ESSENTIAL SURGICAL SKILLS IN RURAL HOSPITALS: A CPD PROGRAMME

by

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PROMOTER: **DR J. BEZUIDENHOUT**
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DECLARATION

I hereby declare that the work submitted here is the result of my own independent study. Where assistance was needed, it was duly acknowledged. I additionally declare that this work is being submitted for the first time at this university/faculty towards a Philosophiae Doctor degree in Health Professions Education and that it has never been submitted to any other university/faculty for the purpose of obtaining a degree.

……. December 2016

Dr D.C. Porter **Date**

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DEDICATION

I would like to dedicate this thesis to Lizelle, my wife and best friend, who has been my consistent inspiration, support and source of wisdom.

Without her love and sacrifice this work would never have been possible.

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So many of my friends and even strangers showed interest in my research. This was a continuous source of encouragement and inspiration. Thank you to all of you.

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LIST OF ACRONYMS

APU:	**Academic Programme Unit**
ATLS:	**Advanced Trauma Life Support**
CDS:	**Capacity of District Surgery**
CEU:	**Continuing Education Unit**
CHE:	**Centre on Higher Education**
CMSA:	**College of Medicine of South Africa**
CPD:	**Continued Professional Development**
DIRAP:	**Directorate for Institutional Research and Academic Planning**
DoH:	**Department of Health**
ECS:	**Executive Committee of the Senate**
GP:	**General Practitioner**
FOTIM:	**Foundation of Tertiary Institutions in the Northern Metropolis**
HEA:	**Higher Education Academy**
HEQC:	**Higher Education Quality Committee**
HEQF:	**Higher Education Qualifications Framework**
HEQSF:	**Higher Education Qualifications Sub-framework**
HPCSA:	**Health Professions Council of South Africa**
NHI:	**National Health Insurance**
NQF:	**National Qualifications Framework**
PQM:	**Process Quality Management**
RUDASA:	**Rural Doctors Association of South Africa**
SAQA:	**South African Qualifications Authority**
SLP:	**Short Learning Programme**

SUMMARY

Key terms: Continued professional development; Essential surgical skills; General practitioners; Rural areas; Learning programme

General practitioners have to deal with a variety of conditions, challenges and diseases. Currently there is little known about surgical practice and the surgical skills required to deal with it in rural South Africa.

The aim of this study was to acquire an understanding of the current surgical practice of general practitioners in rural areas and identify the essential surgical skills needed for rural South Africa. The purpose of the study was to determine the contents of a *Short Learning Programme in Essential Surgical Skills in Rural South Africa.*

The research consisted of a relevant literature search and document analysis to ascertain the current national and international scope of rural surgery, available programmes and the essential contents and outcomes thereof. Attention was also given to curriculum design, HPCSA guidelines for CPD points, learning tools and situations to acquire surgical skills and the development of short learning programmes.

The current GP surgical practice for practitioners in rural areas was evaluated through the use of a Likert-type questionnaire, this was also employed to determine the essential content and outcomes for a short learning programme.

The results of the research was applied to design a *Short Learning Programme for Essential Surgical Skills in Rural South Africa.* It is my recommendation that this programme is rolled out in the second part of 2017 at the University of the Free State. I trust it will contribute to surgical care not only in South Africa, but internationally as well.

OPSOMMING

Belangrike terme: Voortgesette professionele ontwikkeling; Noodsaaklike chirurgiese vaardighede; Algemene praktisyns; Landelike gebiede; Leerprogram

Algemene praktisyns in die platteland staan elke dag voor uitdagings in die praktyk ten op sigte van omstandighede en siektes. Huidiglik is daar baie min bekend aangaande die chirurgiese praktyke en nodige vaardighede om dit the hanteer in die Suid-Afrikaanse platteland.

Die mikpunt van die studie was om te begryp wat chirurgiese praktyke in die platteland behels, en ook om die noodsaaklike vaardighede wat deur praktisyns in die Suid-Afrikaanse platteland benodig word te identifiseer. Die doelwit van die studie was om die inhoud van '*n Kort Leerprogram in Essensiële Chirurgiese Vaardighede in die Suid-Afrikaanse Platteland* te bepaal.

Die navorsing bestaan uit 'n toepaslike literatuurstudie en dokument ontleding aangaande die huidige nasionale en internasionale omvang van chirurgie in die platteland. Daar is ook aandag gewy aan kurrikulumontwikkeling, beskikbare opleidingsprogramme en die inhoud en uitkomste daarvan. Daar is ook gekyk na HPCSA riglyne ten op sigte van VPO punte, die leerproses, die ontwikkeling van chirurgiese vaardighede en die ontwikkeling van kort leerprogramme.

