

# **EFFECTS OF CURRICULUM CHANGE ON MEDICAL GRADUATES' PREPAREDNESS FOR INTERNSHIP**

---

Kathleen Bridget Smuts

A thesis submitted to the Faculty of Health Sciences, University of the Witwatersrand in  
fulfilment of the requirements for the degree of  
Doctor of Philosophy

Johannesburg, August 2011

## **DECLARATION**

I, Kathleen Bridget Smuts, declare that this thesis is my own work. It is being submitted for the degree of Doctor of Philosophy in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

..... [signature of candidate]

..... day of ..... [month], 2011

## **DEDICATION**

For Butch, Ryan and Andrew  
and in loving memory of Karen  
1973 - 1995

# ETHICS CLEARANCE CERTIFICATE

## UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Division of the Deputy Registrar (Research)

## HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

R14/49 Smuts

### CLEARANCE CERTIFICATE

### PROTOCOL NUMBER M050453

#### PROJECT

Effects of Curriculum Change on Medical  
Graduates' Internship Performance

#### INVESTIGATORS

Mrs KB Smuts

#### DEPARTMENT

Health Science Education

#### DATE CONSIDERED

05.04.29

#### DECISION OF THE COMMITTEE\*



Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

#### DATE

05.05.09

#### CHAIRPERSON

   
(Professor PE Cleaton-Jones)

\*Guidelines for written 'informed consent' attached where applicable

cc: Supervisor :

#### DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10005, 10th Floor, Senate House, University.

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. I agree to a completion of a yearly progress report.



PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

## **PRESENTATIONS ARISING FROM THE STUDY**

### **Conference presentations**

- 1 Smuts, K.B. and Prozesky, D.R. 2008 The Development and Validation of a model of the competent South African intern. Paper Presentation, Southern African Association for Health Science Education (SAAHE) Conference, Cape Town, June 2008.
- 2 Smuts. K B, Prozesky, D.R., Hammond, K.D and Libhaber, E.N. 2009. Effects of curriculum change on medical graduates' internship performance.  
Paper Presentation, Southern African Association for Health Science Education (SAAHE) Conference, Cape Town, 2-4 July 2009.

## **ABSTRACT**

**INTRODUCTION:** The University of the Witwatersrand (Wits) changed its medical curriculum in 2003 from a traditional, six-year curriculum to an integrated, problem-based, four year Graduate Entry Medical Programme (GEMP), preceded by two years of basic and medical sciences at university level or a suitable undergraduate degree.

**AIMS:** To compare the preparedness for internship of Wits graduates from the old and new curricula on fifty seven items grouped into nine categories which were identified during the development and validation of a Model of the Competent South African Intern.

**METHODS:** A stratified random sample of interns was drawn from the last graduates of the traditional curriculum and a matched sample of interns from the first graduates of the GEMP. Both quantitative and qualitative methods were used. For each sampled intern a supervisor, colleague and patient were selected by convenience sampling. A questionnaire was completed by interns, supervisors and colleagues followed by an interview to qualify responses at the extremes of the Likert-type scale and link them to curriculum learning opportunities. A semi-structured interview was conducted with patients and a global score allocated. The Cochran-Mantel-Haenszel Statistic for ordinal data was used. Comparisons were drawn between the competence of graduates from the traditional and GEMP curricula from the perspectives of interns, supervisors, colleagues and patients. Interview data were analysed using thematic analysis techniques.

**RESULTS:** Significant differences were reported by interns in six of the nine categories. In one category, “fundamental theoretical knowledge” the GEMP graduates rated themselves significantly less prepared in the basic medical sciences (Pathology, Microbiology and Pathophysiology,  $p=0.01$ ; Pharmacology,  $p<0.0001$ ) but highly significantly better prepared in the theory of interpersonal communication,  $p<0.000001$ ). The GEMP graduates rated themselves significantly better prepared in the other five categories, “medical problem solving” ( $p=0.009$ ), “holistic patient management” ( $p=0.0004$ ), “community health” ( $p=0.0002$ ), “communication skills” ( $p=0.02$ ) and “self directed learning” ( $p=0.0001$ ).

Supervisors reported significant differences in “teamwork” ( $p=0.045$ ) and “personal attributes” ( $p=0.045$ ) giving fewer low scores to the GEMP graduates. There were no significant differences between the category scores for colleagues. Qualitative analysis included vertical summaries of interview data and horizontal or comparative interpretations with quotations in order not to lose the voice of the interns, supervisors, colleagues and patients.

**DISCUSSION AND CONCLUSION:** GEMP graduates rated themselves better prepared in those areas which had been identified as reasons for curriculum change but less prepared in specific basic medical sciences. Although these were not reported as significantly different by supervisors or colleagues they require attention. Other than this, according to the judgements of the informants, the competence of GEMP graduates was similar to that of traditional graduates in certain areas and significantly better in others, which appears to justify the major medical curriculum change undertaken at this University.

**KEYWORDS:** clinical performance, comparative study, competence, complexity, curriculum change, graduate entry, internship, internship performance, medical education, South Africa

## **ACKNOWLEDGEMENTS**

My sincere thanks to my supervisor, Prof Detlef Prozesky, for your unfailing attention to detail, your encouragement and optimism and for keeping me on track so gently.

To Prof Kate Hammond – thank you for your invaluable assistance, companionship and sage advice throughout Phase 2 of the study. It was a privilege working with you and I learned so much from you.

To the interns, supervisors, colleagues and patients who gave of their time and insights, thank you all for making this study possible.

To Dr Elena Libhaber (Dept of Cardiology, Chris Hani-Baragwanath Hospital) special thanks for your help with the statistical analysis and thanks also to Dr Mark Allen, Mr Braimoh Bello, Ms Carren Ginsburg and Mr Eustasius Musenge.

To my colleagues in the Centre for Health Science Education, thank you all for your support and especially to Dr Di Manning who stood in for me so often and so willingly during my absences from the Centre when I was collecting data for this study.

To the Chief Executive Officers, Medical Superintendents, Intern Curators and Staff of the Hospitals, thank you making us welcome and for your time and interest in the project..

I should like to acknowledge Ms Yvette Meintjies of the Health Professions Council of South Africa (HPCSA) who gave so generously of her knowledge and time at the start of the study.

