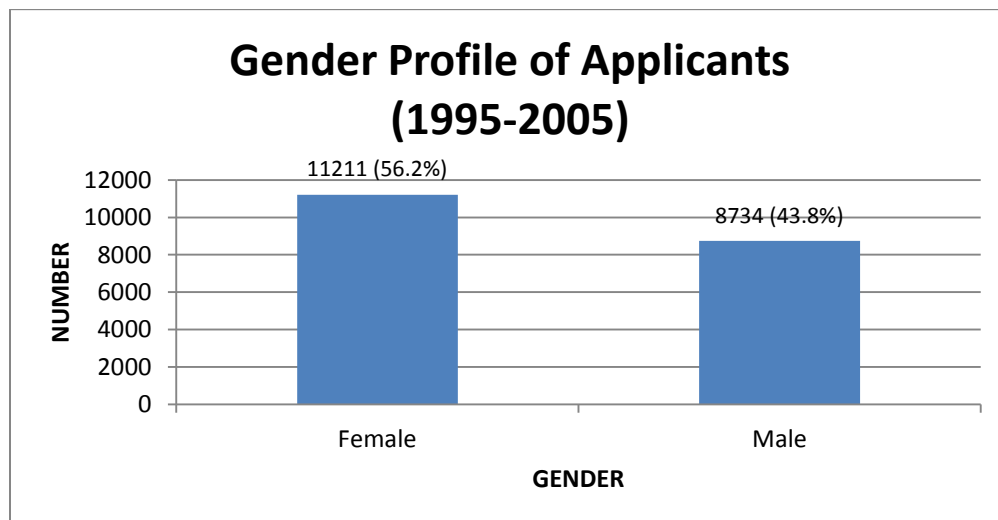


**Figure 4.2.3: The Race Profile of Applicants per Year (1995-2005)**

### 4.2.3. GENDER

Sub-section 4.2.3 describes the gender distribution of the applicant population to the NRMSM’s MBChB programme in terms of the overall gender profile and the gender profile per year.

#### 4.2.3.1. Overall Gender Profile of Applicants

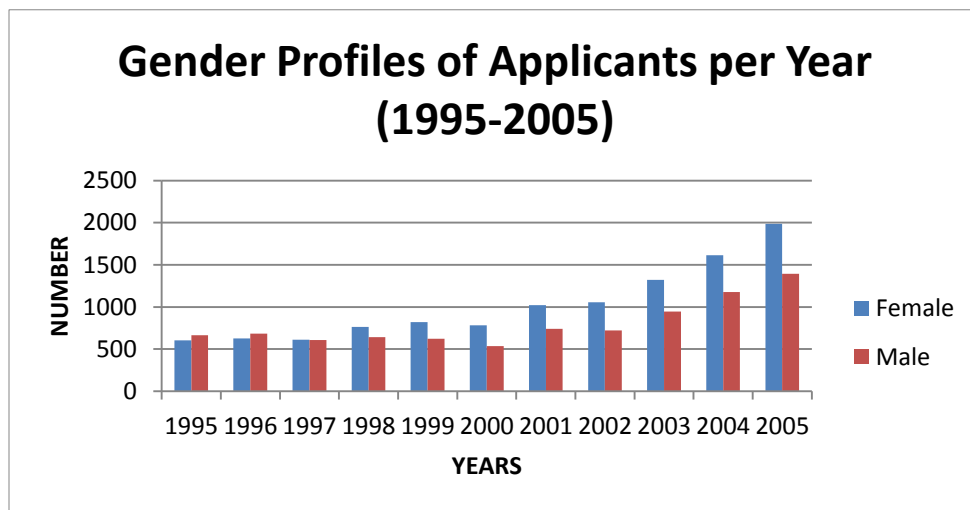


**Figure 4.2.4: Overall Gender Profile of Applicants (1995-2005)**

On average, over the 11 year period females constituted approximately 56.2% of all applicants to the MBChB programme at NRMSM. However, when one looks at the gender profiles per year

(Figure 4.2.5, overleaf) it can be noted that this trend (i.e., greater proportion of female applicants) only started from 1997 when the number of females first exceeded the number of males.

#### 4.2.3.2. Gender Profile of Applicants per Year



**Figure 4.2.5: Gender Profile of Applicants per Year (1995-2005)**

Figure 4.2.5 indicates that there were fewer female applicants (i.e., 47.6% and 47.7%) in 1995 and 1996 respectively. The first year when there were more female applicants was 1997; 50.2% (i.e., there were 5 more female applicants in that year). The proportion of female applicants has been higher than that of male applicants since 1997 and in 2005, 58.8% of applicants were female. According to the National Census results published in 2012 (Statssa, 2012), South Africa has a population comprising of 51.4% female.

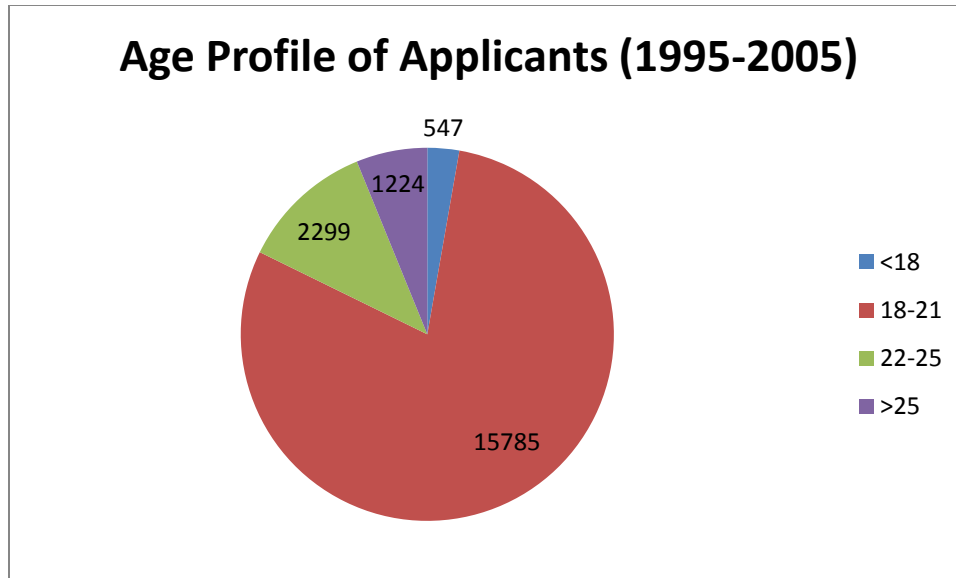
#### 4.2.4. AGE

This sub-section describes the number of applicants per age category. There is a focus on the 18-21 age group, in terms of the numbers as well as the educational qualifications (matric and mature). What is interesting about this group (18-21 year old) is that while it was selected to represent the average approximate age of completing matric (it is assumed that, in general terms, most people matriculate between the ages of 17-21). In this age category both matriculants and mature students are represented (see Figure 4.2.7).

The youngest applicant was 15 years old and the oldest was 52 years old. The age range was 37 years.

##### 4.2.4.1. Overall Age Profile

The graph below (Figure 4.2.6) represents the overall age distribution of the applicants with accurate age records (90 records had inaccurate ages and/or dates of birth).



**Figure 4.2.6: Age Profile of Applicants (1995-2005)**

The data shows that 79.5% (15 785) of all applicants were within the 18-21 age group and 91% (18 084) of the applicants fell within the 18-25 age group. The 18-21 year age group, being the most populous, warrants further analysis in terms of: firstly, the number of applicants per year of age; secondly, the educational qualifications of the applicants (i.e., matric vs. mature).

#### **4.2.4.2. Age Profile in 18-21 year Age Category**

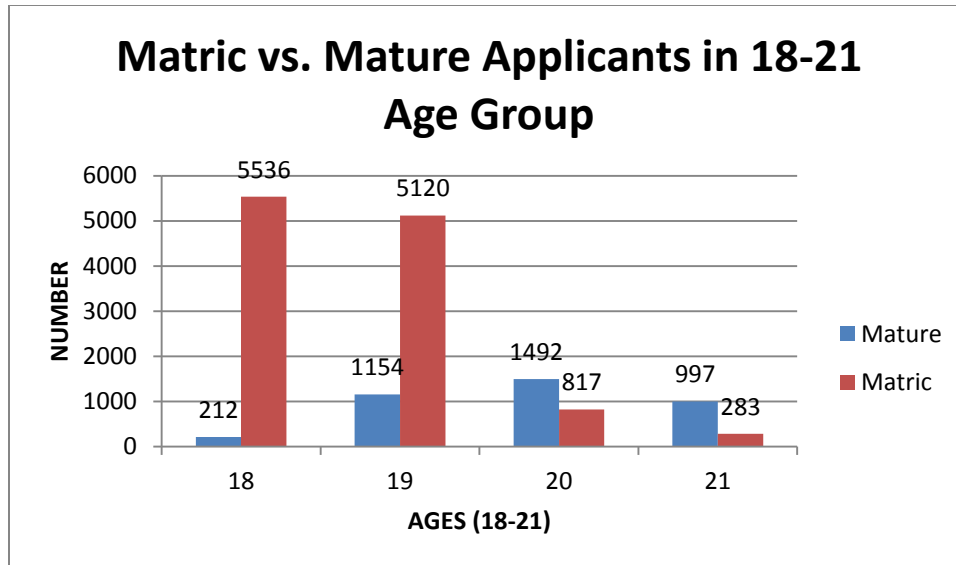
The majority of applicants (76.8%; n=12117) were either 18 or 19 year old. This is demonstrated in Table 4.2.3, below. The table describes the number of applicants in each year of age from 18 – 21.

**Table 4.2.3: Number of Applicants 18-21 year Age Category**

AGE	NUMBER
18	5783
19	6334
20	2360
21	1308

#### **4.2.4.3. Number of Matric and Mature Applicants in 18-21 year Age Category**

The majority of applicants in the 18-21 year age category were matriculants as described in the graph below (Figure 4.2.7). While the majority of the matriculants were either 18 or 19 years old, a number of matriculant applicants were also in the 20 and 21 year old category. It is unclear from the data whether the 20 and 21 year old matriculants completed matric in the year of application, or whether they had completed matric a year or two earlier and then taken a gap year.



**Figure 4.2.7: Matric and Mature Applicants in 18-21 Age Group**

The data presented demonstrates that the highest number of applicants came from the 18 and 19 year olds who completed matric in the year of application. This number decreases dramatically for the 20 and 21 years of age groups. The number of mature applicants in the older age categories is likely to have been significantly higher than matriculant applicants in the older age categories. The number of mature applicants in this age category (18-21 year old) may also represent a significant number of repeat applicants.

The educational qualifications of applicants are presented in the next sub-section. Of particular relevance are the racial profiles of matric and mature students in each age category.

#### **4.2.5. MATRIC and MATURE APPLICANTS**

The concept of matric and mature refers to two cohorts of applicants (and admitted students). As indicated earlier and in accordance with the MBChB admissions policy (Sunderlall, 2012), “matric” refers to applicants who have completed matric within the past two years and have not undertaken any tertiary level studies during that time. “Mature” refers to applicants who have undertaken any post-secondary school studies and may or may not have completed the qualification. Furthermore, according to the admissions policy the NRMSM should be admitting approximately 20% of the year’s intake as mature students and this cohort is subject to the same racial targets applicable to the general intake for the year (Sunderlall, 2012). This sub-section describes the profile of applicants per year and per programme in relation to their educational qualifications (i.e., matric and mature students).

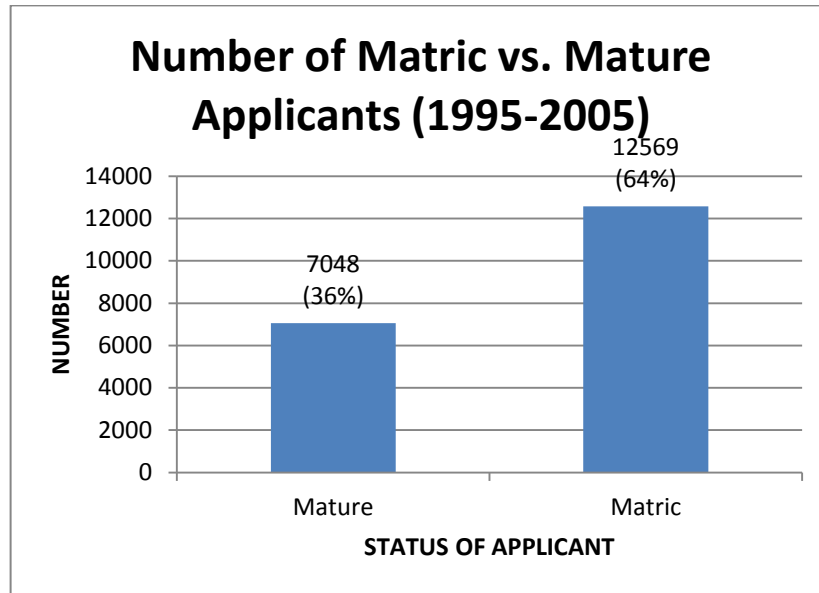
##### **4.2.5.1. Overall Number of Matric and Mature Applicants**

In the graph below (Figure 4.2.8), 7048 (35.3%) were mature applicants and the majority 12569 (63%) were matriculants<sup>9</sup>. With regard to the mature applicants, the data did not stratify this cohort into the level of post-secondary education activity. Specifically the data did not

<sup>9</sup>328 of the 19 945 applicants were unclassified or had “missing” educational qualification data.



distinguish what the applicants did in the years preceding their applications (e.g., engaged in tertiary studies or not or whether they had graduated or whether they were not studying).

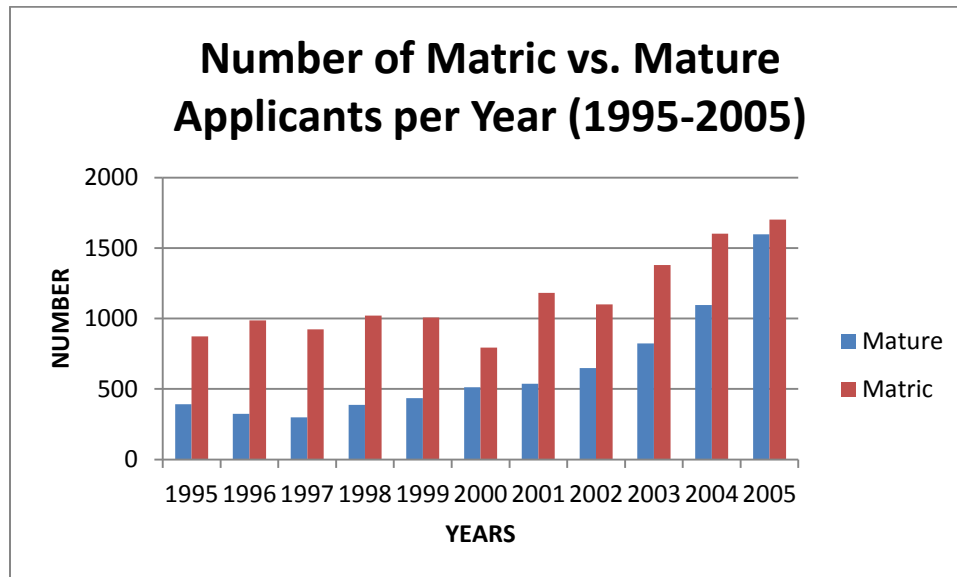


**Figure 4.2.8: The Number of Matric and Mature Applicants (1995-2005)**

Greater clarity is obtained when these large numbers are further analysed according to the year and the programme (MBChB6 vs MBChB5). The following sub-parts provide this information.

#### 4.2.5.2. Matric and Mature Applicants per Year

The graph below (Figure 4.2.9) describes the number of matric vs. mature applicants per year.



**Figure 4.2.9: The Number of Matric and Mature Applicants per Year (1995-2005)**

While the number of applications from matriculants is generally greater every year; there is a trend towards an increasing number of mature applicants. This is especially evident during the MBChB5 years (2001-2005) with 2005 recording the highest number of mature applicants. In 2005, 47.3% of the applicants were mature.

Of the total number of mature applicants in 2005, 506 had applied to the programme previously. This constitutes 31% of the mature applicants for the year, and 15% of the applicants overall.