Die huidige algemene praktisyn chirurgiese praktyk in die platteland is geëvalueer deur middel van 'n Likert-tipe vraelys. Die vraelys is ook gebruik om die essensiële vaardighede en uitkomste vir 'n kort leerprogram te bepaal.

Die resultate van die navorsing is gebruik om '*n Kort Leerprogram in Essensiele Chirurgiese Vaardighede in die Suid-Afrikaanse Platteland* daar te stel. Dit is my aanbeveling dat hierdie program in werking gestel word in die tweede helfte van 2017 by die Universiteit van die Vrystaat. Ek glo dat hierdie program sal nie net in Suid Afrika nie, maar ook internasionaal, 'n bydrae lewer tot beter chirurgiese diens.

ESSENTIAL SURGICAL SKILLS IN RURAL HOSPITALS IN SOUTH AFRICA: A CPD PROGRAMME

CHAPTER 1

ORIENTATION TO THE STUDY

1.1 INTRODUCTION

The researcher investigated the current situation faced by General Practitioners (GP's) in rural areas in South Africa, when dealing with surgical procedures or the referral of patients to specialists. There is widespread concern that GP's do not have the required essential surgical skills or equipment as required in delivering a professional service in a rural setting (Halaas, Zink, Finstad, Bolin & Center). Training for rural practice differs dramatically from training at tertiary hospitals (Van Schalkwyk, Bezuidenhout, Conradie, Fish, Kok, Van Heerden & De Villiers 2014:1-9). Geade (2010:1) alludes to the fact that the procedural skills needed in rural practice include surgical skill and the ability to perform safe anaesthetic. In this research project, an in-depth study was done by the researcher with a view to develop and improve surgical skills of general practitioners in rural South Africa.

The objectives of this study were to determine what specific surgical procedures are relevant to general practitioners in rural South Africa and to determine the contents of a CPD accredited programme to address this need.

This study dealt with doctors in the public sector and private practice in rural South Africa that has HPCSA registration as general practitioners for independent practice and community service. This group is expected to treat or refer patients for surgical diseases.

There is no single, universally preferred definition of *rural*, nor is there a single *rural* definition to serve all policy purposes. *Rural* definitions are used to identify rural people, places and/or health care workers (Coburn, MacKinney, McBride, Mueller, Slifkin & Wakefield 2007:1). A South African definition that was used in the 2011 Local Government Budgets and Expenditure Review used the Rural Development Framework (1997) defining rural areas as having the following characteristics:

- Sparsely populated areas in which people farm or depend on natural resources, including villages and small towns that are dispersed through these areas.

- Areas that include large settlements in former homelands, which depend on migratory labour and remittances as well as government social grants for their survival.

For the purpose of this study, the definition of *rural doctors* was general practitioners including community service doctors that are working in rural areas as defined above or working in a district hospital even in urban areas.

This research project can serve as a directive in providing essential surgical services in rural hospitals by equipping doctors with a specific skill set. The overall goal of the study was to determine the needs in training and to define the contents of a CPD Programme to obtain the necessary skills as required by GP's in rural settings.

The aim of this chapter is to orientate the reader on the background of the research problem. The following components of the study will be discussed broadly: the background to the study from an international, national and local perspective, the problem statement and research questions as identified, the overall goal, aims and objectives of the study, demarcation of the field and scope of the study, the value and significance of the study, research design of the study and methods of investigation, implementation of the findings, schematic overview of the study, implementation of the findings of the study and arrangement of the report. A layout of the subsequent chapters are presented and a short summary conclude the chapter.

1.2 BACKGROUND TO THE STUDY

Different communities have different medical needs. Although surgical conditions account for an estimated 11 to 15% of the global burden of disease, they are not accorded the same priority as other preventive procedures in primary healthcare, such as immunisation and prevention of mother-to-child transmission of HIV. The role and practice of the GP in rural hospitals in South Africa in terms of surgery is extremely ill-defined, and poorly documented. The rural GP is called upon to perform clinical duties ranging from primary care to elective and emergency surgery (Jaques, Reid, Chabikuli & Fehrsen 1998:online).

Delivering surgical services in low-income countries has received increasing attention in the global health community (Farmer & Kim 2008:533-536; Ivers, Garfein & Augustin 2008:179-184). One of the main barriers has been the shortage of surgical workforce (Geelhoed 1998:32-42). This shortage is partly due to the retirement of a capable surgical workforce

in rural areas (Hindle 2006:185) and compounded or caused by the difficulty in recruiting doctors into rural areas (Wasko, Jenkins & Meili 2014:93-98; Viscomi, Larkins & Gupta 2013:13-23). An important objection to practising in rural areas is the lack of support for continuing medical education (Eley, Young, Shrapnel, Wilkonson, Baker & Hegney 2007:12-20).