I acknowledge with gratitude the Faculty Research Committee (FRC) Individual Grant awarded by the Faculty of Health Sciences FRC on 9 Feb 2005 and renewed in 2007.

To my husband, Butch Smuts, thank you for your patience and support throughout the research and writing up of this thesis.



## TABLE OF CONTENTS

TITLE PAGE	i
DECLARATION	ii
DEDICATION	iii
ETHICS CLEARANCE CERTIFICATE	iv
PRESENTATIONS ARISING FROM THE STUDY	v
ABSTRACT	vi
ACKNOWLEDGEMENTS	viii
TABLE OF CONTENTS	ix
LIST OF FIGURES	xvi
LIST OF TABLES	xxi
NOMENCLATURE (OPERATIONAL DEFINITIONS, ABBREVIATIONS, ACRONYMS AND CONVENTIONS)	xxix
PREFACE	xxxii
 <b>CHAPTER 1: INTRODUCTION AND LITERATURE REVIEW</b>	 <b>1</b>
1.1 PURPOSE OF THE STUDY	1
1.2 BACKGROUND TO THE STUDY	1
1.2.1 The history and status of medical education at Wits prior to the 2003 curriculum change	1
1.2.2 Description of the new curriculum as a means to address the identified deficiencies and required changes	6
1.2.3 Essential features of the Graduate Entry Medical Programme (GEMP)	8
1.3 INTERNSHIP TRAINING IN SOUTH AFRICA	14
1.4 RATIONALE FOR THE STUDY	16
1.4.1 The aim of the research	17
1.4.2 Research objectives	18
1.4.3 The importance of the study (originality)	18
1.5 LITERATURE REVIEW	19
1.5.1 Complexity theory and the rigour versus relevance dilemma	19
1.5.2 The status of related research in South Africa	22
1.5.3 International perspectives: The key debates in the field of curriculum change and assessment relevant to this study	24
1.5.3.1 The type of doctor that people now want	24
1.5.3.2 “Competence” and “competency based medical education”	25
1.5.3.3 Curriculum change and change theory, the agents of change and the style of curriculum renewal	38
1.5.3.4 The evaluation of curriculum change in medical education	45
1.5.3.5 Comparisons of internship performance between graduates of traditional and innovative curricula	47

1.5	SUMMARY	50
	<b>CHAPTER 2</b>	
	<b>PHASE 1: THE DEVELOPMENT AND VALIDATION OF A MODEL OF THE COMPETENT SOUTH AFRICAN INTERN</b>	53
2.1	INTRODUCTION AND BACKGROUND	53
2.2	AIMS	53
2.3	METHODS	54
2.3.1	Document and literature reviews	54
2.3.2	Semi-structured interviews	55
2.3.2.1	Study Population	55
2.3.2.2	Sampling Method	55
2.3.2.3	Geographic details	56
2.3.2.4	Hospital Levels	57
2.3.2.5	Instruments	58
2.4	RESULTS	58
2.4.1	Data analysis	58
2.4.2	Refining the Model	60
2.5	VALIDATION OF THE MODEL	61
2.5.1	Definitions of criteria	61
2.5.2	Results of the validation process	62
2.6	THE DEVELOPMENT OF INSTRUMENTS BASED UPON THE MODEL	63
2.7	CONCLUSION	65
2.8	SUMMARY	65
	<b>CHAPTER 3</b>	66
	<b>PHASE 2: EFFECTS OF CURRICULUM CHANGE ON MEDICAL GRADUATES' PREPAREDNESS FOR INTERNSHIP: METHODOLOGY</b>	
3.1	THE RESEARCH FRAMEWORK	66
3.2	RESEARCH QUESTIONS FOR PHASE 2	66
3.3	RESEARCH DESIGN	67

3.4	METHODS AND INSTRUMENTS	68
3.4.1	Questionnaires	68
3.4.1.1	Development and layout of the questionnaires	71
3.4.1.2	Pilot testing of questionnaires	73
3.4.1.3	Validity (Quantitative)	75
3.4.1.4	Reliability (Quantitative)	76
3.4.2	Interviews	78
3.4.2.1	Validity and trustworthiness in qualitative research	79
3.5	STUDY POPULATIONS AND SAMPLING	80
3.5.1	The study population in 2006	80
3.5.2	Sampling methods and sample sizes	83
3.5.2.1	Sampling traditional curriculum graduates in 2006	83
3.5.2.2	Sampling GEMP graduates in 2007	84
3.5.2.3	Selection of supervisors, colleagues and patients	86
3.6	DATA HANDLING	87
3.6.1	Questionnaires and interviews	87
3.6.2	Data reduction (capture, cleaning and coding of data)	89
3.6.3	The concept of a 360 degree study and the limitations encountered	89
3.7	DATA ANALYSIS	91
3.7.1	Statistical analysis of quantitative data	91
3.7.2	Thematic analysis of qualitative data	93
3.8	ETHICAL CONSIDERATIONS	95
3.9	RESEARCH BIAS AND LIMITATIONS TO THE STUDY	96
3.9.1	The study populations	96
3.9.2	Research timing and method	98
3.9.3	Instruments	99
3.9.4	Respondents	99
3.9.5	Researcher	100
3.9.6	Potential for conflict of interest	101
3.9.7	The use of quotations in qualitative research	101
3.10	SUMMARY	101
	<b>CHAPTER 4</b>	102
	<b>PHASE 2: RESULTS</b>	
4.1	RESPONSE RATE	102
4.2	BIOGRAPHICAL INFORMATION ON THE 2006 AND 2007 INTERN SAMPLES	102
4.2.1	Gender distribution	102