#### **4.2.6. GEOGRAPHICAL ORIGINS OF APPLICANTS**

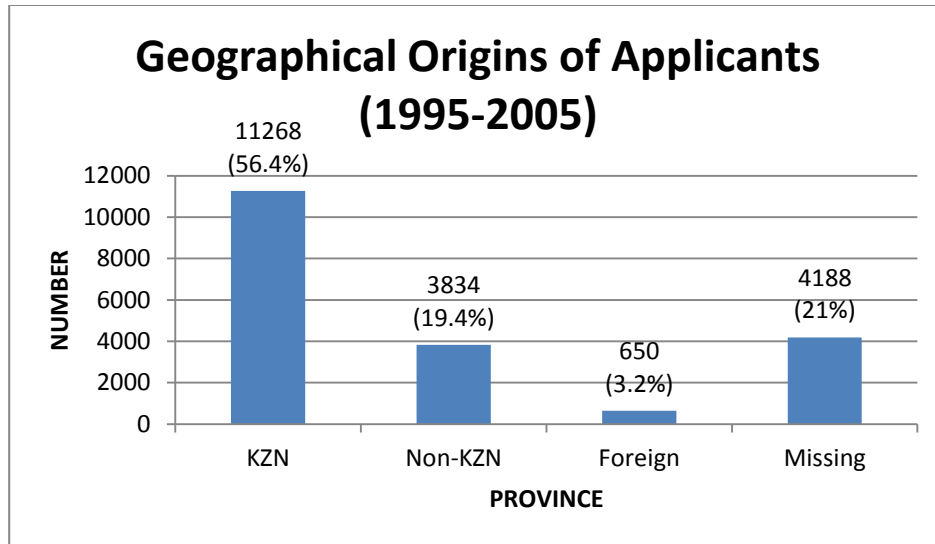
Of particular interest to the workforce distribution and staffing levels in KZN is the question of whether UKZN is producing graduates who remain and work in the province. This should be so if the Faculty is admitting students who apply from within the province. Furthermore, if the majority of applicants are indeed from KZN, it would be relevant to know their regional origins as well as whether the applicants (and admitted students) reside in urban or rural and in medically underserved areas of the province. In addition, the racial profile of the applicants from a regional and provincial perspective will be covered in this sub-section.

For this sub-section; the analysis considers only unique student numbers; that is, an applicant was counted only once when they first applied and were included in the overall number of records (18 775). It did not matter how many times a person re-applied to the programme, it was assumed that his/her geographical origin would not have changed by the next application.

##### **4.2.6.1. Provincial (KZN vs. non-KZN) Distribution of Applicants**

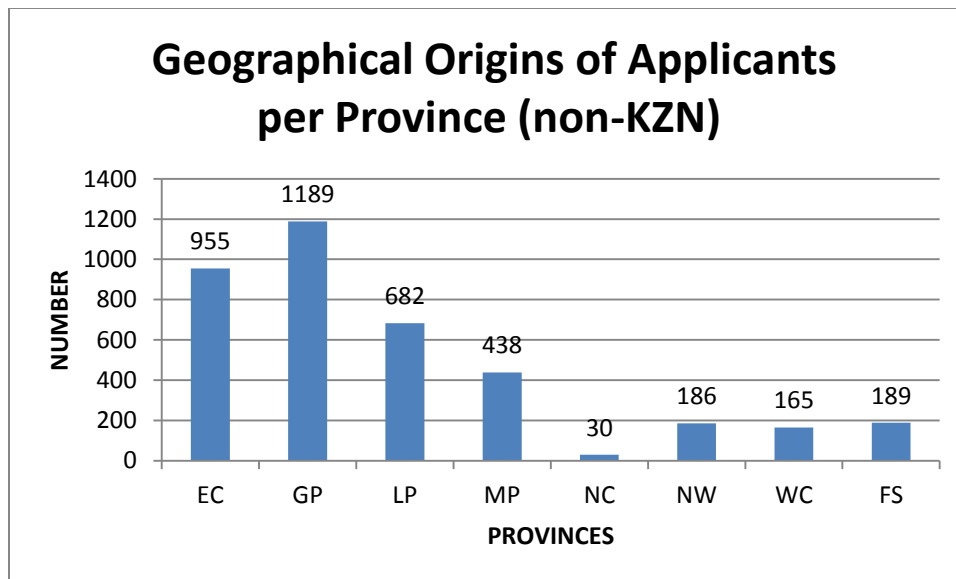
As indicated in the Chapter 3 (sub-section 3.4.1), several problems were identified with the data in this sub-section (4.2.6). The problems included missing post codes; incomplete addresses; the post codes could not be classified into any rural or urban areas and this further could not correlate with the quintile ranking of the schools.

Figure 4.2.10 overleaf describes the number of applicants who were residents of KZN. It is noted that the majority of applicants (11268) were from KZN; this representing 56.4% of the total number; while foreign and non-KZN province applicants accounted for 3.2% and 19.4% respectively. Twenty one percent (21%) of the records had either missing or incorrect information pertaining to the geographical origin of the applicants.



**Figure 4.2.10: The Geographical Origins of Applicants (1995-2005)**

Figure 4.2.11 further describes the number of applicants per non-KZN province.



**Figure 4.2.11: The Geographical Origins of Applicants per non KZN Province**

Among the non-KZN provinces, the Gauteng Province (GP) had the most number of applicants, followed by the Eastern Cape and Limpopo Provinces. The Northern Cape (NC) recorded the lowest number of applicants.

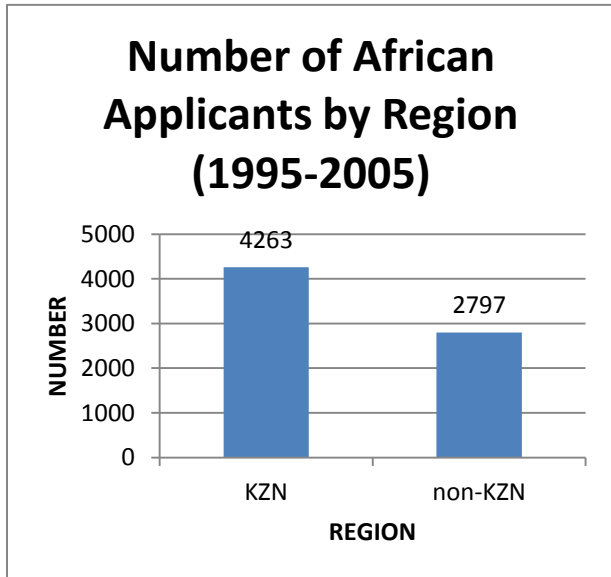
#### **4.2.6.2. Racial Profile of Applicants by Provincial Origins**

With the majority of applicants residing in KZN, the graphs A, B, C and D (Figure 4.2.12 below) show that the number of applicants from all race groups was higher for KZN than the non-KZN

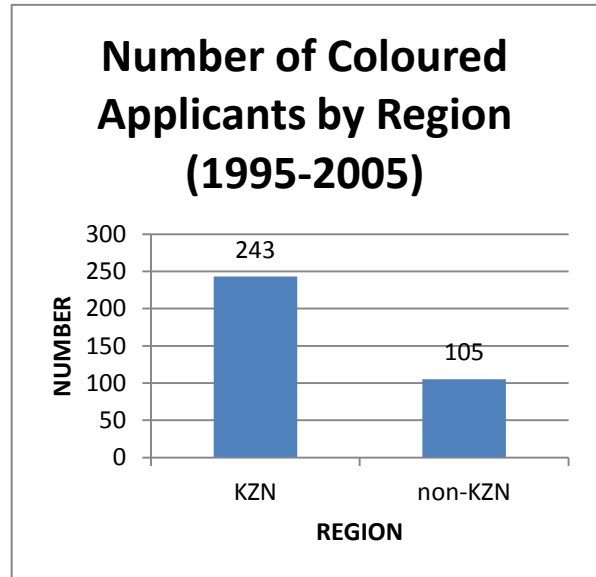
provinces. Although the proportions between KZN and non-KZN applicants may differ, the largest populations of applicants for all race groups hailed from KZN.

In KZN, the majority of the applicants were Indian, this accounting for 55.2% of the applicant pool. This was followed by Africans, Whites and Coloureds with 37.8%, 4.7% and 2.1% respectively. The pattern for non-KZN applicants was substantially different with Africans accounting for 76.2%, Indians 16.2%, and Whites and Coloureds accounting for 5.0% and 2.5% respectively. It is interesting that the KZN profiles resemble the pre-1994 admission quota from NRMSM of 50% African and 50% Indian and Coloured; while the non-KZN profiles resemble the post-1994 quota of 69% African, 19% Indian, 9% Coloured and 3% White.

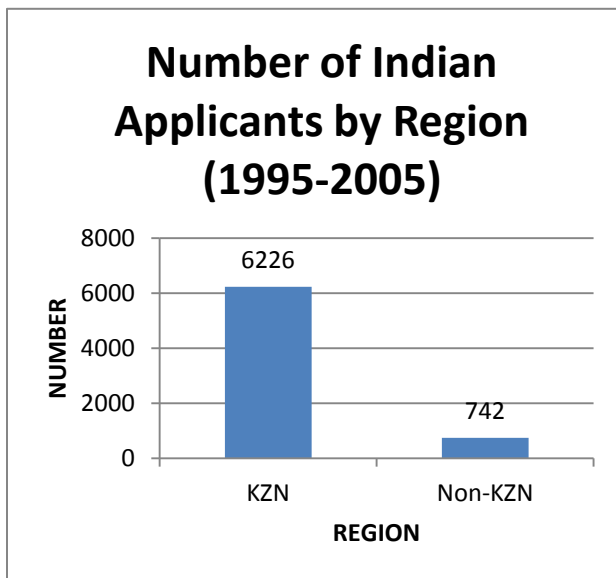
With regard to the KZN profiles, KZN has the highest Indian population in South Africa (Statssa, 2012), however, the population is still substantially lower than the African population. Despite this, the number of Indian applicants was still much higher than that of African applicants.



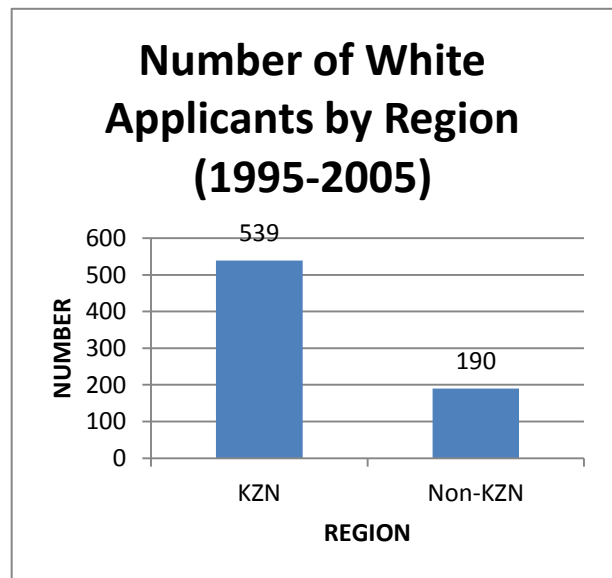
A



B



C



D

**Figure 4.2.12: Number of Applicants by Race per Region**

### 4.2.6.3. Regional Origins of KZN Applicants

In terms of the overall number of KZN applicants, knowledge of the regional origins is important. This knowledge will assist in terms of understanding the student population, student planning and resource allocation (e.g., residence allocation and provision of academic support during vacations), and with regard to the workforce provision on graduation. In this regard and based on the data and information provided, KZN was sub-divided into 4 regions for the purposes of this study, as indicated in table 4.2.4 below (and as explained in Chapter 3, sub-section 3.4.1).

**Table 4.2.4: Description of KZN Regions**

	<b>REGION</b>	<b>DESCRIPTION</b>
<b>1</b>	Ethekwini	Ethekwini Region and small towns between Durban and Pietermaritzburg
<b>2</b>	KZN South Coast	Umkomaas to Port Edward and Southern Interior
<b>3</b>	PMB and Midlands	Pietermaritzburg and Midlands to Drakensberg
<b>4</b>	Northern KZN and Zululand	Stanger to Pongola and Northern Interior

Table 4.2.5 below describes the regional origins of the overall number of KZN applicants.

**Table 4.2.5: Regional Origins of KZN Applicants**

	<b>Ethekwini</b>	<b>South Coast</b>	<b>PMB and Midlands</b>	<b>Northern-KZN and Zululand</b>	<b>Total</b>
<b>Total</b>	9631	423	594	620	11268

The population and geographical dynamics of the Ethekwini region and the area between Durban and Pietermaritzburg would be important to consider. This is an area which is well populated and largely urban and peri-urban. It must also be noted that each of the other regions also incorporate a major city or town which, owing to the relatively high populations, state of development and availability of resources, also accounts for a significant number of applicants. A major limitation, in this study was the inability to distinguish between urban and rural areas within these regions with the available data. The ability to make the distinction between urban and rural would provide valuable insight into the actual origins of our applicant pool. Based on the knowledge that persons in the urban/semi urban centres have better access to resources such as print and audio-visual media and telecommunication facilities, it stands to reason that they would make up the majority of the applicants from each of the four regions.

The majority (85.5%) of applicants from KZN are from the urban and peri-urban areas of Ethekwini. The next populous region being Northern KZN and Zululand with 5.5%, Pietermaritzburg, the Midlands and the Drakensburg with 5.3%, and the South Coast with 3.7%.

In addition to having the largest population, the Ethekewini region is also well resourced in terms of both public and private healthcare facilities and personnel<sup>10</sup>. It is the other regions which require greater effort in terms of health resources despite the relative difference in populations.

#### 4.2.6.4. Racial Profiles of Applicants from KZN by Regions.

As indicated in Table 4.2.5 above, the Ethekewini region in KZN has the highest number of applicants. If this number is further analysed in terms of race then the table below (Table 4.2.6) describes the racial profile of each region and it is therefore not surprising to find that Indian applicants comprise the majority of applicants from Ethekewini region. In this region the Indian cohort makes up 66% of the applicants. Based on the researcher’s personal knowledge of this region, it can be safely assumed that the majority of this number resides in urban environments. This can also be extrapolated to the other regions, giving further credence to the assumption that the majority of applicants from KZN reside in urban and semi-urban regions. In all other regions, again it can be assumed that the majority of the White and Coloured cohorts reside in similar environments to the Indian cohort. In regions other than Ethekewini the African applicant population is higher than Indians and one must also assume that the majority reside in urban or semi-urban environments. While these are assumptions, they are made using the information presented and it would be important to test these in a follow-up study.

Table 4.2.6 further describes the racial distribution of the applicants according to their regional origins in KZN.

**Table 4.2.6: Racial Profile of Applicants from KZN**

	<b>Ethekewini</b>	<b>South Coast</b>	<b>PMB and Midlands</b>	<b>Northern-KZN and Zululand</b>	<b>Total</b>
<b>African</b>	3328	165	253	517	<b>4263</b>
<b>Coloured</b>	225	4	12	2	<b>243</b>
<b>Indian</b>	5603	236	298	86	<b>6223</b>
<b>White</b>	472	18	31	15	<b>536</b>
<b>Total</b>	<b>9628</b>	<b>423</b>	<b>594</b>	<b>620</b>	<b>11265</b>

#### 4.2.7. APPLICANTS FROM DISADVANTAGED (Non-Fee Paying) SCHOOLS

This sub-section describes the number of applicants from non-fee paying (disadvantaged) schools and further describes the racial profile and the geographical origins of the applicants. The indicator of disadvantage has been addressed in previous chapters and for the purpose of this study; “disadvantage” refers to persons who attended Quintile 1 and Quintile 2 schools. It must be noted that these schools are classified according to the poverty index of the catchment

<sup>10</sup> Personal knowledge of this region

community and not because of the lack of available essential resources in the school itself (Mpofu, 2012). Furthermore, the quintile system does not distinguish between rural and urban locations of these schools.

**Table 4.2.7: Applicants from “Non-fee” Schools per Year (1995-2005)**

<b>number of Applicants from Non-fee paying Schools (1995-2005)</b>											
<b>Year</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
<b>Number of Applicants</b>	1266	1310	1220	1408	1444	1318	1763	1778	2267	2792	3379
<b>Number from Non-Fee Paying Schools</b>	29	28	28	19	18	19	17	27	49	44	47
<b>Percentage</b>	2.3	2.1	2.3	1.3	1.2	1.4	1.0	1.5	2.2	1.6	1.4

Table 4.2.7, describes the number of applicants to the MBChB programme between 1995 and 2005 who attended non-fee schools. The average percentage of applicants from non-fee schools relative to the total number of applicants over the period (1995-2005) is 1.7%. This represents a total of only 325 applicants.