The issue of delivering surgical services is further complicated by lack of professional support, medico-legal risk and family obstacles (Eley *et al.* 2007:12-20*;* Glazebrook & Harrison 2006:502). Another factor is our national prevalence for HIV of around 11%. With an estimated 5,2 million people infected with HIV/AIDS, South African doctors treat more patients with HIV than doctors in other countries (UNAIDS 2008). Little is known about South African doctors' experiences when operating on HIV/AIDS patients given their unique circumstances. There is growing body of research in the Western world regarding professionals' attitudes towards HIV, but in a much different context than South Africa (Gwala-Ngozo, Taylor & Aldous 2010:11-16). Gwala-Ngozo *et al.* found in interviews with a small sample of doctors that doctors had in general a positive attitude towards surgery on HIV patients. This view was not shared by international studies (Leow, Groen, Yung Bae, Adisa, Kingham & Kushner; 2012:397-401).

Nordberg (1990:1-28) reviewed the situation in East Africa and collected literature from that area. Hill (1995:674-677) has published a retrospective study from Kokstad, a small rural town where a great deal of surgery was performed by GPs during the 1990s. Stone (1981:56-67) describes the wide range of surgical procedures he performed over a two-year period in a rural hospital in Tanzania. All these studies point to the broad range of skills needed by the rural GP. Very little data exist about the surgical skill levels of GPs in rural South Africa. As a backdrop for this research, the current position and views around rural surgical services from an international, an African and South African perspective will be shortly discussed.

1.2.1 International perspective

The challenge to provide rural surgical services is not a problem limited to the developing countries. Rural hospitals in the USA play a vital role in the areas they serve but unfortunately many are financially struggling (Zuckerman, Doty, Gold, Bordley, Dietz, Jenkins & Heneghan 2006:339-342). Surgical procedures are a substantial contribution to

the income of smaller hospitals. Hospitals are reconstructing surgical programs and actively recruiting surgeons (Zastrow 2006:269-270).

Humber (2008:179-184) reports that GPs still perform a significant number of surgeries in rural British Columbia hospitals in Canada. Here, there is not an adequate population base to support a specialist surgeon. GPs offer low-risk surgical patients local access to broad-based, low-risk surgical procedures. This mix of general practitioners, GP's with special skills in surgery, anaesthesia or obstetrics and specialists has provided local care with no evidence that outcomes for routine procedures such as appendectomies would be improved by transfer to larger, higher volume centres (Hindle 2006:185). "*The pipeline that has produced such capable physicians is now under threat as the current surgical cohort approach retirement. Newly-trained general surgeons are likely to have a narrower scope of practice compared with the 'tonsil to toenail' generalists currently in place".*

The obvious solution for Canada would be to develop the pool of GP surgeons, especially in the backdrop of great successes with this approach in anaesthesia and obstetrics (Hindle 2006:185). This, however, proved difficult in surgery. According to Hindle the most successful programme for training GP surgeons has been at the University of Alberta where 16 GPs over a 12-year period have completed a 6-month programme, usually combined with six months of obstetrics. The university remains supportive, but the programme is struggling to sustain meaningful training. Currently, Canada has no nationally accredited training programme for GPs in rural surgery (Hindle 2006:185).

Green (2003:232-233) reports that many Australians by choice or necessity live and work in rural Australia. In the past, broadly-trained general surgeons and appropriately trained general practitioner (GP) surgeons provided much of the surgical management. Recently, very few rural GPs have been trained in surgery and there is a shortage of specialist surgeons in many rural parts of Australia. Outreach surgery has been proposed to assist in the provision of some surgical services, but it is not as effective as an on-site surgical presence. According to Green, providing adequate surgical services to rural Australians will best be achieved by having adequate numbers of surgeons resident in rural areas, with appropriate outreach specialist services and training and support of the procedural GPs in the smaller centres.

In Pakistan as much as 67% of a population of 160 million live in rural areas, yet as elsewhere the tertiary care facilities are concentrated in large cities. The remote northern

areas have harsh weather conditions and difficult mountainous terrain with travelling times over a distance of 600km of 16 hours been reported by Alvi (2011:57-63). In 1992 The Aga Khan Medical Centre, Singul (AKMCS), a secondary healthcare facility, was established in Ghizer district. AKMCS provides emergency and common elective surgical care to a rural population of 132000 people. Besides providing a service AKMCS also strengthened the primary health service through providing an opportunity for general practitioners to be trained in common surgical procedures.