4.2.2	Racial distribution	103
4.2.3	Quartile ranking	104
4.2.4	Hospital level	104
4.2.5	Age groups	105
4.3	QUESTIONNAIRE RESULTS	106
4.3.1	Overall results for the 2006 and 2007 intern years	106
4.3.2	Overall results by hospital level	108
4.3.3	Overall results by population group	111
4.3.4	Results for the nine categories of the intern model	113
4.3.5	Results for each of the nine categories of the model and those items showing statistically significant differences between 2006 and 2007	114
4.3.5.1	Category 1: Fundamental (theoretical) knowledge	119
4.3.5.1.1	Anatomical Pathology, Pathophysiology and Microbiology	121
4.3.5.1.2	Pharmacology	126
4.3.5.1.3	Interpersonal and communication skill	135
4.3.5.2	Category 2: Medical problem solving and clinical judgement	140
4.3.5.3	Category 3: Holistic patient management and skills	155
4.3.5.3.1	Perform basic clinical procedures safely	158
4.3.5.3.1(a)	Performing an endotracheal intubation	164
4.3.5.3.1(b)	Put up a drip (intravenous cannulation)	168
4.3.5.3.1(c)	Initiate basic life support (cardiopulmonary resuscitation)	173
4.3.5.3.2	Involve the patient and his or her family in planning care	180
4.3.5.4	Category 4: Community Health	184
4.3.5.4.1	Working with ambulatory patients in clinics and outpatient departments	186
4.3.5.4.2	Taking into account the patients' home circumstances when planning for discharge and aftercare	189
4.3.5.4.3	The incorporation of knowledge of South African communities and cultures in caring for patients	194
4.3.5.5	Category 5: Professional attitudes and values/ethics	200
4.3.5.6	Category 6: Effective communication skills	209
4.3.5.6.1	Support or counsel a dying patient and his/her relatives	210
4.3.5.7	Category 7: Working with others in a team	216
4.3.5.7.1	Development of good professional relationships with others in the health care team (nursing staff, colleagues, therapists, administrators)	218
4.3.5.8	Category 8: Self Directed Learning	225

4.3.5.8.1	Finding up-to-date information to improve knowledge about the conditions with which patients present	226
4.3.5.8.2	The use of research articles and evidence based medicine (e.g. Cochrane) searches to reflect on, or make sense of, complex patient management problems	231
4.3.5.9	Category 9: Confidence and Personal Attributes	236
4.3.6	Interviews with patients	250
4.4	RESPONSES TO ADDITIONAL INTERVIEW QUESTIONS	261
4.4.1	Skills, attitudes or knowledge learned in the curriculum which were stifled during internship	261
4.4.2	Analysis of invited additional comments on the curriculum	266
4.4.2.1	Traditional Curriculum (2006 Interns)	266
4.4.2.2	GEMP curriculum (2007 Interns)	269
4.4.3	Additional questions to supervisors	278
4.4.4	General comments	280
4.4.4.1	Interns' "general" comments	281
4.4.4.2	Supervisors' "general" comments	283
4.5	SUMMARY	289
	<b>CHAPTER 5</b>	290
	<b>PHASE 2: DISCUSSION OF RESEARCH FINDINGS</b>	
5.1	DO THE QUANTITATIVE RESULTS ALLOW FOR THE REJECTION OF THE NULL HYPOTHESIS?	291
5.1.1	Interns' overall results	291
5.1.2	Supervisors' overall results	292
5.2	ANALYSIS OF THE RESULTS FOR THE TWO VARIABLES USED IN THE SAMPLE STRATIFICATION	297
5.2.1	Discussion of results in the three hospital levels	297
5.2.2	Discussion of results for the three population groups	298
5.3	DISCUSSION OF THE QUESTIONNAIRE RESULTS	300
5.3.1	Discussion of the findings for the nine categories of the model	300
5.3.1.1	Category 1: Fundamental (theoretical) knowledge	300
5.3.1.2	Category 2: Medical problem solving and clinical Judgement	310
5.3.1.3	Category 3: Holistic patient management and skills	313
5.3.1.4	Category 4: Community health	318
5.3.1.5	Category 5: Professional attitudes and values/ethics	321
5.3.1.6	Category 6: Effective communication skills	323
5.3.1.7	Category 7: Working with others in a team	328

5.3.1.8	Category 8: Self-directed learning	331
5.3.1.9	Category 9: Confidence and personal attributes (intangible personal resources)	332
5.4	THE ISSUE OF PERSONALITY	340
5.5	COMPARISONS WITH PREVIOUS WITS INTERNS AND OTHER UNIVERSITIES	341
5.6	INTERVIEWS WITH PATIENTS	342
5.7	COLLEAGUES' VIEWS	347
5.8	RELATING GRADUATES' PREPAREDNESS FOR INTERNSHIP TO ASPECTS OF THE UNDERGRADUATE CURRICULUM	350
5.9	SUMMARY	356
	<b>CHAPTER 6</b>	357
	<b>FINAL CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH</b>	
6.1	REVIEW OF THE PROBLEM IN THE LIGHT OF THE STUDY RESULTS	357
6.1.1	The relationship of the study findings to complexity theory	357
6.1.2	The more important findings of the entire study	359
6.2	CONCLUSIONS	361
6.3	POSITIVE ASPECTS OF GEMP CONFIRMED BY THE STUDY	362
6.4	CHANGES SUGGESTED BY THE STUDY	363
6.5	LIMITATIONS OF THE STUDY	364
6.6	RECOMMENDATIONS ARISING FROM THE STUDY	366
6.7	JUSTIFICATION FOR CONTINUING AND IMPROVING THE GRADUATE ENTRY MEDICAL PROGRAMME	368
	<b>APPENDICES</b>	369
	APPENDIX A: Phase 1	
A1:	Spreadsheet of sources and final categories for "The Model of the Competent South African Intern"	370
A2:	Interview schedules and information sheets	371

APPENDIX B:	Phase 2	376
B1	Information and consent form for interns and supervisors	377
B2	Intern Questionnaire and information sheet (2007 update)	379
	Intern Interview Schedule	
B3	Supervisor Questionnaire and information sheet (2007 update)	384
	Supervisor Interview Schedule	
B4	Colleague Questionnaire and open ended comment schedule	
B5	Patient Interview Schedule	389
		392
APPENDIX C:		
C1	Full table of interns' scores	395
C2	Full table of supervisors' scores	398
C3	Full table of colleagues' scores	401
C4	Full table of patients' allocated interview scores	402
REFERENCES		404
BIBLIOGRAPHY		419