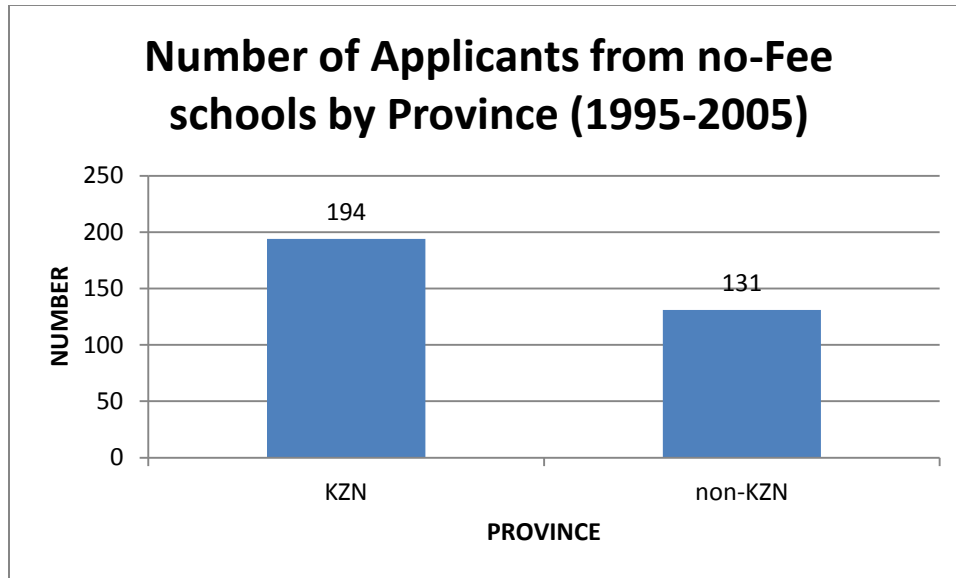
Of the 20114 applicants to the MBChB programme, 1305 records did not have the school recorded. The reasons for this may be that they were either not captured, or not provided, or they may have been international schools. They were not included in the analysis, and of the 18 809 records with schools, 325 applicants were from disadvantaged schooling backgrounds, i.e., they attended schools that were classified as “non-fee paying” (Quintile 1 and Quintile 2 schools).

#### **4.2.7.1. KZN vs non-KZN Applicants from Non-Fee Schools**

The number of KZN resident applicants from non-fee schools represents 59.7% (194) of the total number of non-fee paying applicants. This is depicted in Figure 4.2.13 below. Furthermore, 131 (40.3%) were from non-fee schools from other provinces.

In 2007 the province had a total of 955 secondary schools classified as non-fee schools. Of these the total number of applicants (194) came from only 26 of these schools. This represents 2.7% of the quintile 1 and 2 schools that had learners who had applied to study Medicine at NRMSM. Of these, 95 applicants attended non-fee schools in the Ethekwini region of KZN, 30 applicants attended non-fee schools in Pietermaritzburg and the Midlands; a further 65 attended non-fee schools in Northern KZN and Zululand and 4 applicants attended non-fee schools in the South Coast region.





**Figure 4.2.13: The Number of Applicants from Non-Fee Paying Schools by Province**

#### **4.2.7.2. Racial Profile of Applicants from Non-Fee Paying Schools**

Of the 325 applicants from non-fee schools, 315 were African; two were Coloured and eight were Indian. Of the 10 non-African applicants from non-fee Schools; nine attended the same school (i.e., Holy Cross High School, in Mtata). The above-mentioned findings strengthen the assertion that race will continue to be a measure of disadvantage in South African Society, despite calls for alternative class based means.

#### **4.2.8. SUMMARY OF APPLICANT DATA**

There has been an increase in the number of applicants for a place in the MBChB programme at NRMSM over the 11 year period. This has resulted in an increase in the ratio of applicants to the number of available places. There was also an increase in the number of repeat applicants during this period. Black applicants constituted the majority of applicants as did females. The majority of applicants were matriculants between 18-21 years of age. Most applicants hailed from KwaZulu-Natal and in particular the Ethekewini region of the province. Only 325 applicants attended non-fee paying school and of these the majority was Black.

### 4.3. ADMITTED STUDENT PROFILES

#### Research Question 2:

What was the socio-demographic profile of students admitted to the NRMSM's MBChB programme after 1994 (from 1995-2005)?

This section explores the socio-demographic profiles of all students admitted to the NRMSM's MBChB programme in the post-apartheid (1995-2005) period. The variables reported on are the same as for the applicant cohort.

#### 4.3.1. NUMBER OF ADMITTED STUDENTS

In this section the number of students admitted to the MBChB programme between 1995-2005 is described as is the number of students admitted per year.

The number of students admitted was and still is determined by the prevailing policy which governs the total intake per year, for which the NRMSM is accredited by the Health Professions Council of South Africa (HPCSA). While this number determines the size of the first year class, the actual number of students admitted per year is variable and is further determined by the number of students repeating a level one module.

Table 4.3.1 describes the number of enrolled students; the intake of new students and the number of repeat students per year over the 11 year period. The total number of students enrolled in the programme during this period was 2050; however, only 1884 were newly admitted (first admission) to the programme and 166 students were either readmitted or repeated the year or modules. The latter cohort represents students who repeated a year or were readmitted to the programme; either, after a period of absence or after they had been excluded from the programme (due to poor progress). The readmission was on application and/or appeal. These applications would not have gone through the regular admission process; they would have been dealt with on an individual basis by the faculty's Undergraduate committee. The latter cohort does not equate the number of students who failed in each previous year, as some of the students who failed may have dropped out, re-curriculated or been academically excluded.

**Table 4.3.1: Enrolled students, New Admissions and Repeat Students per Year**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
Enrolled students	130	160	149	197	198	200	195	198	206	211	207	2050
New Admissions	118	131	136	190	186	171	162	176	200	208	207	1884
Repeat/Readmitted	12	29	13	7	12	29	33	22	6	3	0	166

Despite the time frame being different, between the two programmes (i.e., MBChB6 = 6 years offered between 1995-2000 and MBChB5 = 5 years offered between 2001-2005); there were proportionally more students admitted to the MBChB5 programme (953) than the MBChB6

programme (931). This was as a result of the NRMSM policy to increase the intake of students from 130 in 1995 to 160 in 1996 and to 200 by 1999 (Sunderlall, 2012). However, despite the decision to only increase the intake to 200 from 1999, a higher number of students were admitted from 1998.

The change in the programme influenced the intake of new students in several ways. Firstly, there was a drop in intake in years 2000, 2001 and 2002. This was accompanied by a high number of readmissions to the programme. These transitional years were considered the “pipeline years” which represented the phasing out and phasing in of the old and new programmes respectively. The high number of readmissions to the programme represented students who had failed modules in the first, second and third years of the old programme and/or those who were facing exclusion on academic grounds. These students were offered a reprieve if they registered for the new programme. This meant that their (poor) academic record in the old programme would no longer be considered and they were able to start afresh with a new academic record in the new programme. Many students accepted the offer and re-registered under the new rules of the MBChB5 programme, hence the low intake in 2001 and 2002. Secondly, the change in the programme was accompanied by an improvement in the pass rates of the first year students and as a result fewer students repeated the first year. The decrease (by approximately 20%) in the number of students repeating the first year significantly improved the intake targets per year from 2003 onwards. Thirdly, the change in the programme was also accompanied by a change in the admission criteria (see Chapter 1; sub-section 1.1.4). The change in admission criteria meant that more people were now eligible for admission to medicine and it was no longer the domain of only school leavers who had chosen a science-based<sup>11</sup> track within their schooling curriculum.

#### **4.3.2. RACE**

In this sub-section the racial profile of all admitted students is described. This is represented in terms of the overall profile; the annual intake as well as the racial profile per programme. It must be noted that this variable is governed by policy which is linked to redress initiatives of the NRMSM and UKZN. As a result the admission policy stipulates a racial quota in which the admission targets are representative of the demographics of the province.

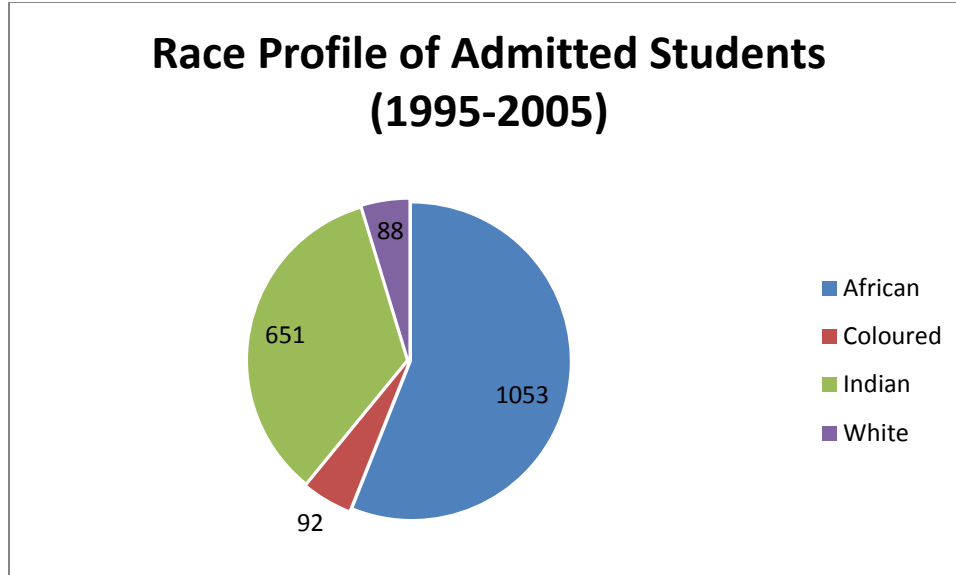
Prior to 1994 the racial targets for admission was roughly 50% African and 50% Indian and Coloured (White students were first admitted to NRMSM in 1995). This subsequently changed in 1994 (Sunderlall, 2012) to the present targets of African 69%; Indian 19%; Coloured 9% and White 3%. However, despite the change in policy around 1994, it took another seven years to achieve the targets set. This was attributable to several factors; the main reason being the generally poor results achieved by African matriculants (Myburgh, 2007) and the relatively small pool of applicants with the appropriate qualifications meeting the admission criteria (Sunderlall, 2012). Furthermore, this small pool of applicants was also shared among the other South African

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<sup>11</sup> Science-based track: this refers to subjects: physical science and biology, which were requirements for admission to Medicine

universities. Therefore, in order to fill the required number of places the NRMSM had to look to other race groups and/or mature students.

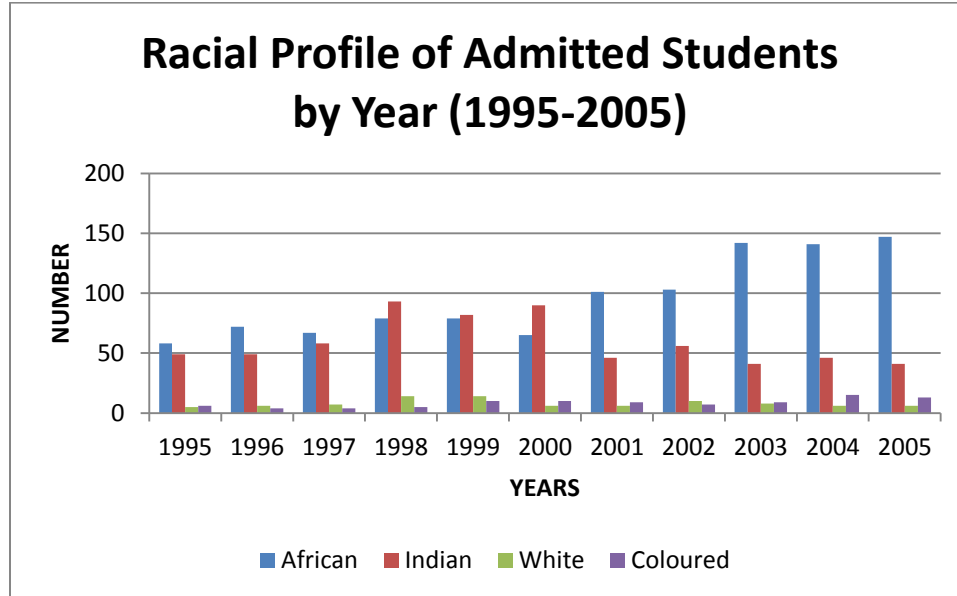
#### 4.3.2.1. Overall Race Profile of Admitted Students



**Figure 4.3.1: The Racial Profile of Admitted Students (1995-2005)**

Figure 4.3.1 demonstrates that the intake of African students was 1053 (55.9%); Indian students 651 (34.5%); Coloured students 92 (4.9%) and White students 88 (4.7%). This is not representative of the stated targets as it is an average over the 11 years. Has NRMSM achieved its stated racial targets? If so, when was this first achieved? An analysis of the racial profile of admitted students per year provides the answers, as is seen in Figure 4.3.2.

#### 4.3.2.2. Racial Profile per Year – Newly Admitted Students



**Figure 4.3.2: Racial Profile of Newly Admitted Students by Year (1995-2005)**

Figure 4.3.2 (see above) describes the racial profile of newly admitted students to the MBChB programme from 1995 to 2005. The high number of Indian admissions in 1998-2000 is attributable to the poor results of African learners in the matriculation examinations (Myburgh, 2007; Sunderlall, 2012) as well as the relatively low number of learners with the appropriate grades in the Sciences<sup>12</sup> and Mathematics (Sunderlall, 2012). The graph demonstrates that progress has been made (at NRMSM) from 2003 in achieving its stated targets for all race groups and for the African cohort in particular.

In considering this shift in racial profiles, the questions which remain unanswered are:

1. Did the number of African learners meet the requirements for admission because the sciences and were no longer compulsory? That is, did the change in admission criteria improve access? OR,
2. Was there an overall improvement in the results of the African students during this period? OR,
3. Was the racial profile achieved through greater adherence, by the selection committees, of the rules/policy?

While it would be possible to determine the answers to these questions; and certainly interesting to explore the major contributors to the NRMSM achieving its racial targets, it is not part of this research.

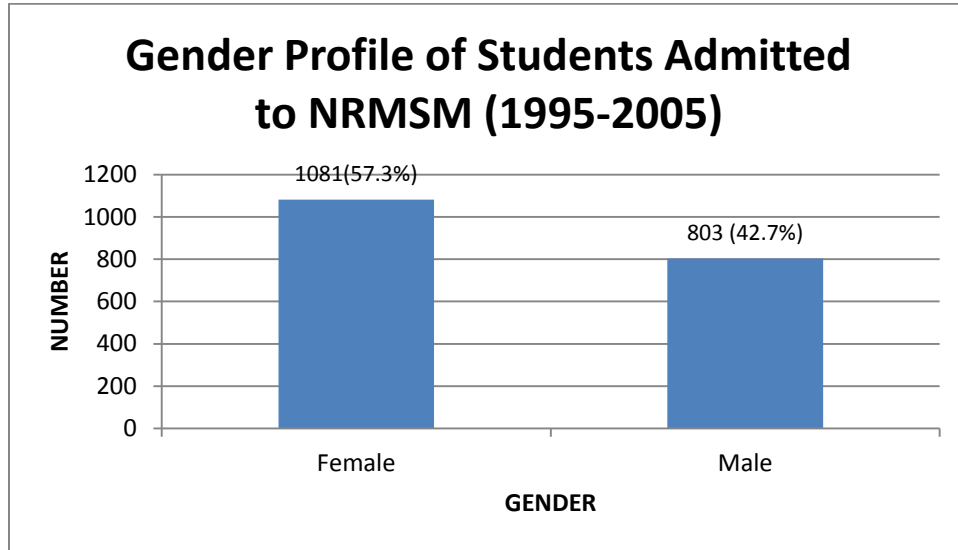
#### 4.3.3. GENDER

The selection/admission process is blind to gender and in general terms, it seems that the number of females admitted to the programme at the NRMSM mirrors the trend found in other South African medical schools (Breier & Wildschut, 2006) and internationally (McManus, 2002).

<sup>12</sup> Physical/Natural Science and Biology/Life Science

Figures 4.3.3 and 4.3.4 (see below) describe the overall gender profile of the first year student population at NRMSM as well as the gender profile of the first year student population per year from 1995 to 2005, respectively.