## LIST OF FIGURES

- Figure 1.1 Wits medical school in its current premises adjacent to the Johannesburg Hospital ([www.johannesburghospital.org.za/](http://www.johannesburghospital.org.za/)) (p.2)
- Figure 1.2 Diagram depicting the new MBChB degree at the University of the Witwatersrand Faculty of Health Sciences and timeline for implementation (p. 7)
- Figure 1.3 A graphic interpretation of Schön's rigour versus relevance dilemma (p.22)
- Figure 1.4 A continuum to explain the working definition of the term competency as used in the intern study (p.37)
- Figure 1.5 Flow chart for Phase 1 of the research process (p.51)
- Figure 1.6 Flow chart for Phase 2 of the research process (p.52)
- Figure 2.1 Map to show interview regions (circled) (adapted from CABS Car Rental South Africa 1990) (p.57)
- Figure 3.1 The Wits intern population in 2006 (n=247) by race and gender (p.81)
- Figure 3.2 Wits Intern allocations to training institutions at the various hospital levels in 2006 (n=247) (p.81)
- Figure 3.3 Distribution of the 2006 intern population by province (including Namibia) (p.82)
- Figure 3.4 Map of the nine South African provinces and Namibia ([www.places.co.za](http://www.places.co.za)) (p.83)
- Figure 3.5 Proportion of intern colleagues to nurse colleagues in 2006 and 2007 (p.86)
- Figure 3.6 Diagrammatic representation of the four perspectives on intern preparedness measured in the 360<sup>0</sup> study (p.90)
- Figure 4.1 Comparison between the distributions of male and female interns in the 2006 and 2007 intern samples (p.103)
- Figure 4.2 Comparison between the racial distributions for the 2006 and 2007 intern samples (p.103)
- Figure 4.3 Comparison between the quartile rankings in the MBChB final year mark for the 2006 and 2007 intern samples (p.104)



- Figure 4.4 Comparison between the hospital levels to which interns in the 2006 and 2007 samples were allocated (p.105)
- Figure 4.5 Comparison between the age groups of interns in the 2006 and 2007 intern samples (p.105)
- Figure 4.6 Comparison between the 2006 and 2007 interns on the overall scores for all 57 items of the questionnaire (**p<0.0001**) (p.107)
- Figure 4.7 Comparison between the 2006 and 2007 supervisors on the overall scores for all 57 items of the questionnaire (**p=0.03**) (p.107)
- Figure 4.8 Overall intern responses in 2006 and 2007 in the three hospital levels, Level I (district), Level II (regional) and Level III (nat/prov) (p.109)
- Figure 4.9 Comparison of supervisor ratings for interns working in the three hospital levels in 2006 and 2007 (p.110)
- Figure 4.10 Overall responses to feeling competent for internship by interns from the three different population groups in 2006 and 2007 (p.111)
- Figure 4.11 Overall responses of the supervisors of interns from the three population groups under their supervision in 2006 and 2007 (p.112)
- Figure 4.12 Comparison between intern responses for Category 1: Fundamental theoretical knowledge in 2006 and 2007 (Significant difference **p=0.01**) (p.119)
- Figure 4.13 Comparison between supervisor responses for Fundamental theoretical knowledge in 2006 and 2007 (p=0.47, not significant) (p.119)
- Figure 4.14 Intern responses regarding how well the curricula in 2006 and 2007 had prepared graduates in the medical sciences (microbiology, anatomical pathology and pathophysiology) (item 1.2) (**p=0.009**) (p. 121)
- Figure 4.15 Intern responses regarding how well the curricula in 2006 and 2007 had prepared graduates in Pharmacology (therapeutics, pharmacokinetics and pharmacodynamics) (item 1.3) (**p=0.0001**) (p.127)
- Figure 4.16 Intern responses regarding how well the curricula in 2006 and 2007 had prepared graduates in interpersonal and communication theory (item 1.4) (**p<0.000001**) (p. 135)
- Figure 4.17 Comparison between intern responses for Category 2: Medical Problem Solving in 2006 and 2007 (**p=0.009**) (p.140)

- Figure 4.18 Comparison between supervisor responses for Category 2: Medical Problem Solving in 2006 and 2007 (n/s) (p.140)
- Figure 4.19 Comparison between interns' responses for Category 3a: Holistic Patient Management in 2006 and 2007 (**p=0.0045**) (p.156)
- Figure 4.20 Comparison between supervisors' responses for Category 3a: Holistic Patient Management in 2006 and 2007 (n/s) (p.156)
- Figure 4.21 Comparison between colleagues' responses for Category 3a: Holistic Patient Management in 2006 and 2007 (n/s) (p.156)
- Figure 4.22 Intern responses on how well the curricula in 2006 and 2007 had prepared them for the safe performance of basic clinical skills (item 3.4) (**p=0.04**) (p. 159)
- Figure 4.23 Supervisor responses regarding how well the curricula in 2006 and had prepared graduates to pass an endotracheal tube (item 3.2) (**p=0.0087**) (p.165)
- Figure 4.24 Comparison between the responses of the 2006 and 2007 interns regarding intravenous cannulation (item 3.7) (**p=0.03**) (p.169)
- Figure 4.25 Comparison between scores for the 2006 and 2007 interns regarding the initiation of basic life support (item 3.10) (**p=0.01**) (p.174)
- Figure 4.26 Comparison of the responses of interns in 2006 and 2007 regarding the involvement of patients and their families in planning care (item 3.17) (**p=0.01**) (p.180)
- Figure 4.27 Comparison between interns' responses for Category 4: Community Health in 2006 and 2007. (**p=0.0002**) (p.185)
- Figure 4.28 Comparison between supervisors' responses for Category 4: Community Health in 2006 and 2007 (n/s) (p.185)
- Figure 4.29 Comparison between scores for the 2006 and 2007 interns regarding working with ambulatory patients in clinics and outpatient departments (item 4.1) (**p=0.05**) (p.186)
- Figure 4.30 Comparison between the preparedness of interns in 2006 and 2007 to take into account patients' home circumstances when planning discharge and aftercare (item 4.3) (**p=0.003**) (p.190)
- Figure 4.31 Comparison of interns' scores in 2006 and 2007 regarding the incorporation of their knowledge of South African communities and cultures in caring for patients (item 4.4) (**p = 0.014**) (p.195)