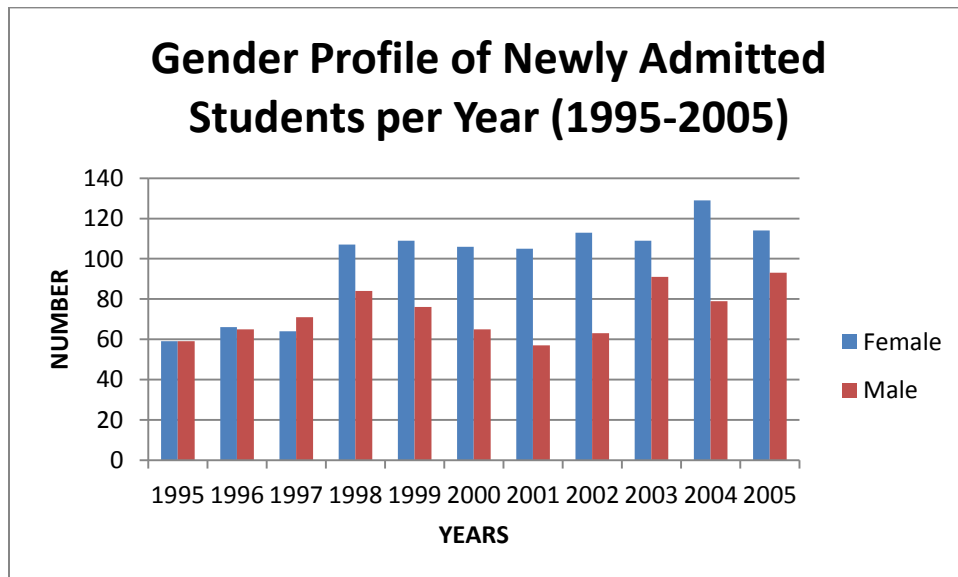
#### 4.3.3.1. Overall Gender Profile



**Figure 4.3.3: The Gender Profile of Admitted Students (1995-2005)**

The NRMSM admitted a higher number of female students (57.3%) during this time. The trend of admitting a higher proportion of females has been consistent from 1998 onwards.

#### 4.3.3.2. Gender Profile per Year



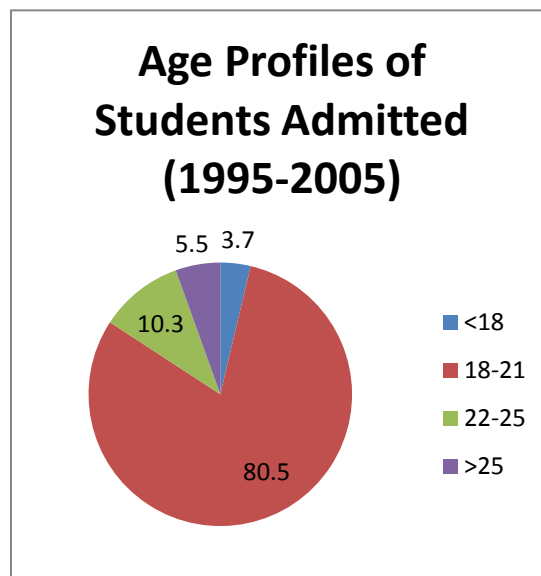
**Figure 4.3.4: The Gender Profile of Newly Admitted Students (1995-2005)**

As can be seen from Figure 4.3.4, in 1995 the number of males and females was equal. In 1996 females outnumbered males by one and in 1997 males dominated the profile by seven. However, from 1998 onwards the number of females admitted to the programme was consistently higher than the number of males. On average, the male to female ratio during the 11 year period was 1:1.35.

#### 4.3.4. AGE

This sub-section describes the age of the student population and provides insight into the sub-population of students and hence their educational qualifications on entrance to the programme. As indicated previously in sub-section 4.2.4, the age categories were selected arbitrarily to represent the general age of completing school (Grade 12).

##### 4.3.4.1. Overall Age Profile of the (First Year) Student Population



**Figure 4.3.5: The Age Profiles of Admitted Students (1995-2005)**

In Figure 4.3.5, 3.7% of the student population was under 18 years of age. The data describes 3.7% (68) students who were under 18 years. Of these students, 64 were 17 years old, three were 16 and one was 15 upon admission. It is assumed that the data regarding the students less than 17 years of age is correct.

The data also indicates that 90.8% (1709) of the first year medical student population was between the 18-25 years age range. The 18-21 year age group was the most populous, comprising 80.5% (1515) of students on admission. The information regarding the age a student admitted is important as it influences the overall number of working years of the graduate. For example, admitting older people means that they would spend a shorter time working considering the duration of the programme, and the duration of internship and community

service. Therefore, with the majority of students admitted being relatively young, the national workforce resource allocation is given a boost in that these individuals will (in theory) spend the maximum working time in the profession.

#### 4.3.4.2. Matric and Mature First Year Students in 18-21 Age Category

Figure 4.3.6 (see below) describes the fact that the majority of 18 to 19 year old students are matriculants, however, it also demonstrates that a number of older (20 and 21 year old) admitted students were categorised as matric. The number of mature students admitted increases with increasing age within this category.

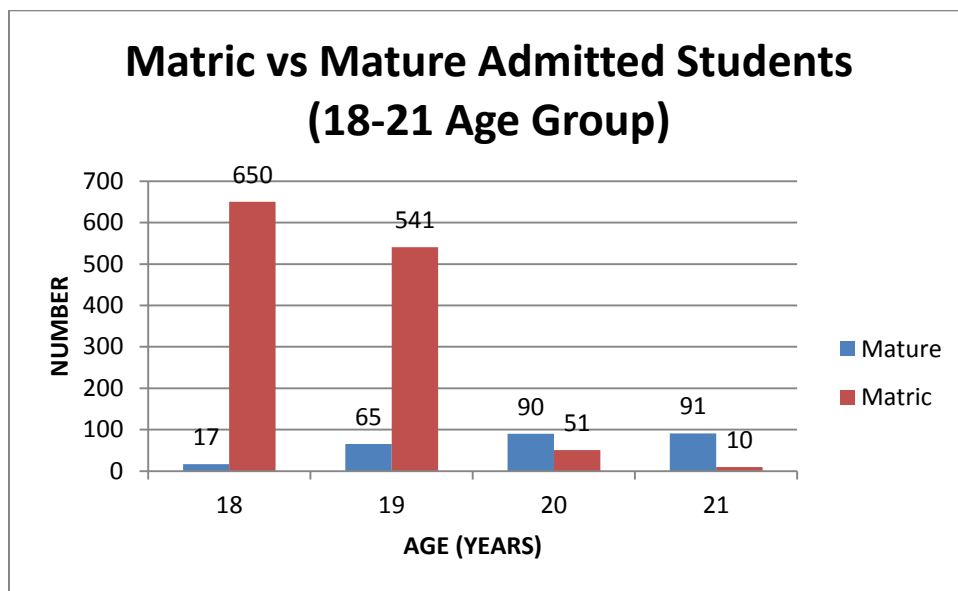


Figure 4.3.6: The Number of Matric and Mature Students Admitted

#### 4.3.5. MATRIC and MATURE FIRST YEAR STUDENTS

Higher education institutions have the responsibility to absorb school leavers into the next phase of their education. This third phase (tertiary education) is presumably determined by personal preferences and choices by school leavers. Many learners apply to study medicine, and may not be admitted in the year they are scheduled to complete matric. They undertake other courses at higher education institutions and/or seek employment and reapply after a few years. This sub-part describes the profile of matric and mature students who were admitted to the programme and provides insight into their numbers, ratios and racial characteristics.

##### 4.3.5.1. Overall Number of Matric and Mature Students Admitted

Table 4.3.2 describes the number of admitted students classified as matric and mature. It also shows the percentage of the total number of admission the mature group constitutes per year. One must interrogate the table with the NRMSM’s admission policy in mind. The policy states



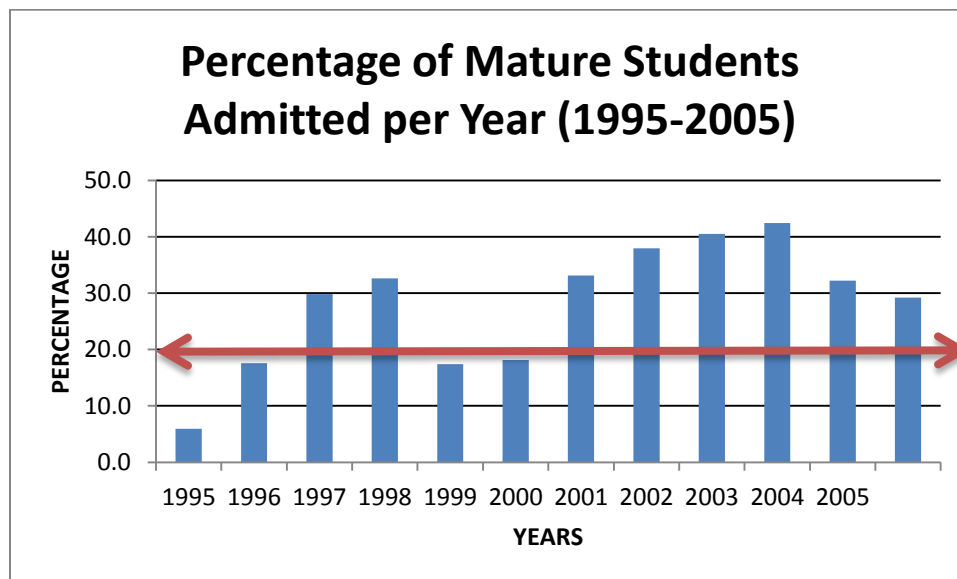
that at least 20% of admissions should be from the mature category and that they would be subject to the same racial targets as the matriculants (Sunderlall, 2012).

**Table 4.3.2: Number of Matric and Mature Students**

	Mature	Matric	Total	Mature/Total Percentage
<b>1995</b>	7	111	118	5.9
<b>1996</b>	23	108	131	17.6
<b>1997</b>	40	94	134	29.9
<b>1998</b>	62	129	191	32.5
<b>1999</b>	32	152	184	17.4
<b>2000</b>	31	140	171	18.1
<b>2001</b>	53	108	161	32.9
<b>2002</b>	66	108	174	37.9
<b>2003</b>	81	119	200	40.5
<b>2004</b>	87	118	205	42.4
<b>2005</b>	66	140	206	32.0
<b>Total</b>	<b>548</b>	<b>1324</b>	<b>1872</b>	<b>29.2</b>

It is evident that the number of mature students admitted to the programme has increased progressively over the years. On average the ratio of mature to matric students is 1:2.4, meaning that for every 1 mature student admitted 2.4 matriculants are admitted. The overall average of mature students admitted to the NRMSM is 29.2% of the total intake for that period.

#### 4.3.5.2. The Quota of Matric and Mature Students



**Figure 4.3.7: The Percentage of Mature Students Admitted per Year (1995-2005)**

The NRMSM admission policy states that the target for each race group in terms of the proportion of mature students admitted should be approximately 20%, i.e., at most 20% of places allotted for each race group will be for mature students. Figure 4.3.7 above, describes the 20% allotment (red arrow) as well as the actual percentage of the admitted population who are mature students. It can be seen that the proportion of mature students has been consistently high from 2001, which represents the MBChB5 programmes intake. In addition, both 1997 and 1998 recorded a higher proportion of mature students. The reason given for this during this time is the poor matric results during these years (Myburgh, 2007; Sunderlall, 2012) and this meant that fewer matriculants met the required admission criteria in those years. In order to fill places the NRMSM could have dropped the admission requirements or looked “elsewhere” for its cohort of students. It did both, the number of points required was dropped from 38 to 36<sup>13</sup> (Sunderlall, 2012) and the numbers required for the intake was made up by more mature students and by a greater number of Indian students.

An interesting point to note from the data is that; of the African students admitted; approximately 40% were mature compared to the Indian cohort, where only 4% were mature students. The White and Coloured intake of mature students was approximately 20% (this was congruent with the overall policy).

#### **4.3.6. GEOGRAPHICAL ORIGINS of the STUDENT POPULATION**

In this sub-section, the geographical (provincial and regional) origins of students are explored. In addition, the racial profiles of these areas (regional and provincial) are also described.

Similar difficulties encountered with the applicant group were experienced in handling the data with this cohort. However, it must be noted that the data for this cohort was more accurate and more complete than that of the applicant cohort; despite some of the records having missing information (1824 out of 1884 records had complete information).

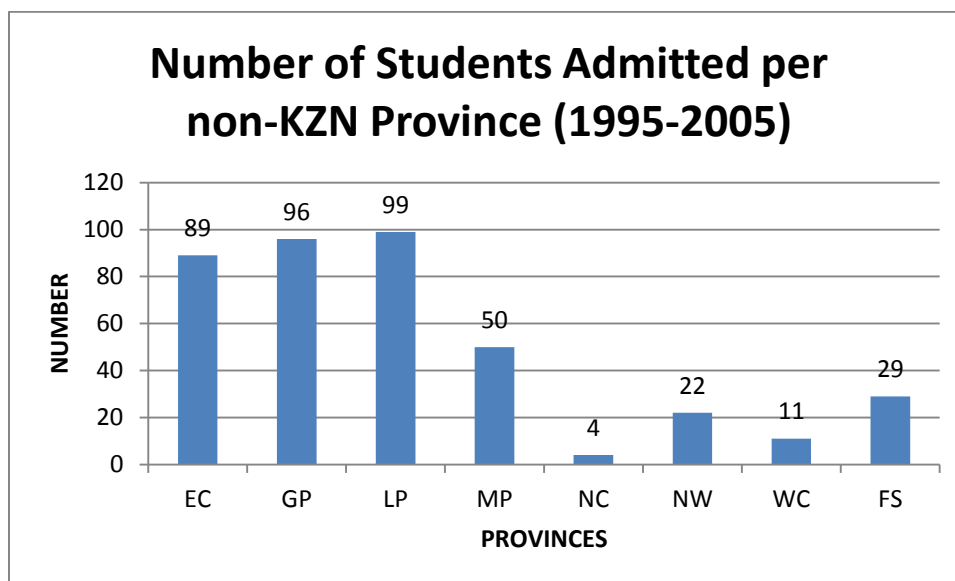
##### **4.3.6.1. The Provincial Residential Origins of the Student Population**

Table 4.3.3 below, describes the total number of admitted students who reside in KZN and collectively in the other provinces of South Africa. It is evident that the majority of students reside in KZN (74.6%).

**Table 4.3.3: Distribution of Admitted Students by Provincial Origins**

	<b>Number</b>	<b>Percentage</b>
<b>KZN</b>	1417	74.6
<b>non-KZN</b>	400	21.1
<b>missing</b>	83	4.3
<b>Total</b>	<b>1900</b>	<b>100</b>

<sup>13</sup> Grade Points were allocated according to result symbols obtained in matriculation examination; A=8; B=7; C=6; D=5; E=4; F=3.



**Figure 4.3.8: The Number of Students Admitted from non-KZN Provinces (1995-2005)**

Figure 4.3.8 (see above) describes the number of students admitted from each of the other provinces. The highest number of students admitted came from Limpopo Province (99), followed by Gauteng Province (96) and Eastern Cape (89). The 3 above-mentioned provinces collectively account for 71% of the total non-KZN admissions and the other provinces collectively make up 29% of the non-KZN admissions to NRMSM.

#### **4.3.6.2. Racial Profile of Admitted Students by Province**

In considering the racial distribution of the admitted student population in terms of KZN vs. non-KZN residents; Table 4.3.4 describes the racial distribution of the student population by provincial category.

**Table 4.3.4: Racial profile of Students Admitted by Province**

	<b>African</b>	<b>Indian</b>	<b>Coloured</b>	<b>White</b>
<b>KZN</b>	610	650	79	83
<b>Non-KZN</b>	379	3	14	6

It is evident that the majority of African, Indian, White and Coloured students reside in KZN, while 94.3% (379) of students who reside outside KZN are African.

#### 4.3.6.3. Profile (Race and Number) of Students who are Residents in KZN

Of the student population the number resident in KZN is the highest of all the provinces combined. It is therefore logical to determine the number of students resident in the various regions of KZN as well as the racial profiles of the residents of these regions. (Refer to Table 4.1.4 for the description of the KZN regions).