- Figure 4.32 Comparison between interns' responses for Category 5 Professional Attitudes and Values/Ethics in 2006 and 2007(n/s) (p.200)
- Figure 4.33 Comparison between supervisors' responses for Category 5 Professional Attitudes and Values/Ethics in 2006 and 2007 (n/s) (p.200)
- Figure 4.34 Figure 4.34 Comparison between colleagues' responses for Category 5 Professional Attitudes and Values/Ethics in 2006 and 2007 (n/s) (p.200)
- Figure 4.35 Comparison between interns' responses for Category 6 Effective Communication Skills in 2006 and 2007 (**p=0.02**) (p.209)
- Figure 4.36 Comparison between supervisors' responses for Category 6 Effective Communication Skills in 2006 and 2007 (n/s) (p.209)
- Figure 4.37 Comparison between colleagues' responses for Category 6 Effective Communication Skills in 2006 and 2007 (n/s) (p.209)
- Figure 4.38 Comparison between intern scores in 2006 and 2007 for the item relating to the support or counseling of dying patients and their relatives (item 6.2) (**p=0.002**) (p.211)
- Figure 4.39 Comparison between interns' scores for Category 7: Working with others in a team in 2006 and 2007 (n/s) (p.216)
- Figure 4.40 Comparison between supervisors' scores for Category 7: Working with others in a Team in 2006 and 2007 (**p=0.045**) (p.216)
- Figure 4.41 Comparison between colleague scores for Category 7: Working with others in a team in 2006 and 2007 (n/s) (p.216)
- Figure 4.42 Comparison between 2006 and 2007 colleagues' responses to the item on developing good professional relationships with others in the health care team (nursing staff, colleagues, therapists, administrators) (item 7.1)(Fisher, **p=0.04**) (p.218)
- Figure 4.43 Comparison between interns' responses for Category 8: Self Directed Learning in 2006 and 2007(**p=0.0001**) (p.225)
- Figure 4.44 Comparison between supervisors' responses for Category 8: Self Directed Learning in 2006 and 2007 (n/s) (p.225)
- Figure 4.45 Comparison between the interns' scores in 2006 and 2007 relating to the finding of up-to-date information to improve knowledge about the conditions with which patients present (item 8.1) (**p=0.0001**) (p.227)

- Figure 4.46 Comparison between the interns' scores in 2006 and 2007 for the item relating to the use of research articles and evidence based medicine (e.g. Cochrane) searches to reflect on, or make sense of, complex patient management problems (item 8.4) (**p=0.0001**) (p.231)
- Figure 4.47 Comparison between interns' responses for Category 9: Confidence and Personal Attributes in 2006 and 2007 (n/s) (p. 236)
- Figure 4.48 Comparison between supervisors' responses for Category 9: Confidence and Personal Attributes in 2006 and 2007 (**p=0.045**) (p. 236)
- Figure 4.49 Comparison between colleagues' responses for Category 9: Confidence and Personal Attributes in 2006 and 2007 (n/s) (p. 236)
- Figure 4.50 Overall patients' scores allocated by the researcher during each patient interview in 2006 (n=53) and 2007 (n=44) (n/s) (p. 251)
- Figure 4.51 Diagram to illustrate the nature of the interns' communications with patients and the relationship of the questions to the categories of the model (p. 252)
- Figure 4.52 Intern responses to the question ““Were any skills, attitudes or knowledge that you had learned in the curriculum stifled during internship?”” (p. 262)
- Figure 4.53 Supervisors' responses to the item comparing this intern to other Wits Interns supervised over the past few years (p. 279)
- Figure 4.54 Supervisors' responses to the item comparing this intern to interns from other universities (p.280)
- Figure 4.55 The main areas of general comments given by the 2006 (traditional curriculum) interns during the post-questionnaire interview (p. 282)
- Figure 4.56 The main areas of general comments given by the 2007 (GEMP) interns during the post-questionnaire interview (p. 283)

## LIST OF TABLES

Table 1.1	A comparison between the traditional MBBCh and the GEMP curricula of the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg (pre- and post-2001 rule change) (Manning 2008; University of the Witwatersrand, 2001&2002) (p. 10)
Table 1.2	The ideas of various authors regarding competency, capability, performance, knowledge in action and metacompetency (adapted from Prozesky 2000 and extended in this literature review) (p. 33)
Table 2.1	Sample of intern supervisors and community service doctors interviewed (p.56)
Table 2.2	The process of refining the model of the competent South African intern (p. 60)
Table 2.3	The Model of the Competent South African Intern (p. 64)
Table 3.1	Operationalisation of complexity theory: Possible methods to assess intern competence in a 360 <sup>0</sup> study - multiple methods are best (Holmboe and Hawkins, 1988) (p. 69)
Table 3.2	The sampling frame for all Wits interns in 2006 (p. 84)
Table 3.3	The sample drawn from the 2006 intern sampling frame, including 10% “spare” respondents (Stata IC 10.0) (p. 84)
Table 3.4	Percentages of intern pairs in 2006 and 2007 which fitted the four criteria (p. 85)
Table 3.5	Comparison between the proportion of intern peers to nurse colleagues who completed the questionnaires and interviews in 2006 and 2007 (p. 86)
Table 3.6	Individual items falling under each of the nine categories (p. 93)
Table 4.1	Results of the comparison between the overall scores for all questionnaire items for interns and supervisors in 2006 and 2007 (p. 106)
Table 4.2	Levels of agreement between intern and supervisor responses in 2006 and 2007 using the weighted kappa coefficient (p. 108)
Table 4.3	Results of the comparison of overall scores for interns in Level I, II and III hospitals in 2006 and 2007 (p. 108)
Table 4.4	Overall supervisor ratings in the three hospital levels in 2006 and 2007 (p.110)
Table 4.5	Comparison of overall responses from interns in the three population groups in 2006 and 2007 (p. 111)