**Table 4.3.5: Number and Racial Profile of Students Admitted by KZN Region**

	<b>Ethekwini</b>	<b>South Coast</b>	<b>PMB and Midlands</b>	<b>Northern-KZN and Zululand</b>	<b>Total</b>
<b>African</b>	300	60	91	159	<b>610</b>
<b>Coloured</b>	62	2	14	1	<b>79</b>
<b>Indian</b>	542	47	56	5	<b>650</b>
<b>White</b>	69	5	8	1	<b>83</b>
<b>Total</b>	<b>973</b>	<b>114</b>	<b>169</b>	<b>166</b>	<b>1422</b>

Table 4.3.5 (above) describes the number of students who are resident in the four selected regions of KZN. It is evident that the majority of students admitted resided in the Ethekwini region. This accounted for 68.4% of the student population. The Indian student population was the highest in the Ethekwini region [55.7%] compared to the African population which comprises of only 30.8%. The White and Coloured students make up 7.0% and 6.5% of the students who reside in the Ethekwini region, respectively. In other regions the African population is much higher. In the South Coast region the African students comprise of 52.6%; Indian students 41.2%; and 6.2% is made up by White and Coloured students collectively. A similar profile is seen in the PMB and Midlands region, where African (53.8%); Indian (33.1%) and the White and Coloured students made up 13.1% of the number of admitted students. The Northern KZN and Zululand region had a 95.8% African student population with 4.2% being made up of the other races collectively.

#### 4.3.7. STUDENTS ADMITTED from DISADVANTAGED SCHOOLS

This sub-section describes the profiles of students who had attended Quintile 1 and Quintile 2 schools in the ranking system employed by the DoE as a measure of disadvantage. The number of students admitted, the proportion of this to the general intake per year is explored.

Table 4.3.6 (overleaf) describes the number of students admitted in each year, 1995-2005. Of the total intake of 1884 during the 11 year period, only 61 students who attended non-fee schools were admitted to the MBChB programme at NRMSM. This represents an average of only 3.2% of the overall intake. Of this number, 41 attended non-fee schools in KZN and the students were exclusively African.

**Table 4.3.6: Number of Students Admitted from “Non-Fee” Schools per Year**

<b>Number of Students Admitted from Non-fee paying Schools (1995-2005)</b>												
<b>Year</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>Tot</b>
<b>Number Admitted</b>	10	4	5	6	4	5	4	6	6	5	6	<b>61</b>
<b>New Admissions</b>	118	131	136	190	186	171	162	176	200	208	207	<b>1884</b>
<b>Percentage</b>	<b>8.4</b>	<b>2.3</b>	<b>3.7</b>	<b>3.7</b>	<b>2.7</b>	<b>2.9</b>	<b>2.5</b>	<b>3.4</b>	<b>3.0</b>	<b>2.4</b>	<b>2.9</b>	<b>3.2</b>

#### **4.3.8. SUMMARY of ADMITTED STUDENTS DATA**

The enrolment figures reflect the total number of places available in the MBChB programme at the NRMSM for each intake. The actual number of students admitted for the first time varies each year and is dependent on the number of students who repeat the year. Out of the 2050 available places (1995-2005), 1884 students were admitted to the programme for the first time. Of these Black students constituted 55.9% and Indian students 34.5% respectively. The majority were female and matriculants between the ages of 18-21. 74.6% of the new admissions reside in KwaZulu-Natal and the majority reside in the Ethekwini region (68.4%). One in every 5 applicants from disadvantaged schools (i.e., Quintile 1 and Quintile 2 schools) was admitted to the programme and they were exclusively Black.

#### **4.4. SUCCESS RATES OF STUDENTS FROM DISADVANTAGED EDUCATIONAL BACKGROUNDS**

##### **Research Question 3**

What proportion of students admitted to the programme are from educationally disadvantaged backgrounds and what is the success rates of these students compared to those from “educationally advantaged” backgrounds?

Research Question 3 does not ask about the proportion of applicants to the MBChB programme, however, section 4.2, described the number of applicants from non-fee paying schools. It was found that of the 19945 applicants in the 11 year period (1995-2005), 325 applicants were from non-fee schools. This represents an average of 1.7% of the total applicants. The number of applicants from non-fee paying schools started to increase from 2003 onwards, in accordance with the increase in the overall number of applicants.

In Section 4.3, the number of students admitted from non-fee paying schools was described in sub-section 4.2.7. Of the number of applicants from non-fee schools (325) only 61 students were admitted from non-fee schools. This represents 3.2% of the admissions to NRMSM from non-fee paying schools over the 11 year period.

Therefore the first part of research question 3 has been answered in section 4.3 (4.3.7) of this chapter.

This section (i.e., 4.4) of the chapter 4 focuses on the students admitted who attended educationally disadvantaged schools, i.e., quintile 1 and quintile 2 schools which were deemed to be “non-fee” paying schools. It considers the relative proportions of admitted students to the number of applicants from non-fee paying schools and the success in the first year of the non-fee paying school cohort by analysing their results and expressing it in terms of failure rates.

##### **4.4.1. PROPORTION OF ADMITTED STUDENTS TO APPLICANTS per COHORT**

While research question 3 does not specifically ask about it, this proportion provides an interesting statistic. When one considers the proportion of students admitted to the number of applicants from each cohort (fee-paying schools and non-fee paying schools), the data demonstrates a different scenario. NRMSM admits a higher proportion of students (i.e.  $61/325 = 18.8\%$ ) from non-fee paying (quintile 1 and 2) schools as opposed to that (i.e.,  $1823/19620 = 9.4\%$ ) from quintile 3-5 schools (and other unidentified schools). This means that proportionally (based on admitted student to applicant ratios), NRMSM is admitting more students from non-fee paying schools than students from fee-paying schools. However, with the relatively low overall admission rates (an average of only 3.2%) of students from non-fee schools, it is relevant to ask whether the university and NRMSM is doing enough to address past inequalities and improve access or is the racial profile of our student population a sufficient indicator of success in addressing the issue of access? In response to this the NRMSM has, since 2012, reserved 20% of place for students from quintile 1 and quintile 2 schools (UKZN, 2013).

#### 4.4.2. SUCCESS RATES OF STUDENTS FROM FEE PAYING AND NON-FEE PAYING SCHOOLS

Table 4.4.1 (below) summarises the admission statistics for the period 1995-2005 (seen previously in 4.3.7.) and contains breaks down the new admissions into the 2 cohorts (fee-paying and non-fee paying schools attended) as well as the number of students who failed first year modules.

**Table 4.4.1: Admissions and Results of Students Admitted per Year**

	Parameters	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1	Fee Admit	108	127	131	184	182	166	157	170	194	203	201
2	Non-fee Admit	10	4	5	6	4	5	4	6	6	5	6
3	Fee Fail	35	30	9	15	28	42	8	7	4	1	0
4	Non-fee Fail	6	2	1	2	4 <sup>14</sup>	3	0	4	1	0	0
5	Total no. Fail	41	32	10	17	32	45	8	10	5	1	0

Table 4.4.1, above, item 2 (row 3 –“Non-fee Admit”) and item 4 (row 5 – “Non-fee Fail”), describes the number of students admitted to the MBChB programme, who attended non-fee schools and the number of these students who failed in the first year of the MBChB programme.

Table 4.4.2 below represents the data as a percentage of the number failures to the admitted students per year for both cohorts (fee-paying and non-fee paying school cohorts).

**Table 4.4.2: Students who failed per Year from fee-paying and non-fee schools**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>Fee Fail</b>	32.4%	23.6%	6.9%	8.2%	15.4%	25.3%	5.1%	4.1%	2.1%	0.5%	0.0%
<b>No-fee Fail</b>	60.0%	50.0%	16.7%	33.3%	100%	60.0%	0.0%	66.7%	16.7%	0.0%	0.0%

The information in the table represents an average failure rate of 35% for the non-fee paying school cohort. By contrast, the average failure rate for the fee-paying school cohort was 10.5%.

There is a relatively high failure rate in the non-fee paying school cohort. The failure rates range from 0% to 100%; whereas in the fee-paying school cohort the failure rate ranges from 0% to 32.4%. With regard to the non-fee paying school cohort; 1995 and 2000 recorded a 60 % failure rate; a 66.7% failure rate was recorded in 2002 and in 1999 there was a 100% failure rate in the same cohort. A 0% failure rate was recorded in the non-fee paying cohort in 2001, 2004 and 2005 (all part of the MBChB5 programme).

Table 4.4.3, overleaf, summarises the failure rates between the fee-paying and the non-fee paying school cohorts in the overall MBChB programme as well as the failure rates of the fee-paying and the non-fee paying school cohorts between programmes (MBChB6 (1995-2000) and MBChB5 (2001-2005)).

<sup>14</sup>One student was admitted in the previous year and failed for the second time

**Table 4.4.3: Failure Rates per Programme**

	Fee Fail Avg (%)	Non-Fee Fail Avg (%)
<b>1995-2000</b>	18.6	53.3
<b>2001-2005</b>	2.4	16.7
<b>TOTAL</b>	10.5	35.0

The overall failure rate in the MBChB6 programme, for both cohorts was 17.6%; while in the MBChB5 programme this had dropped to 2.5%. The failure rate of the non-fee paying school cohort has also seen an improvement in the average failure rate from 53.3% in MBChB6 to 16.7% in MBChB5. Although the drop in the failure rate across the board is encouraging, it must still be noted that the rate is still substantially higher for the non-fee paying school cohort, despite the curriculum change. What is encouraging though is that the overall failure rate for both cohorts is substantially lower in the MBChB5 programme.

#### **4.4.3. SUMMARY**

NRMSM is admitting a higher proportion of students from non-fee schools (based on the number of applicants), despite the low overall number. However, the success of this cohort seems to be severely compromised. This is evidenced in the proportion of the admitted students from non-fee paying schools having failed a module in their first year. The implications of this is in terms of the actual preparedness of this cohort for success in higher education is that the NRMSM, and the University in general, must continue to improve access to this cohort while simultaneously providing the adequate support structure needed for this cohort to succeed in the demanding and vastly different environment from which they came.



## **4.5. STATISTICAL CORRELATIONS**

In this section the statistical correlations of the variables from the previous sections are discussed. The descriptive statistics are described in Sections one, two and three of this chapter respectively. The implications of the descriptive and correlative statistics are discussed in Chapter 5.

### **4.5.1. NUMBERS AND RATIOS of APPLICANTS AND ADMITTED STUDENTS**

Over the 11 year period the NRMSM received 20114 applications for 2050 places. Of the 2050 places 1884 new students were admitted in this time. This represents a mean ratio of 10.67 applicants for each place at the NRMSM's MBChB programme. This ratio (over the 11 year period) ranged from 6.6 to 16.1. This is further discussed in Chapter 5. Apart from analysing the applicant to admitted ratio, it has been noted that there was a higher number of applicants for the available places. Statistical investigation and analysis using the  $\chi^2$  test of independence performed on the applicant and admitted student cohorts revealed a significant difference exists between the applicant and admitted student cohorts. The results were as follows:  $\chi^2 (1, N = 21919) = 14994.326, p < 0.001$ .

### **4.5.2. RACE**

Admission to the MBChB programme is "engineered" for number of places and race, while the applicant pool is not limited by institutional or government policies. Because of such "engineering" of the admitted cohort and the relative "free-range" effect of the applicant cohort; as well as the limited number of places available for admission, the applicant cohort had a significantly higher overall number than the admitted cohort for each race group. The  $\chi^2$  test of independence revealed that there is a statistically significant difference between the applicant and admitted student populations for race. The  $\chi^2$  test (3,  $N = 21919$ ) = 59.724, revealed  $p < 0.00$ ; hence the results reveal that race was a significant factor in determining the characteristics of the student population at NRMSM, which concurs with the admissions policy of the institution.

### **4.5.3. GENDER**

On average, females constituted 56.2% and 57.3% of the applicants and admitted student populations respectively (Figure 4.1.5 and Figure 4.2.3). Men represented 43.8% and 42.7% of the applicant and admitted cohorts respectively. Statistical comparisons between the two cohorts (applicant and admitted students) for gender using a  $\chi^2$  test strengthened by the Fischer's Exact Test revealed no statistical significance between the cohorts for gender. That is, the ratio by gender was similar in both cohorts. The  $\chi^2$  test (1,  $N = 22008$ ) = 1.188,  $p = 0.276$ ; hence no significant differences existed between these variables. Furthermore, while there may be a perceived increase in the number of females, there isn't a corresponding decrease in the absolute number of male applicants and admitted students. On average the ratio of males to females over

the 11 year period was 1:1.28. However, using the linear regression<sup>15</sup> model, the increasing trend of admitted female students (with little or no increase in males) does imply that by 2019, the admitted student population would be exclusively female.

#### **4.5.4. AGE**

The applicant pool demonstrated a mean age of 20.07 years, with a standard deviation of 3.295, a maximum age of 52 years and a minimum age of 15 years. The admitted students mean age was 19.74 years, with a standard deviation of 2.930 and a maximum age of 42 years and a minimum age of 15 years. The age ranges for the applicant and admitted cohorts was 37 years and 27 years respectively. A One-Sample Kolmogorov-Smirnov test indicated that the data for each cohort was not normally distributed. The Mann-Whitney U Test = 17247480.500, revealing  $p < 0.001$ , and this indicating that there was a statistically significant difference in the mean ages of the applicant and admitted cohorts (i.e., the admitted students were significantly younger).

#### **4.5.5. MATRIC and MATURE**

Matriculants constituted 12569 (64%) of the applicant pool and accounted for 1324 (70%) of the admitted pool. By contrast 7048 (36%) of applicants were from the mature cohort and 548 (30%) of admitted students were mature. Statistical comparisons between the two cohorts (applicant and admitted students) using a  $\chi^2$  test revealed a significant difference for matric and mature students. The result of the  $\chi^2$  test was as follows:  $\chi^2 (10, N = 22008) = 99.637$ , and this revealed  $p < 0.001$ . Hence these variables are dependent and demonstrate a significant difference between the type of student (matric and mature) and the cohorts (applicants and admitted students) (i.e., matriculants were significantly more likely to be admitted to the MBChB programme).

#### **4.5.6. GEOGRAPHICAL ORIGINS**

When the comparison is made between the applicant cohort and the admitted student cohort in terms of their geographical location (i.e., whether their primary residence is in KZN or non-KZN provinces); it can be noted that 11268 (56.4%) of the applicant cohort reside in KZN while 1417 (74.6%) of the admitted cohort reside in KZN. Statistical comparisons of the applicant cohort and the admitted cohort demonstrate that a significant difference exists. The  $\chi^2$  test of independence was performed and the results were as follows:  $\chi^2 (1, N = 20675) = 161.70$ ,  $p < 0.001$ . The  $p$  value was  $< 0.05$ , indicating the statistically significant differences between the applicant and admitted student cohorts (i.e., students residing in KZN were more likely to be admitted to the MBChB programme).

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<sup>15</sup> The Linear regression test was used to determine when the admitted student population would be exclusively female if the present trend was followed.

#### 4.5.7. FEE-PAYING vs. NON-FEE PAYING SCHOOLS

There were 325 applicants from disadvantaged (non-fee paying) schools and 61 of these applicants were admitted to the programme. A comparison ( $\chi^2$  test of independence) of the applicant cohort revealed there was a statistically significant relationship between the fee-paying school and non-fee paying school applicant cohorts. The  $\chi^2$  test of independence revealed the following results:  $\chi^2(10, N = 19788) = 20.835, p = 0.02$ . Hence these variables are dependent and a significant relationship exists between fee-paying and non-fee paying applicants, in that, people attending fee-paying schools are more likely to apply for a place in medicine than those attending non-fee paying schools.

A comparison ( $\chi^2$  test of independence) of the admitted student cohort for fee-paying school attended and non-fee paying school attended revealed there was no significant difference between the cohorts in terms of these variables. The  $\chi^2$  test of independence revealed the following results:  $\chi^2(10, N = 1895) = 16.291$  and  $p = 0.092$ .

#### 4.5.8. FIRST YEAR RESULTS

NRMSM admits students from fee-paying and non-fee paying schools, however, what is the relationship between school status and success in the MBChB programme? The failure rate among students who attended non-fee paying school is significantly higher than that of the fee-paying school cohort. An average of 35% (21/61) students who attended non-fee paying schools failed at least one course in the first year. In comparing the results of the fee-paying school cohort with that of the non-fee paying cohort, the  $\chi^2$  test of independence revealed the following results:  $\chi^2(1, N = 1899) = 19.704$  and  $p < 0.001$ . The result indicates that there is a significant relationship between school status and result. That is, there is a significantly greater chance of failing a module in the MBChB programme if you come from a non-fee paying school.