Table 4.6	Comparison of overall responses from the supervisors of interns in the three population groups under their supervision in 2006 and 2007 (p. 112)
Table 4.7	The nine categories identified in the Model of the Competent South African Intern showing significant differences (bold) between interns', supervisors' and colleagues' responses in 2006 (traditional) and 2007 (GEMP) (p. 113)
Table 4.8	Summary of results of the intern, supervisor and colleague responses to questionnaire items by category and by individual item (p. 115)
Table 4.9	Category 1: Overall scores for Fundamental (theoretical) knowledge (p. 119)
Table 4.10	Results for all items in Category 1 of the intern model: Fundamental (Theoretical) Knowledge (p. 120)
Table 4.11	Item 1.2: Comparison between interns and supervisors in 2006 and 2007 regarding theoretical knowledge of Anatomical Pathology, Pathophysiology and Microbiology (p. 121)
Table 4.12a	Themes and patterns identified by interns and supervisors in 2006 and 2007 comparing competence in the basic medical sciences (p. 122)
Table 4.12b	Themes identified by interns and supervisors in 2006 and 2007 which relate preparedness in the basic medical sciences to the curriculum experienced (p. 124)
Table 4.13	Item 1.3: Know enough pharmacology (therapeutics, pharmacokinetics and pharmacodynamics) to safely prescribe routine medicines (p. 127)
Table 4.14a	Themes identified by interns and supervisors in 2006 and 2007 regarding interns' preparedness in Pharmacology (p. 128)
Table 4.14b	Themes identified by interns and supervisors in 2006 and 2007 linking Pharmacology competence to specific aspects of the curriculum experienced (p. 131)
Table 4.15	Item 1.4: Apply theory of interpersonal and communication skills to all doctor/patient and doctor/colleague relationships (p. 135)
Table 4.16a	Comparison of the themes identified by interns and supervisors in 2006 and 2007 regarding competence in the application of knowledge of interpersonal and communication theory (p. 136)

Table 4.16b	Themes and patterns identified by interns and supervisors in 2006 and 2007 relating competence in interpersonal and communication skills to the particular curriculum that they had experienced (p. 138)
Table 4.17	Category 2: Overall scores for Medical problem solving and clinical judgement (p. 140)
Table 4.18	Results for all items in Category 2 of the intern model: Medical problem solving and clinical judgement (p. 141)
Table 4.19	Composite table of interns' and supervisors' responses to the ten non-significant items in Category 2 (p. 142)
Table 4.20	Overall scores for Category 3a: Holistic patient management (p. 155)
Table 4.21	Results for items in Category 3 of the Intern Model: 3a Holistic patient management and 3b Individual procedural skills (p. 157)
Table 4.22	Item 3.4 "Perform basic clinical procedures safely" (p. 158)
Table 4.23a	Themes identified by interns and supervisors in 2006 and 2007 comparing the interns' ability to perform basic clinical procedures safely in 2006 and 2007 (p. 159)
Table 4.23b	Themes that emerged during the interviews that related responses about the safe performance of basic clinical procedures to curriculum experience (p. 162)
Table 4.24	Item 3.2: Comparison between 2006 and 2007 scores for supervisors with regard to the performance of an endotracheal intubation (p. 164)
Table 4.25a	Summary of interview comments for interns and supervisors comparing the performance of endotracheal intubation by interns in 2006 and 2007 (p. 166)
Table 4.25b	Summary of interview comments for interns and supervisors in 2006 and 2007 relating their questionnaire responses to curriculum experience regarding endotracheal intubation (p. 167)
Table 4.26	Intern, supervisor and colleague responses to the item on putting up a drip (intravenous cannulation) (item 3.7) (p. 169)
Table 4.27a	Comparison of the number of comments made by interns and supervisors in 2006 and 2007 regarding putting up a drip (intravenous cannulation) (p.170)
Table 4.27b	Summary of interview comments for interns and supervisors in 2006 and 2007 relating their questionnaire responses to curriculum experience in putting up a drip (intravenous cannulation) (p. 171)

Table 4.28	Item 3.10: Interns' responses to regarding the initiation of basic life support (cardiopulmonary resuscitation) (p. 173)
Table 4.29a	Comparison of the number of comments made by interns and supervisors in 2006 and 2007 regarding the initiation of basic life support (p. 174)
Table 4.29b	Summary of interview comments for interns and supervisors in 2006 and 2007 relating their questionnaire responses to curriculum experience in the initiation of basic life support (p. 177)
Table 4.30	Item 3.17: Scores for the 2006 and 2007 interns and supervisors regarding the involvement of the patient and his or her family in planning care (p. 180)
Table 4.31a	Summary of interns' and supervisors' comments comparing the competence of the 2006 and 2007 interns in the involvement of patients and their families in planning care (p. 181)
Table 4.31b	Summary of interns' and supervisors' comments in 2006 and 2007 relating the inclusion of patients their families in planning care to curriculum experience (p. 182)
Table 4.32	Category 4: Overall scores for Community Health (p. 185)
Table 4.33	Results of the intern and supervisor responses to the items under category 4 on "Community Health" (p. 185)
Table 4.34	Item 4.1: Comparison between interns and supervisors in 2006 and 2007 regarding working with ambulatory patients in clinics and outpatient departments (p. 186)
Table 4.35a	Comparison of the number of comments made by interns and supervisors in 2006 and 2007 regarding working with ambulatory patients (p. 187)
Table 4.35b	Summary of interns' comments in 2006 and 2007 relating their questionnaire responses to curriculum experiences in working with ambulatory patients (p. 188)
Table 4.36	Item 4.3: Intern and supervisor scores in 2006 and 2007 regarding taking into account the patients' home circumstances when planning for discharge and aftercare (p. 190)
Table 4.37a	Comparison of the number of comments made by interns and supervisors in 2006 and 2007 regarding taking into account the patients' home circumstances when planning for discharge and aftercare (p. 191)



Table 4.37b	Interview comments for interns and supervisors in 2006 and 2007 which relate questionnaire responses to curriculum experience in taking the patients' home circumstances into account when planning for discharge and aftercare (p. 192)
Table 4.38	Item 4.4: Intern and supervisor scores in 2006 and 2007 regarding the incorporation of knowledge of South African communities and cultures in caring for patients (p. 195)
Table 4.39a	Comparison of the number of comments made by interns and supervisors in 2006 and 2007 regarding the incorporation of knowledge of South African communities and cultures into patient care (p. 196)
Table 4.39b	Interview comments for interns and supervisors in 2006 and 2007 which relate questionnaire responses to curriculum experience regarding the incorporation of knowledge about South African communities and cultures into patient care (p. 198)
Table 4.40	Category 5: Overall scores for professional attitudes and values/Ethics (p. 200)
Table 4.41	Intern, supervisor and colleague responses to questionnaire items under category 5 on "Professional values and attitudes, and ethics" (p. 201)
Table 4.42	Composite table showing the interns' and supervisors responses to the ten non-significant items in Category 5 (p. 202)
Table 4.43a	Comparison of the number of comments made by interns and supervisors in 2006 and 2007 regarding professional attitudes and values/Ethics (p. 203)
Table 4.43b	Interview comments for interns and supervisors in 2006 and 2007 which relate questionnaire responses on professional attitudes and values/ethics to curriculum experience (p. 206)
Table 4.44	Category 6: Overall scores for effective communication skills (p. 209)
Table 4.45	Results of the intern, supervisor and colleague responses to the items under category 6 on "Effective communication skills" (p. 210)
Table 4.46	Item 6.2: Intern, supervisor and colleague responses to the item regarding the support or counselling of a dying patient and his/her relatives (p. 211)
Table 4.47a	Comparison of the number of comments made by interns and supervisors in 2006 and 2007 regarding the support and counselling of dying patients and their relatives (p. 212)

Table 4.47b	Interview comments for interns and supervisors in 2006 and 2007 which relate questionnaire responses regarding the support or counselling of dying patients and their relatives (p. 214)
Table 4.48	Category 7: Overall scores relating to working with others in a team (p. 216)
Table 4.49	Results of the intern, supervisor and colleague responses to the items under category 7 on “Working with others in a team” (p. 217)
Table 4.50	Item 7.1: Colleague responses to the item regarding the development of good professional relationships with others in the health care team (nursing staff, colleagues, therapists, administrators) (p. 218)
Table 4.51a	Comparison of the number of comments made by interns and supervisors in 2006 and 2007 regarding the development of good professional relationships with others in the health care team (p. 219)
Table 4.51b	Interview comments for interns and supervisors in 2006 and 2007 which relate questionnaire responses regarding the development of good professional relationships with others in the health care team (p. 223)
Table 4.52	Category 8: Overall scores for interns and supervisors regarding self directed learning (p. 225)
Table 4.53	Results of the intern and supervisor responses to the items under category 8 on “Self Directed Learning” (p. 226)
Table 4.54	Item 8.1: Intern and supervisor responses to the item regarding finding up-to-date information to improve knowledge about the conditions with which patients present (p. 226)
Table 4.55a	Comparison of the number of comments made by interns and supervisors in 2006 and 2007 regarding the finding of up-to-date information to improve knowledge about the conditions with which patients present (p. 227)
Table 4.55b	Interview comments for interns and supervisors in 2006 and 2007 which relate questionnaire responses regarding the finding of up-to-date information to improve knowledge about the conditions with which patients present (p. 229)
Table 4.56	Item 8.4: Intern and supervisor responses to the item regarding the use of research articles and evidence based medicine (e.g. Cochrane) searches to reflect on, or make sense of, complex patient management problems (p. 231)
Table 4.57a	Comparison of the number of comments made by interns and supervisors in 2006 and 2007 regarding the use of research articles and evidence based

medicine (e.g. Cochrane) searches to reflect on, or make sense of, complex patient management problems (p. 232)

Table 4.57b	Interview comments for interns and supervisors in 2006 and 2007 which relate questionnaire responses regarding the use of research articles and evidence based medicine (e.g. Cochrane) searches to reflect on, or make sense of, complex patient management problems (p. 234)
Table 4.58	Category 9: Overall scores for confidence and personal attributes (p. 236)
Table 4.59	Results of the intern, supervisor and colleague responses to the questionnaires regarding confidence and person attributes (p. 237)
Table 4.60	Composite table showing the interns' and supervisors responses to the ten items in Category 9. No individual item results reached significance but the overall category score for the interns was significant ( <b>p=0.0093</b> ) (p. 238)
Table 4.61	Comparison of the number of comments made by interns and supervisors in 2006 and 2007 regarding responsibility and accountability (p. 239)
Table 4.62	Comparison of the number of comments made by interns and supervisors in 2006 and 2007 regarding the ability to cope with the long hours and demands of internship (p. 242)
Table 4.63	Comparison of the number of comments made by interns and supervisors in 2006 and 2007 regarding the ability to manage time so as to maintain a balance between work demands and personal life (p. 245)
Table 4.64	Comparison of the number of comments made by interns and supervisors in 2006 and 2007 regarding the ability to cope with the uncertainty that doctors sometimes feel (p. 248)
Table 4.65	Overall scores for the patient interviews allocated by the interviewer during the 2006 and 2007 patient interviews (p. 250)
Table 4.66	The themes identified for the question "Are you happy with the way that the doctor addresses you?" (p. 254)
Table 4.67	The themes identified for the question "Has your doctor told you what is wrong with you? What did he or she say?" (p. 255)
Table 4.68	The themes identified for the question "Has your doctor asked you if you know about the treatment and what is best for you?" (p. 256)
Table 4.69	The themes identified for the question "Has your doctor explained how you can change the things that you do to stay healthy?" (p. 257)

Table 4.70	The themes identified for the question “Has your doctor discussed what will happen when you go home?” (p. 260)
Table 4.71	Intern responses to the question “Were any skills, attitudes or knowledge that you had learned in the curriculum stifled during internship?” (p. 262)
Table 4.72	Supervisors’ years of experience in supervising interns (p. 278)
Table 4.73	Supervisor responses to the question “How would you rate the competence of this intern compared to other Wits interns supervised in the past five years?” (p. 279)
Table 4.74	Supervisor responses to the question “How would you rate the competence of this intern compared to interns from other universities?” (p. 280)
Table 4.75	Matrix of interns’ general comments in 2006 (p. 281)
Table 4.76	Matrix of interns’ general comments in 2007 (p. 282)
Table 4.77	Summary of positive comments by supervisors in response to the question “Any further comments”? Examples of comments in each year are given (p. 284)
Table 4.78	Summary of negative general comments by supervisors in response to the question “Any further comments”? Examples of comments in each year given (p. 285)
Table 4.79	Suggestions for future curriculum improvement given by intern supervisors in 2006 and 2007 in responses to the general question “Any further comments?” (p. 286)

## **NOMENCLATURE**

### **OPERATIONAL DEFINITIONS OF CONCEPTS**

**INTERNSHIP** – A post graduate period of 12-24 months (24 months from 2006 for universities on a five year curriculum and from 2007 onwards for universities on a six year curriculum) for the training and practice under supervision of junior, newly graduated doctors prior to the Community Service Year. Interns and Community Service doctors have partial registration with the Health Professions Council of South Africa but are not registered for independent practice until successful completion of both.