What is the relative risk of a student from a fee-paying school passing compared to that of a student from a non-fee paying school? The relative risk of fee status is computed by comparing the proportion of results with fee-paying school status to the proportion of results with non-fee paying school status. The value obtained from a logistic regression analysis revealed an odds ratio for result was 3.534 (i.e., a student coming from a fee-paying school was 3.534 times more likely to pass the first year than a student coming from a non-fee paying school).

## CHAPTER FIVE: DISCUSSION

### 5.1 INTRODUCTION

In this chapter each of the variables in Chapter Four (i.e., applicant data and admitted students' data) will be interrogated. In addition, the implications of the findings to the institution (NRMSM) as well as the province and country will be discussed. For the institution, the discussion will relate the results of this research to the implications for the institution related to funding and resource allocation for present and future planning. For the province and the country the discussion will focus on the implications of the results to the general provision of health care and in terms of the national workforce distribution.

### 5.2. NUMBER OF APPLICANTS AND ADMITTED STUDENTS

#### 5.2.1. APPLICANT to ADMISSION RATIO

While the number of available places in medical schools is fixed, governed by institutional resources and admission policies, and the accreditation by professional bodies (HPCSA); the number of applications are not. Applications are accepted from all persons (i.e., all ages, all races, genders, all geographical locations and both school leavers and mature students). From an institutional perspective it is imperative for the institution to have knowledge of the socio-demographic dynamics of its applicant pool. This knowledge provides important insight into the popularity of the programme as well as the position of the institution among its peers in attracting students. The applications to admissions ratios provide some insight to the institution.

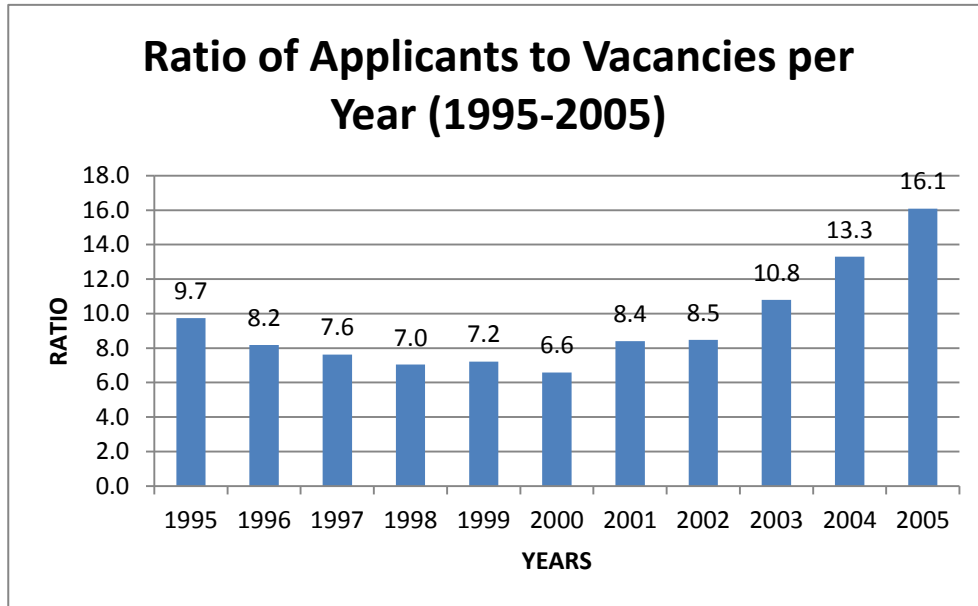
The researcher was not able to find any current data for local (i.e. South African) applicant to admission ratios except the recent articles (Carte, 2012; Editorial, 2014) indicating the number of applicants and the number of available places. Colborn et al. (1995) indicated that UCT's Faculty of Medicine had an applicant to admission ratio of 12.1:1. (1995)<sup>16,17</sup>. The quoted applicant to admission ratio contrasts with the U.K., where the ratio had dropped from 2.11:1 in 1995 to 1.55:1 in 2000 (McManus, 2002). McManus (2002) also projected a further drop in the applicant to admission ratio by 2005 and attributed this to several factors. Some of the reasons forwarded included: the lack of popularity of medicine as a career, the long duration of study and the financial implications thereof, fewer people achieving the required pass/grades in mathematics and science.

The application to admission ratio seen at UKZN during the period under study differs and this can be seen in Figure 5.1.1 below. The slight decline in the ratio seen between 1995 and 2000 can be attributed to, firstly, the poor matric results from these years (Myburgh, 2007) and, secondly, to the increase in the number of admissions during these years. During these years the number of applicants remained fairly constant.

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<sup>16</sup> This is a rather old reference as many authors have published enrolment figures and not the application: admission ratios.

<sup>17</sup> <http://www.moneyweb.co.za/moneyweb-south-africa/the-bunfight-to-get-into-med-school> ; published article by David Carte (28 October 2012). [Accessed 15/09/2014].



**Figure: Ratio of 5.1.1: Applicants to Vacancies per Year (1995-2005)**

Between 2001 and 2005, however, there was a dramatic increase in the ratio (8.8:1 in 2001 to 16.1:1 in 2005). This trend of an increase in the applicant to number of places ratio for medical schools has continued and Carte (2012) quoted the number of applicants compared to the number of available places at WITS (6000 applications for 250 places; ratio 24,1:1) UP (11 000 applications for 240 places; ratio 45,8:1) and UCT (4400 applications for 220 places; ratio 20:1) (Carte, 2012). Recent figures reflect a ratio of 33.2:1 for UKZN and 20.6:1 nationally (Editorial, 2014)<sup>18</sup>. We must acknowledge that any increase in the ratio will be because of an increase in the number of applicants as, the number of available places at medical schools have remained relatively static over the years.

There are several possibilities for the increase in the number of applicants and hence the ratio of applicants to admitted students at NRMSM. The two most significant reasons for this in the NRMSM context would be: firstly, the dramatic improvements in the matric pass rates between 2000 and 2003 (Myburgh, 2007) and secondly, the changes to the MBChB programme and the associated changes to the admission criteria between 2000 and 2005. The overall matric pass rate improved from 48.9% in 1999 to 73.2% in 2003; while in the number of exemptions increased from 15.4% in 1996 to 18.2% 2003 (Myburgh, 2007). This “improvement” may have accounted for the increased number of people applying to medicine and hence the increase in the ratio. The changes to the MBChB programme and the associated changes to the admission criteria between 2000 and 2005 may also have contributed to the overall increase in the ratio. The 20% increase in the number of applicants between the MBChB6 and MBChB5 programmes can be explained in part, by the changes to the minimum admission requirements for medicine at NRMSM. Prior to 2001, a prospective student had to have done english, mathematics, physical science, and biology on the higher grade at school. As indicated by McManus (2002), in the UK, a large

<sup>18</sup> Newspaper editorial did not provide the name of the author nor the editor (Daily News)

proportion of students fare poorly in these subjects and this has a “gatekeeping” effect on the number of applicants. This is probably true in the South African context as well. However, for the 2001 and subsequent intakes (MBChB5) the sciences (physical science and biology) were no longer a prerequisite for admission. With the removal of the “gatekeeping” effect of the sciences, a larger number of learners who did “non-science” courses at school were now eligible to apply to study medicine. This may have resulted in a large number of secondary school learners who applied for admission to medicine from a “non-science” background.

However, while the “improved” matric pass rates (Myburgh, 2007) and the changed admission criteria may have been major contributors to the increased ratio, they certainly were not the only factors. Several other factors may have been responsible and these may have included improved socio-economic circumstances making more learners eligible to apply; the need of an increasing pool of learners to access higher education<sup>19</sup>; a greater awareness among learners about medicine as a career as well as the relative stability of employment afforded by medicine; the lure of wealth and self-employability offered by medicine; the need to be in a “sexy” profession as depicted in popular television shows; and greater marketing of medicine by universities. These factors would need to be studied further in order to provide insight into the factors influencing and affecting the applicants: admissions ratio.

Despite the trend (described above) in terms of the increase in the applicant to admitted student ratio, it would be interesting to note what proportion of the applicants actually met the criteria for admission to the MBChB programme. This particular issue would warrant further research as the current data is silent in this regard.

The implications of this change in applicant to admitted student ratio for NRMSM, is that there would never be a dearth of applications as there has been a general trend in the increase in the number of applicants. Despite this, the institution needs to determine the quality of the applicants in relation to the quantity. Nevertheless, with the current number of places available the institution can dictate the terms by which it selects only those students with the best results. A high ratio, such as the present, ensures that fierce competition exists for the relatively few places. Using present admission criteria ensures that only the highest achieving students from each race group are admitted, which in theory, should improve throughput rates and hence funding and cash flow to the University. This together implies that less has to be spent on academic development programmes and students should exit the system in the minimum time. This however, is not the case when the institution has to ensure that social justice (in terms of access) is maintained. The implication for the institution in terms of increasing access to students from disadvantaged backgrounds is that they enter the university system with poor results and are under-prepared; hence they may require additional support and may take a longer time to graduate, thereby compromising the university’s cash flow. Therefore, from a business perspective accepting students from disadvantaged backgrounds places additional financial constraints on the institution, and it needs to grapple with the financial security (associated with admitting students from advantaged educational backgrounds) or the social responsibility of improving access to higher education to students from educationally disadvantaged backgrounds.

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<sup>19</sup> More people are becoming aware of the need to access higher education as they matriculate.



For the Department of Higher Education and Training this rise in the applicant:admissions ratio is a cause for concern. More people (matriculants and mature students) are attempting to access higher education; however, while the higher education platform is expanding, its expansion is slow and disproportionate to the demand. While both the Departments of Health and Higher Education and Training expressed the desire to double the intake of medical students by 2014 (Breier, 2008); this, to date, has not been achieved. The reason for this is that any increase in the intake of students is not only dependent on increasing funding but an increase in the human resource and infrastructure capital as well. The opening of new medical schools may provide an alternative solution to reducing the applicant: admitted ratio; however, this is again dependent on similar factors indicated above and may in fact be a very temporary solution.

In conclusion, there is a significant difference in the numbers of the two cohorts described above and several objective and anecdotal reasons may explain the differences and the ratio of applicants to admitted students. From a governmental and institutional perspective several challenges have been identified which would impact on future policy.

### **5.3. RACE**

In the post-Apartheid era, the socio-political and higher education landscapes in South African have undergone significant changes. In the early years the concepts of access and redress were used interchangeably and were taken to have the same meaning. It is accepted that Apartheid discriminated against Black people. Under the Apartheid regime, Black people suffered with poor quality primary and secondary educational infrastructure and resources and admission to tertiary education was prevented by the apartheid laws and institutional policies (Colborn et al., 1995; Myburgh, 2007). The end of Apartheid saw the end to such discrimination; however, this resulted in the sudden propulsion of unprepared Black people into the higher education arena, which in itself was unprepared for such an influx. Furthermore, new legislation protected the interests of Black people and ensured greater access to the “newly available resources” (i.e., higher education). In response to the new legislation, institutions subsequently changed admission policies, set targets and ring-fenced the number of available places in order to improve the intake of persons from disadvantaged backgrounds and, in particular, for Black, African people. In this context, access and redress have become conflated and race has been used as a measure/indicator of previous disadvantage.

However, in recent years, the legitimacy of using race as the sole marker for access and redress has been questioned, with Soudien (2010) specifically inquiring as to whether the changing socio-economic situation in South Africa had altered the link between race and disadvantage. His inquiry explored whether there should be another measure of disadvantage (i.e., class). Within the Black race group there are those who are socio-economically advantaged and those who still remain in a similar situation as they were in during the Apartheid era. Should we as a society not be acknowledging this and thereby treating the concept of redress differently from access? Soudien (2010) further questions whether UCT could have two separate components in admission policies; firstly, policies quoting redress could refer only to admissions on racial profiles and, secondly, policies quoting access should refer to admissions of students from communities that demonstrate current socio-economic disadvantage.

In his answer, Soudien (2010) maintains that it is difficult to separate the two issues in the South African context at present and race would continue to be a measure/indicator of disadvantage and hence may still be used to inform policies on redress and access. NRMSM, however, has been able to address this issue. It has acknowledged that the level of socio-economic disadvantage currently affecting the race groups would exclude many potential students from higher education. It has therefore maintained its racial quotas and in addition provides for 20% of each race category admitted are derived from quintile 1 and 2 schools.

NRMSM's admission policies state that the school sets targets for the number of students admitted to the School by race. The present quotas have been in place since 1994. This is done for two main reasons; firstly, to address the past inequalities in terms of access and redress and, secondly, to address the severe shortage of African doctors in South Africa.

With regard to the applicant cohort the progression through the 11-year period saw a general increase in the absolute number of applicants for each race group. However, the proportional increases were significantly different between Africans and Indians, and significantly different between Whites and Coloureds. For African applicants, there was a significant increase from 517 applicants in 1997 to 2335 applicants in 2005. In terms of a percentage this proportion increased from 42.2% in 1995 to 69.1% in 2005. These proportions reflect the admission policy in place at the time. This is interesting to note considering the university has no control over the number of applicants in any particular race group.

While the change in the number of applicants from the African cohort is significant and great, the Indian applicants, however, constituted an average of 38.9% of all applicants in the same (1995-2005) time frame and demonstrate a minimal change in the numbers. The difference between the highest number of applicants and the lowest number in the time period was 275. Similar comparisons can be made with the White and Coloured cohorts. This means that over the 11 year period the number of applicants from the Indian, White and Coloured communities remained fairly constant with a significant rise in the number of Black applicants in the same time.

Also as indicated above the substantial increase in the number of African applicants is likely to be a cause for concern in government; as it means that this volume cannot be absorbed into the institution and hence creates a bottleneck effect in terms of students completing school with the required minimum admission criteria having been met and not being able to access higher education. However, those applicants who do not get accepted to study medicine may be accepted into other disciplines/schools/faculties or other institutions. Further research may be undertaken, in that it would be interesting to discover what the career outcomes are of those applicants who don't get accepted into medicine.

#### **5.4. GENDER**

The results in chapter four indicate that has been a greater number of female applicants to the MBChB programme since 1997 and similarly a greater number of female students have been admitted to the MBChB programme. A higher number of females in a student population is not



specific to NRMSM. Breier and Wildschut (2006) report on the feminization of medical schools, and demonstrates this phenomenon in all eight South African medical schools. Similar trends are described in international literature. McManus (2002), however, dispels as a myth that there is a severe shortage of males in the profession.

Furthermore, while females constitute a greater proportion of the population in medical schools, the same does not apply to the work situation. Between 2002-2004, an average of 72,3% of registered practitioners in South Africa were male (Breier & Wildschut, 2006). Colborn et al. (1995) reported that at Groote Schuur Hospital 88% of the staff were men. From a professional perspective, the historical dominance of men in the profession has not yet been challenged by the higher female student population. It is uncertain when this feminization of medical schools will translate into dominance by the current gender majority, as the female workforce describes other issues which are described in the following paragraphs.

From an institutional perspective, considering the admissions policy is blind to gender, there are no serious adverse implications of this ratio on the general training. However, the institution needs to take cognisance of this in terms of resource allocation related to residences, both on and off campus. This becomes especially relevant when students are sent to areas that are not under the direct control of the university and where accommodation may have to be shared, e.g., the DoH hospitals and clinics that are away from the university residences for intake (on call, after hours work-based learning) and rural attachment purposes.

For the DoH, achieving equity in the health workforce distribution<sup>20</sup> is a priority (De Vries & Reid, 2003). This poses a challenge for the DoH presently, and the challenge would be intensified when the current undergraduate gender ratios seen in medical schools translates into the workforce. In terms of this the DoH would have to change its current recruitment strategies in order to attract an increased number of women practitioners into rural practices (De Vries & Marincowitz, 2004). Some of the reasons women do not choose rural practices as a preferred place of employment (De Vries & Marincowitz, 2004) include limited employment opportunities for spouse/partner; fewer schooling choices for children; being less prepared than men to sacrifice family life; preferring to work part-time or to not do over-time especially when they have children; lack of part-time training opportunities and lack of mentoring and career guidance; difficulty to find locums in terms of maternity leave arrangements; their dual responsibilities of home and work; feeling a sense of isolation and deprivation, especially with regard to shopping (De Vries & Marincowitz, 2004). In this regard, the DoH needs to acknowledge the special needs of women in order to recruit and maintain a workforce in rural areas.