**CURATORS OF INTERNS** – Doctors given the specific role of overseeing the interns in an intern training facility.

**INTERN LOGBOOK**- Compulsory completion of a logbook by interns came into place in 2002. Logbooks are submitted as a prerequisite for registration as a medical practitioner to perform community service.

**HOSPITAL CATEGORIES** – Hospitals in South Africa are categorised according to staffing, services offered and referral structures.

**LEVEL 3 - TERTIARY / CENTRAL**

**LEVEL 2 - SECONDARY / REGIONAL**

**LEVEL 1 – DISTRICT**

**SPECIALIST HOSPITALS** were not included in this study. They treat only patients with particular conditions and may be at any hospital levels eg. Specialised District Hospitals for Tuberculosis or Specialised Regional Hospitals for Spinal Injuries.

### **ABBREVIATIONS AND ACRONYMS**

**AIDS** – Acquired Immune Deficiency Syndrome

**CD** – Community-Doctor (theme)

**BCS** – Basic and Clinical Sciences (theme)

**CHB or Bara** – the Chris Hani-Baragwanath Hospital in Soweto, Johannesburg

**CHSE** – Centre for Health Science Education. A centre in the Faculty of Health Sciences, University of the Witwatersrand tasked with the introduction, improvement and support of modern curricula and teaching methods and their evaluation. It is headed by a Director (Professor) and approximately 30 academic and administrative staff.

**EBM** – Evidence Based Medicine

**EDL** – Essential Drug List

GEMP – The Graduate Entry Medical Programme, the final four years of the revised MBCh degree, instituted at the University of the Witwatersrand Medical School in 2003.

GEMP (GEMP curriculum interns) – 2007 interns

HIV – Human Immunodeficiency Virus

HPCSA – Health Professions Council of South Africa

IE – Integrated Examination

IPC – Integrated Primary Care

IT – Information Technology

JUDASA – Junior Doctors Association of South Africa

MBCh – Bachelor of Medicine and Bachelor of Surgery degree from the University of the Witwatersrand, Johannesburg. (Some other universities use the abbreviation MBChB).

MCQ – Multiple Choice Questions

MEQ – Modified Essay Questions

MO – Medical Officer. Registered Medical Practitioner, registered for independent practice

OSCE – Objective Structured Clinical Examination

PBL – Problem Based Learning

PCMS – Preliminary Concepts in Medical Science (see Table 1.1 for details)

PD – Patient-Doctor (theme)

PPD – Personal and Professional Development (theme)

PSEs - Problem Solving Exercises

REG – Registrar. Registered Medical Practitioner undergoing specialist training

RIDIT – Relative to an Identified Distribution together with “it” to resemble other terms in statistical use such as logit or probit (Selvin 1996, p. 175)

The model – Model of the Competent South African Intern developed in Phase 1

TRAD (traditional curriculum interns) – 2006 interns

Wits – The University of the Witwatersrand, Johannesburg. The abbreviation ‘Wits’ is frequently used in this thesis to allow for ease of reading as the pronunciation of the Afrikaans word “Witwatersrand” is difficult for some. The term “Wits” is widely used and accepted when referring to the University.

## CONVENTIONS

The following conventions are used throughout:

- 1 Each set of Intern, Supervisor, Colleague and Patient data was given the same code number, prefixed by the following identifiers:

IRC – Intern research code

SRC – Supervisor research code

CRC/PRC – nurse /intern (peer) colleague research code

PtRC – Patient research code

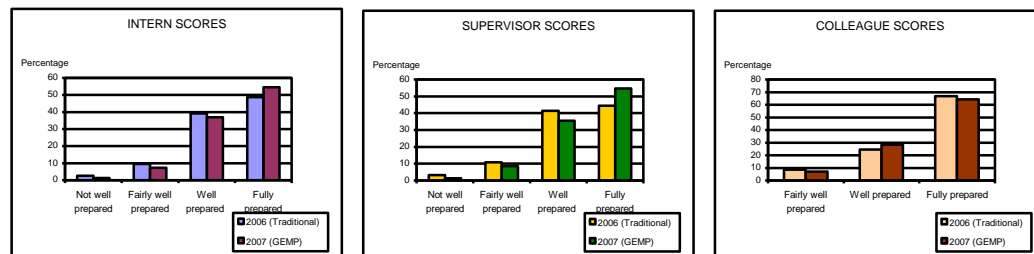
Example: IRC118, SRC118, CRC118, PtRC118

- 2 **CHART COLOURS** – The same chart colours have been used throughout the thesis for clarity and ease of reading.

INTERNS – blue (2006/Trad) and purple (2007/GEMP)

SUPERVISORS – yellow (2006/Trad) and green (2007/GEMP)

COLLEAGUES (nurses or intern peers) – beige (2006/Trad) and brown (2007/GEMP)



- 3 In 2008, after the completion of the data collection for this study, three Gauteng hospitals were renamed after struggle heroes.  
<http://www.news24.com/SouthAfrica/News/3-Gauteng-hospitals-renamed-20080929>  
(accessed 28/02/2011).

The Johannesburg Hospital is now the Charlotte Maxeke Johannesburg Hospital.

The Pretoria Academic Hospital is now the Steve Biko Academic Hospital.

The Coronation Hospital is now the Rahima Moosa Mother and Child Hospital.

The old names are used throughout as they were in use during the research study.

- 4 Significant results are given in bold typeface and significant p-values are included in the respective bar diagrams as well as in the text.

- 5 References and citations are in the Harvard style

## **PREFACE**

The reason for undertaking a study of this nature stemmed from the need to gather comprehensive empirical evidence of the outcomes of the major curriculum change that was occurring in medical education at the University of the Witwatersrand.

The research was made possible through the support of the Faculty of Health Sciences and thanks are extended to the then DEAN, Professor Max Price, Professor James Ware who was the first Director of the Centre for Health Science Education (CHSE) and the current Director, Professor Detlef Prozesky who generously allowed time to conduct the study, contributed additional funding and gave valuable guidance throughout the study.

The writer, as an academic member of the CHSE, had an intimate knowledge of both the traditional and GEMP curricula and was thus suitably qualified to undertake the study.

The research would not have been possible without the willing participation of the graduates, hospital staff and patients who completed the questionnaires and interviews with openness and candour.