Another, and probably more subtle, implication of the gender ratio is the actual number of years men and women spend contributing to the health workforce (i.e., working). In general terms, that women prefer to work part-time and to not do over-time (Breier & Wildschut, 2006; De Vries & Marincowitz, 2004). In addition, women may take time off work for child rearing responsibilities and retire from the profession earlier than men would. This has great impact on service delivery and actual time spent working. Furthermore, as indicated by Breier and Wildschut (2006), almost half the women medical graduates in Britain worked part-time 18 years after graduating. This means that the current inequities and shortages experienced in the health workforce distribution is anticipated to worsen in the future, as a result of the feminization of medical schools. The

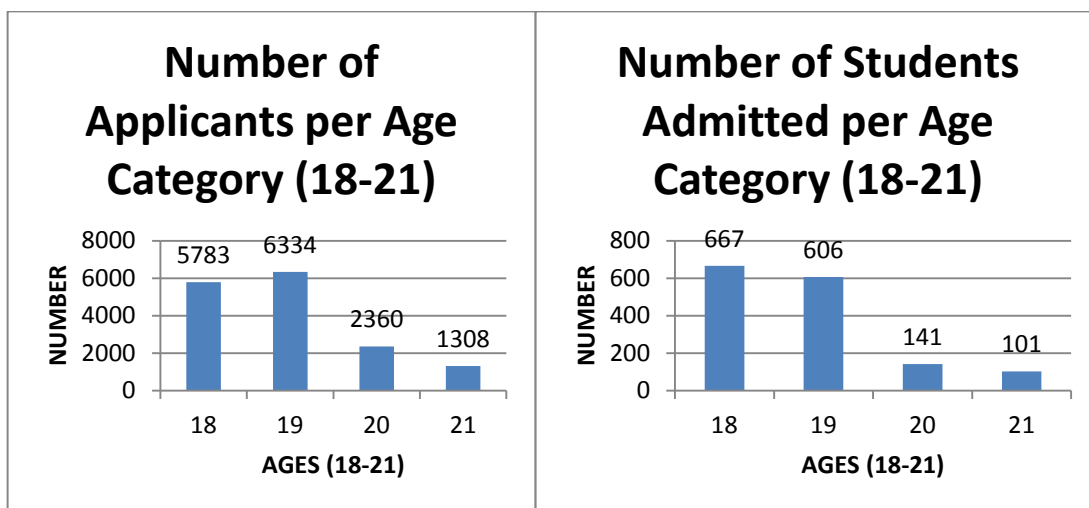
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<sup>20</sup> This does not refer to gender equity, but rather to the workforce distribution between urban and rural areas.

implication is that you need more personnel to fill the employment gaps that occur with the shortened time in the workforce.

## 5.5. AGE

NRMSM's admissions policy does not consider age as a criterion for admission; however, it does state that 20% of the places will be reserved for mature students. These two variables are inter-related. As indicated in Chapter 1 (1.4) and Chapter 2 (2.4) the most populous age group in both cohorts was the 18-21 year group. The graphs below demonstrate the relative numbers of the applicants and the admitted students in the 18-21 year age category. It can be seen in very general terms that the trend is similar; however, significant differences exist in this category.



**Figure 5.1.2: Number of Applicants and Students Admitted per Age Category (18-21)**

From an institutional perspective, a major responsibility is to provide access to and absorb school leavers into the higher education system, and the age of the student entering is of no consequence. A further responsibility extends to ensure the progression of students in mainstream programmes from other bridging and access programmes. It has been demonstrated that the older, mature students who have had some prior experience at higher education are more likely to remain in the programme, to succeed in it and complete their degrees in the shortest possible time. The advantage of this to the universities is that they would obtain their subsidies for the student in the shortest possible time and this would boost cash flows.

For the Government on the other hand, it invests a significant amount of money and resources in the training of doctors through subsidies provided to universities from the Departments of Education and Health and the provision of human resources for teaching. Breier (2008) suggests an amount of R780000,00<sup>21</sup> to train a single doctor in South Africa. The return on this investment is the retention of the graduates in the health system (i.e., the individual's contribution to the health workforce). This contribution is not only measured by the individual's presence as part of the workforce but also in terms of the duration of such presence, i.e., the number of active working years. As seen above, females spend less time than men in the

<sup>21</sup> Recent estimates puts the figure closer to R 1,3 million per candidate (Carte, 2012)

profession. Age is also significant as the following example illustrates: there are 2 students entering the MBChB programme. The first student is 18 years old and the second is a mature student at 40 years of age. Let us also assume that they both retire at the age of 60 years. The training period (including internship and community service) for both is 9 years. These individuals would spend 33 and 11 years, respectively, in active service within the Department of Health. Therefore, in simple terms, the return on investment from the governments perspective is only one-third (1/3<sup>rd</sup>) of what it could be. Similarly a student admitted at age 29 would spend 22 years in service and the return would be at least two-thirds of the original. This is still substantially better.

Having considered the age vs. return on investment argument, should universities place a cap on the maximum age of admission to an MBChB programme in South Africa?

### 5.6. MATRIC and MATURE

Closely related to the issue of age and alluded to above is the consideration of admitting people who have either, completed matric in the year immediately preceding the year of admission (Matric) or people who have attended a tertiary institution in the year immediately preceding the year of admission (“Mature” students). NRMSM’s admission policy states that 20% of the intake per year and per race group will be allocated to mature students. This proportion of admitted students has never remained static. During the admission process, the mature cohort provides a secondary pool should the required number of matric applicants not meet the basic requirements/criteria for admission. As indicated previously the 18-21 year old cohort (applicant and admitted students) is a heterogeneous group consisting of both matric and mature students, while older age groups are mostly mature students.

As age increases from 18 to 21, the numbers of matriculants decrease and the number of mature students increase, as evidenced in the table below.

**Table 5.1.1: Distribution of Matric and Mature Students in the 18-21 Age Category**

Age	Applicants		Admitted Students	
	Mature	Matric	Mature	Matric
18	212	5536	17	650
19	1154	5120	65	541
20	1492	817	90	51
21	997	283	91	10

James et al. (2008) indicated that graduate entry into medicine widens the academic and socio-demographic diversity in the student population. This is of particular advantage to the PBL programme where learning is student-centred and the diversity of the groups assists in the learning and problem-solving process.

Jama et al. (2008) reviewed the theories affecting student performance and hence retention within the higher education system in South African universities and presented a theoretical model describing the circles of progression of a university student in South Africa. While it refers mainly to “non-traditional” (older, part-time and commuter students; mainly Black

students from disadvantaged backgrounds) students in South Africa, if the circles of progression is applied to the matric and mature context of the medical students, then it can be seen that mature students are already at an advantage over matric students in that they have already been through and experienced the first two circles and only need to adapt to the 3<sup>rd</sup> and 4<sup>th</sup> circles. Matric students on the other hand have to progress through the first two circles and should there be any factors associated with the first circle (family, schooling and language, finance, etc.) and the second (finance, accommodation, separation from families, social and academic integration, etc.) which have not been resolved, then it would hamper progress in the next circle.

Therefore, from an institutional perspective, the diversity provided by the admission of mature students reflects in the heterogeneous mix of the student groups in the PBL programme and may assist with the learning. However, the NRMSM must take cognisance of the issues surrounding first time entrants into higher education and must provide adequate support to ensure their success.

## **5.7. GEOGRAPHICAL ORIGINS**

After graduation and on completion of their compulsory internship and community service, many doctors return to their province of origin to work. Their place of work within the province is influenced by their origins within the province in term of whether they lived in urban or rural environments. de Vries and Reid (2003) indicated that students of rural origin are more likely than students of urban origin to practice in rural areas. For the NRMSM more people apply to study medicine from within the province, hence, more people admitted to the programme reside in the province. In all race groups the majority have KZN origins. While the provincial and general regional origins of applicants and admitted students could be determined from the data, the actual separation into rural and urban areas could not be done. Neither the post codes nor the quintile rating of schools could reliably provide this information. The results, however, seems to indicate that the majority of the KZN students admitted hailed from urban and peri-urban areas, within the provincial regions.

From an institutional perspective, NRMSM's admission process does not consider the origins of its students in terms of rural and urban. From a workforce perspective it is known that the majority of doctors in South Africa service the private sector and hence practice in urban areas (Breier & Wildschut, 2006; De Vries, Irlam, Couper, & Kornik, 2010). Reid (2006) indicated that in Northern KZN there was an overall vacancy rate of approximately 48% and in the district hospitals this figure was much higher at 59.5%. In light of this uneven distribution of the workforce and the high vacancy rates in district hospitals should the universities (in general and NRMSM, in particular) not consider selected recruitment rather than blind selection (Rourke et al., 2005)?

## **5.8. FEE-PAYING vs. Non-FEE SCHOOLS (DISADVANTAGED SCHOOLS)**

NRMSM is meeting its goals in terms of racial targets from around 2002 to date. This means that the targets affecting the issues of redress were being met, however, how does NRMSM fare when it comes to access? Is NRMSM admitting students from schools in the poor and under-resourced communities?

Of the total number of applicants (19945), NRMSM admitted 1884 students. Of the total number of applicants only 325 applicants attended quintile 1 and quintile 2 (no-fee schools)<sup>22</sup>. Of this number only 61 were admitted. Therefore several significant ratios can be determined. The first ratio is that of the no-fee school applicants to fee-paying school applicants (1:60.4). The second ratio is that of the no-fee schools admissions to fee-paying school admissions (1:29.9). These ratios imply that, firstly, for every one applicant from a no-fee school there is a corresponding 60.4 applicants from fee-paying schools and secondly, for every one student admitted from a no-fee school the NRMSM admits 29.9 from fee-paying schools. Furthermore, an average of 3.2% of the admitted cohort attended no-fee schools.

While these ratios and percentages seem disparagingly disproportional consider the following. The admitted to applicant ratio is approximately 1:10 for fee-paying schools and 1:5.3 for non-fee schools respectively. Therefore, proportionally NRMSM admits a higher proportion of applicants from no-fee schools than it does from fee-paying schools. This is a surprising statistic, as NRMSM is in-fact admitting a high proportion of applicants from no-fee schools; however, such a ratio is meaningless in terms of the absolute numbers gaining access to medicine.

From 2013 (UKZN, 2013), NRMSM indicated that it would reserve 20% of its total intake for students attending Quintile 1 and Quintile 2 (no-fee schools). This is a significant change and addresses the issues of redress (if racial quotas are maintained) and access (the 20% intake from Quintile 1 and Quintile 2 schools would apply to each race category).

## **5.9. RESULTS OF FIRST YEAR MBChB STUDENTS**

This section addresses the performance of first year students (who attended non-fee paying schools) in the MBChB programmes at NRMSM between 1995 and 2005. This cohort represented an average of 3.2% of the student population during that time and, according to data presented in section 4.3.7, they were exclusively Black African by race. This, by definition, would mean that the cohort may be classified as “non-traditional” university students in the South African context (Jama et al., 2008) (i.e., Black, from disadvantaged family and schooling backgrounds). According to Zewotir et. al (2011) the odds of an African student failing was significantly higher than White students (their research considered all African students and did not distinguish between those from advantaged backgrounds and non-traditional students).

In the context of this research and as indicated in section 4.5.8, 35% of these non-traditional university students, admitted to the MBChB programme at NRMSM between 1995 and 2005, failed the first year. Furthermore, the fee-paying school cohort was 3.5 times more likely to pass the first year than the non-fee paying cohort (in other words this cohort (non-fee paying school and non-traditional) was more likely to fail the first year than their counterparts from the fee-paying school cohorts). What factors influence this statistic? The “circles of progression” (Jama et al., 2008) may provide a holistic understanding of the academic and social factors and how they integrate in leading to poor academic performance.

These non-traditional students may have encountered problems related to family and/or school backgrounds, poor skills set, many may have English as a second language, many may not have

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<sup>22</sup> The data refers to students with identifiable schools

nor understand the financial resources required at the higher education level. These problems are inherent in the pre-entry circle and influence the performance of the student.

In the second circle, social integration in the new environment of the big city and urban lifestyle, the exposure to different cultures, problems encountered with accommodation, the realization of the financial commitment to higher education, separation from families and the associated loss of support can lead anxiety and hence contribute to the poor performance. Also significant in this circle is the inadequate academic integration which may also contribute to their poor performance.

The teaching and learning experience defines problems encountered in the third circle. Unresolved financial problems, accommodation and poor social integration from the previous circles may have significant influence. In addition, the new format of teaching and learning and assessment methods, the lack of skills, the confusion related to the jargon of higher education may also contribute.

Having considered these factors in a holistic manner, the institution needs to acknowledge its unpreparedness for dealing with this type of student and prepare itself adequately. Part of this preparedness is to allocate adequate resources to orientate and support these students, not just during orientation week but throughout the first year in order to ensure that with widening access there is going to be success, i.e., seamless progression through to the fourth circle.

## **5.10. CONCLUSION**

This chapter has explored each variable and sub-section in terms of the implications it has (be it immediate, intermediate, long term) on the NRMSM, society, college, DoH (National and Provincial) and other stakeholders (where necessary).

In terms of the number of applicants, the NRMSM has no control over this number, however, it can within limits manipulate the ratio of applicants to number of places by increasing the number of places available in the MBChB programme. This is desirable to all stakeholders responsible for the provision of equitable, accessible and affordable healthcare to all South Africans in rural and urban environments.

Increasing the number of places in its programme would have several beneficial effects:

1. It will address issues related to redress associated with the legacy left by Apartheid.
2. It will result in widening access to higher education and to medicine. Widening access would not only provide students with an opportunity to study medicine (which they may not be able to do under normal circumstances) but would also assist in recruiting potential students from underserved/rural areas. This has the potential to assist in solving the staffing problems currently experienced in the rural areas as student originating from rural areas are more likely to return to work in this areas (De Vries & Reid, 2003; Wilson et al., 2009).
3. It will increase the diversity of the student population and the effect of this has the potential to improve throughputs as older and mature students could serve as mentors for the non-traditional students thereby improving the overall pass rates and the ultimate chances of success of these students.

4. It could alleviate future shortages in the workforce created by a bias in terms of the current trend of a higher number of females being admitted (Breier & Wildschut, 2006; van der Reis, 2004).

In order to do increase the number of places in the programme however, the NRMSM will require additional resources in terms of the training platform, physical infrastructure to house students, additional staffing and funding to ensure that the quality of the programme is not compromised. In addition, additional funds may be needed to provide both academic and psycho-social support to the non-traditional students in order to ensure their success in the new environment.

While the NRMSM, has the potential to address the health care delivery problems currently being encountered, greater cohesion and collaboration is required between all stakeholders responsible for the provision of healthcare in South Africa.



## **CHAPTER SIX: SUMMARY, CONCLUSION and RECOMMENDATIONS**

### **6.1. INTRODUCTION**

Chapter 6 summarises the findings from the study and makes recommendations to the NRMSM and UKZN and the relevant government departments responsible for the education and training, employment and deployment and the provision of healthcare by the workforce to the people of South Africa. In addition, some recommendations for further research following the findings of this research are discussed.

### **6.2. SUMMARY**

Higher education in post-Apartheid South Africa faces several challenges. Apart from being able to absorb the country's youth into higher education, the country must also ensure that past injustices and inequalities are addressed and that school leaving youth have equal opportunities and access to higher education. In this regard the biggest and most pronounced challenge for South African higher education is that of access and redress.

Questions have been asked about the meaning of access and redress in the context of the new post-apartheid South Africa and whether race will continue to be the confounding variable for access and redress. Redress and race cannot be separated. The time frame, for when redress will stop being an important consideration for admission, cannot be determined (currently). However, can access and race be separated in considering disadvantage? In other words, can access be related to socio-economic class differences within communities and not based solely on race? If this is so, is there a measure of disadvantage based on socio-economic class differences (and not on race) that would assist the institution in providing improved access? The measure currently utilised to determine disadvantage is the quintile rating of schools.

In recognising the quintile ratings of schools and using this system as a measure to provide access, higher education essentially acknowledges that students from advantaged and disadvantaged backgrounds cannot compete equally for places in higher education. Some preference for admission, therefore, has to be given to students from disadvantaged backgrounds.

Evidence suggests (Jama et al., 2008; Mpofu, 2012) that students from disadvantaged backgrounds admitted to higher education institutions are under prepared and hence have increased chances of failure or dropping out (Zewotir et al., 2011). Therefore, in order to link access with success higher education in South Africa would need to allocate additional resources. This assertion is strengthened by the findings in this research; an average failure rate of 35% in the non-fee paying school cohort of medical first year medical students. The non-fee paying cohort should be the targeted population for improved access. This cohort was disadvantaged during schooling and hence are (in general terms) underprepared for the rigours of higher education, therefore, it would be irresponsible of any institution to provide increased access to higher education for this cohort without the necessary support to ensure that this cohort succeeds in higher education.



This research focused on the challenges experienced by NRMSM in the training of doctors with regard to access, redress and success. In addition to providing information about the attainment of targets for redress, this research provided valuable insight into the changes in the socio-demographic profiles of applicants as well as profiles of the admitted students to the MBChB programmes (MBChB6 and MBChB5) in post-apartheid South Africa (between 1995 and 2005); that Black Africans make up the majority of applicants and admitted students from disadvantaged educational backgrounds; and that students from disadvantaged backgrounds are more likely to have poor success rates at medical school.

In terms of applicant profiles, the research has identified a number of trends over the 11 (1995-2005) year period. There were approximately 20000 records of applicants over the 11 year period. The numbers of applicants have increased over the years, with an increasing number of mature applicants and repeat applications noted over the latter years. Many applicants (56.4%) had their origins in KZN and of these, the majority was Indian. Of these KZN applicants the majority (85.4%) reside in the Ethekwini region. Of the non-KZN provinces the highest number of applicants came from Gauteng. This was followed by applicants from the Eastern Cape and Limpopo Province. The majority of applicants, however, are African (54.1%) followed by Indian (38.9%), White (4.7%) and Coloured (2.3%). The relatively high number of Indian applicants is explained by the demographics of the province. KZN has the highest population of Indians. It must also be noted that the applicant pool is an unregulated pool and the racial proportions of applicants is not subject to any target or quotas. This pool is regarded as being “free-range”. Females represented the larger number of applicants (56.2%) overall. The reversal of the male: female ratio first occurred in 1998. The age range of applicants was 37 years. The youngest applicant was 15 years old and the oldest being 52 years old. The majority of applicants (79.5%) fell with the 18-21 year-old category, with the next populous group being the 22-25 year olds. There were more matriculants than mature applicants. Matriculants accounted for 64% of the applicants; however, there is an general trend describing an increase in the number of mature applicants and 2005 saw the proportion nearing 50% (47.3% is the actual percentage of mature applicants in 2005). In the 11 years there were 325 accurate records of applicants from no-fee schools. This represents only 1.7% of the total number of applicants. Of this number only 10 applicants were not African.

Similarly, trends were identified in the admitted student cohort in the same period (1995-2005), in that, the total number of students enrolled in the MBChB programme in the 11 year period was 2050; however, 1884 were new admissions during this period. This period saw the change in programmes and the admission policies. The majority of the students admitted to the programme were from KZN (74.6%). Of these, the majority (68.4%) resided in the Ethekwini region. Of the non-KZN provinces; Limpopo Province (99) was the province with the highest number of students, followed by Gauteng (96) and the Eastern Cape (89). The overall racial profile is governed by the prevailing admissions policy and as indicated previously this period (1995-2005) witnessed a change in the admissions policy and racial targets were adjusted to be more representative of the provincial demographics. The overall proportion of African students was 55.9% and that of Indians, Coloureds and Whites was 34.5%, 4.9% and 4.7% respectively. While the current policy and the targets were first approved in 1998, it was only in 2003 that the NRMSM started achieving its racial targets. More females were admitted to the programme than males, in general. The overall proportion of admitted students was 42.7% male and 57.3%

female. However, this transition in the ration only started to change between 1995 and 1997. From 1998 to present females have been the dominant gender at NRMSM, in terms of numbers admitted, with the male to female ratio being 1:1.35. The youngest person admitted to the programme, according to the data, was 15 years of age. The oldest was 42. The most number of students (1515) admitted were in the 18-21 year age group, followed by the 22-25 year age group with 194 admitted students. The majority of admitted students were matriculants. The numbers of mature students varied per year; however, the policy stated that this cohort would make up at least 20% of the intake per year. The number of mature students admitted was dependent on several factors, one of which was the quality of the matric results (Myburgh, 2007; Sunderlall, 2012). Of the 325 applicants from no-fee schools 61 were admitted to the programme. This means that the proportion of applicants: admitted students for this cohort was higher than that of the fee-paying school cohort.

The overall success rate of students admitted from no-fee schools is 65%. This result is the average success rate over the 11 year period and includes the success rates of the MBChB6 programme (46.7%) and the MBChB5 programme (83.3%), for this cohort. By contrast the average success rate of the fee-paying school cohort is 89.5% and includes that of the MBChB6 programme (81.4%) and the MBChB5 programme (97.6%). The change in programme improved the success rates for both cohorts. The improvement in the success (or failure) rate was markedly better for the no-fee cohort. In MBChB6 53.3% of the number admitted from no-fee schools failed the first year, whereas only 16.7% failed the first year in MBChB5.

When the two cohorts (i.e., the applicants and admitted students) were subjected to statistical analyses, significant differences were found for the variables number, race, age, matric vs. mature, geographical origins, no-fee schools and fee-paying schools attended. Gender was the only variable where no significant difference was present between the two cohorts. In addition, a significant difference was found in the success rates of the no-fee cohort and the fee-paying school cohort; which means that statistically, students admitted from no-fee schools have a greater chance of failing the first year than a student admitted from a fee-paying school.

### **6.3. IMPLICATIONS AND RECOMMENDATIONS**

With regard to the number of applicants vs. the number of places at NRMSM, the ratio is increasing and has changed from 8.8:1 in 2001 to 16.1:1 in 2005. This ratio continues to rise and is currently 33.2:1 for NRMSM in the 2014 intake. This implies that medicine continues to be a popular vocation for school leavers despite the negatives of the programme's duration and cost. Universities, the DoE and DoH need to strategise to increase the intake of medical students – in order to, firstly, address the chronic shortage of doctors as well as provide a mechanism to absorb school leavers into a popular vocation.

Race would continue being a criterion in admissions policies as it needs to address the inequalities of Apartheid and access to higher education. The historically White universities transformation has been slow in the 11 years and has not been able to adequately address the national and regional demographics. It is difficult to change demographics rapidly. Admission policies require radical changes for the student demographics at South African medical schools to equate that of the nation. Universities need to pay particular attention to this and a part of the

solution may lie in increasing the intake per year, in that the new number of students can be from a designated group or a groups who are inherently disadvantaged.

With regard to access, this research indicates that it is mainly African students who attend the no-fee schools (in terms of the applicants and admitted students), and therefore race will continue being a measure of disadvantage in terms of determining access policies, despite the institution using the quintile ratings to measure disadvantage. As indicated above, institutions may need to “ring-fence” a number of places available in order to adequately address the issues of access.

In improving access, Universities need to take cognizance of the results of students admitted from quintile 1 and quintile 2 schools. This research has demonstrated that students from these schools are more likely to fail their first year. Therefore, in order to link success and access, resources need to be made available for academic, financial and psycho-social support of these students.

There are no major implications for the institution in terms of the predominance of females in the student body. However, from a workforce distribution perspective the DoH would need to strategise and devise new recruitment and retention policies to attract and retain the high number of females in the workforce to the under staffed rural areas of the province and the country. Furthermore, females tend to spent less time working than men and hence there will need to be an increase in the number of graduates to accommodate for this.

Related to the recruitment and retention strategies of the DoH, is the provision of adequate post-graduate training opportunities and career progression in the rural hospitals. This may be achieved by distance education. Other rural retention strategies the DoH may consider is the support for families and provision of adequate schooling for children of the doctors. Therefore the interaction between the various stake-holders is paramount to the successful delivery of healthcare in South Africa.

Admission, the university would benefit in terms of subsidies with shorter programmes and minimum time taken in the programme. Both of these are possible with graduate entry programmes, in which more mature and experienced older students are admitted. NRMSM does not have a graduate entry programme, however the admission of mature students compensates as it increases the diversity of the admitted cohort. Age, however, has greater implications for the DoH and DoL as the amount of time spent in the health workforce is seen as a return in the investment of training a doctor. The younger the candidate, the longer time spent working the better the return on the investment. The same applies to the matric vs. mature cohort.

The high vacancy rate in rural hospitals may be addressed by recruiting students from these rural areas with the understanding that they would return to the area of origin to work. This has been demonstrated by several authors (Curran & Rourke, 2004; De Vries et al., 2010; De Vries & Reid, 2003). The issue of recruitment vs. selection must also be addressed as (Curran & Rourke, 2004) it has been found that in order to retain doctors in rural practices it is better to recruit students from the rural areas than to apply a general selection “lottery”. In this regard, it is recommended that NRMSM (and medical schools in general), give some attention to this

(recruitment rather than selection) in order to assist the DoH in addressing the shortages of doctors serving the rural areas.

Therefore, based on the evidence presented and rather than being completely blind to certain variables, universities need to pay attention to some of these variables during their selection processes as each variable has an impact on and implications for all stake-holders responsible for the training and deployment of doctors.

Furthermore, in improving access by admitting more students from quintile 1 and quintile 2 schools as well as (possibly) actively recruiting students from under-resourced rural communities needs to be supported with adequate financial aid and psychosocial support to these students. Such a programme removes a learner from the home environment with adequate support structures to a “strange” urban centre with no or very little psychosocial support. Furthermore, the financial resources at home are strained to provide for the student at university and both the student and the family incurs debt that would take several years of working to clear. The burden of debt is another factor that drives doctors out of the public sector and into the private urban practices. A recommendation, to medical schools is to develop decentralised programmes and rural medical schools which would serve several functions and address the lack financial, psychosocial support associated with urban medical school.

#### **6.4. FUTURE RESEARCH**

This research being quantitative and positivist has been a rewarding exercise. There are several other aspects that have arisen from this that would be interesting to follow up on.

- 6.4.1. This research was conducted on data from 1995 to 2005. It would be interesting to subject the current data (2005-2014) to a similar study and draw comparisons between the variables, especially with regard to numbers, racial profiles, issues of access and geographical origins of applicants and admitted students.
- 6.4.2. Further research into the matric and mature cohorts may be undertaken. In this regard,
  - i) the success rates of mature students vs. matriculants in the undergraduate programmes;
  - ii) the socio-demographics and the geographic origins of the mature cohort itself needs to be investigated;
  - iii) the academic qualifications of the mature cohort also need further interrogation;
  - iv) to determine whether the “older” matriculants had completed matric in the year of application or whether they represent students who had taken a gap year;
  - v) a study into the socio-demographic profiles of the “older” matriculants, in order to determine the reason(s), if any, for completing matric at an older age;
  - vi) the overall class averages in modules where there was a greater proportion of mature students in the year cohort;
  - vii) the reasons why a higher proportion of African students are mature students compared to other race groups.
- 6.4.3. With regard to students from no-fee schools, this study focused on their first year results. It would be prudent to follow these students through the duration of the programme to

determine whether they failed any other module as well. Furthermore, those who passed first year modules, how did they fare in subsequent and later clinical years? This would be looked at in terms of Jama et al's (2008) circles of progression, i.e., does the initial disadvantage continue being a handicap for these students or are they able to "catch-up and keep-up" with the students from advantaged backgrounds?

- 6.4.4. The postgraduate career choices of the cohort admitted from 1995-2005 and the socio-demographic profiles of the graduates (from the 1995-2005 admissions) who returned to rural practices. The proportion of female graduates who returned to rural practices. The implications for the clinical disciplines in terms of the recruitment of postgraduate students from this cohort and the success rates of these students in postgraduate programmes.
- 6.4.5. Inferences have been made with regard to, for example, gender and the implications of the findings on the future of the profession, however, this is not tested in this research and neither is the staffing in the public sector and rural areas nor the career prospects of woman. All other issues that arise from the analysis will be investigated and analysed in separate studies.

## **6.5. CONCLUSION**

Government and higher education are still grappling with the effects of Apartheid, in terms of addressing redress and access and linking that with success. While access to South Africa's medical schools has improved greatly for Black people, many of the medical schools are still predominantly White. This changes the dynamic in terms of the country's demographics and the demographics of the medical schools. Access with success remains a challenge and race will continue being a measure of disadvantage for a long while (Soudien, 2010). It is uncertain when the country will be truly freed from the legacy of Apartheid and rise beyond race.

Despite the issues surrounding race and resources, the country's medical schools are still producing a steady stream of doctors each year. However, this is insufficient to meet the needs of the country and much is being attempted to increase the output of doctors (Breier, 2008). Furthermore the general shortage of doctors in the rural areas further hampers the equitable delivery of quality health care. Strategies to increase the cohort of doctors willing to work in the rural areas commence from the initial intake into medical school (Curran & Rourke, 2004; McLachlan, 2005) to contributions from many facets of government in the provision of incentives and other support mechanisms (Wilson et al., 2009).

Despite the socio-political and economic challenges facing South African society in terms of healthcare provision and access to higher education medicine remains a popular career choice for school leavers and other graduates. This is evidenced by the increase in the number of applicants to the NRMSM and the country's medical schools in general. Despite the heartache of initial rejection (caused by a relatively small number of places) many people are willing to attempt to gain entry through repeated applications to multiple medical schools. For some, medicine is a calling, for others it is a means of securing employment in a difficult world. The lure of medicine as a career choice will prevail.



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# APPENDICES

## Appendix 1: Turnitin Originality Report

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Socio-demographics and Post-Apartheid Medical Training at the Nelson R Mandela School of Medicine Navin Sunderlall 10/22/2014 Submitted in fulfilment of the requirements for the degree of Master of Education (Higher) MEd(Higher) Supervisor: Dr N Munro Date Submitted: 22 October 2014 Durban: University of KwaZulu-Natal DECLARATION Submitted in fulfilment of the requirements for the degree of: MEd (Higher), the Graduate Programme in the School of Education, College of Humanities and Social Science, University of KwaZulu-Natal, Pietermaritzburg, South Africa. I, Navin Sunderlall, declare that 1. The research reported in this thesis, except where otherwise indicated, and is my original research. 2. This thesis has not been submitted for any degree or examination at any other university. 3. This thesis does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons. 4. This thesis does not contain other persons' writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then: a. Their words have been re-written but the general information attributed to them has been referenced b. Where their exact words have been used, then their writing has been placed in italics and inside quotation marks, and referenced. 5. This thesis does not contain text, graphics or tables copied and pasted from the Internet, unless specifically acknowledged, and the source being detailed in the thesis and in the Reference sections.

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## Appendix 2: Gate Keepers Letter



17 May 2012

Dr Navin Sunderlall  
Education  
UKZN  
Email: [sunderlalln@ukzn.ac.za](mailto:sunderlalln@ukzn.ac.za)

Dear Dr Sunderlall

### RE: PERMISSION TO CONDUCT RESEARCH

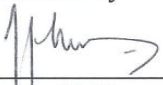
Gatekeeper's permission is hereby granted for you to conduct research at the University of KwaZulu-Natal towards your postgraduate studies, provided Ethical clearance has been obtained.

The title of your dissertation is:

"An investigation of the profiles of applicants and successful admissions (1996-2005) to the MBChB degree at the Nelson R Mandela School of Medicine (NRMSM) in order to inform future decision making by the faculty".

Please note that the data collected must be treated with due confidentiality and anonymity.

Yours sincerely



Professor J J Meyerowitz  
REGISTRAR

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#### Office of the Registrar

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## Appendix 3: Ethics Approval



24 October 2012

Dr Navin Sunderlall 903480470  
School of Education  
Edgewood Campus

Dear Dr Sunderlall

Protocol reference number: HSS/1118/012M  
Project title: Socio-demographics and post-apartheid medical training at the Nelson R Mandela School of Medicine.

### EXPEDITED APPROVAL

I wish to inform you that your application has been granted Full Approval through an expedited review process.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. Please note: Research data should be securely stored in the school/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Professor Steven Collings (Chair)

/pm

cc Supervisor: Nicholas Munro  
cc Academic leader: Dr MN Davids  
cc School Admin.: Ms S Naicker

Professor S Collings (Chair)  
Humanities & Social Sc Research Ethics Committee  
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