Looking at the data from January 1998 to December 2001 and descriptively analysed by Alvi (2011:57-63) confirmed the important part that surgery plays in rural surgery. Thirty-one thousand seven hundred and eighty-two patients were seen during this period; 53% were medical; 24% surgical; 16% obstetric and 7% with psychiatric illness.

1.2.2 African perspective

As in the rest of sub-Saharan Africa, surgeons are in extremely short supply in most hospital districts in Nigeria. The existing few are mostly stationed at the national or teaching hospitals in major cities. However, most of the surgical cases are to be found in the rural areas where at least 80% of the population resides. To meet this volume of surgical services, many African countries rely on assistant medical officers who are trained to provide surgical services in rural hospitals with good clinical outcome and economic benefits in terms of training cost to the government (Mullan & Frehywat 2007:2158-2163).

In Nigeria, general practitioners with surgical and obstetric skills do the majority of surgical procedures. Most of the medical doctors practising in remote centres do not have adequate surgical training to meet the challenges of the volume and procedures of surgical cases at their location. The Nigerian postgraduate medical training programme in general practice and family medicine was designed to bridge this gap and give adequate surgical exposure to residents who will eventually function as gatekeepers in rural and remote communities.

Monjok and Essien (2009) are of the view that delivery of surgical services to the rural population in Nigeria is feasible through mobile units utilizing existing static health centres, basic surgical instruments and local health staff. They also postulate that the training of general practitioners in surgery and obstetrics procedures will increase the volume of surgical procedures and reduce surgical and maternal mortality and morbidity effectively.

As in Nigeria a large part of the population in Niger also live in rural areas, and they also turned to GPs to solve the lack or surgical expertise. In Niger 72% of the population live in rural areas where there is a limited ability to offer emergency obstetrical and surgical care that is needed (Sani, Nameoua, Yahaya, Hassane, Adamou, Hsia, Hoekman, Sako & Habibou 2009:2063-2068). The Ministry of Health in Niger, in association with the Faculty of Medicine of Niamey, made the decision in 2005 to address this problem. As part of Niger's health strategy surgery was launched at the district hospitals (DH). General Practitioners provided these surgical services after 12 months training in basic surgery. These practitioners received a "Capacity of District Surgery" (CDS) certificate after their training is completed. The first group were deployed at the end of 2006. Sani *et al.* (2009:2063-2068) reported that mortality and morbidity were low for both emergent and elective procedures, and referrals to the regional hospital have been reduced drastically. The results from this study of rural surgery performed by GPs trained in surgical procedures are most promising and encouraging.

In Mozambique, programmes to train persons without any medical background (assistant medical officers) in performing major obstetric surgery have been in place for a number of years (Pereira, Bugalho, Bergstrom, Vaz & Cotiro 1996:508-512). This programme had good results from an economic perspective (Kruk, Pereira, Vaz, Bergstrom & Galea 2007:1253-60) as well as for a service-delivery quality point of view (Pereira, Cumbi, Malalane, Vaz, McCord & Bacci 2007:1530-3).

Pereira, Mbaruku, Nzabuhakwa, Bergström and McCord (2011:180-3) documented the contribution of non-physician clinicians, assistant medical officers (AMO) and medical officers (MO) with regard to meeting the need for comprehensive emergency obstetric care in the Mwanza and Kigoma regions in Tanzania. All hospitals in the two regions were visited to determine the proportion of major obstetric interventions performed by AMOs and MOs. All deliveries (n=38758) in these hospitals in 2003 were reviewed. AMOs operating independently performed most major obstetric surgery. Outside of the single university hospital, AMOs performed 85% of caesarean sections and high proportions of other obstetric surgeries. The case fatality rate was 2.0% in Mwanza and 1.2% in Kigoma.

In another study from Tanzania (McCord, Mbaruku, Pereira, Nzabuhakwa & Bergstrom 2009:876-885) they reviewed the records of all patients admitted for complicated deliveries to fourteen district hospitals during four months. Among 1,134 complicated deliveries and

1,072 major obstetrical operations, there were no significant differences between assistant medical officers and medical officers in outcomes, risk indicators, or quality.

In Sudan, the strategy of providing care through mobile surgical missions in settings where the establishment of permanent referral services is not feasible due to the infrastructure and security conditions, or not cost-effective due to the sparse population density has proved very effective (Cometto, Belgrano, De Bonis, Giustetto, Kiss, Taliente & Meo 2012:556-564). Furthermore, their experience corroborates the thesis that simple, yet lifesaving, surgical and anaesthetic procedures can be taught to nurses and general practitioners. Cometto *et al*. (2012:556-564) postulates that "this approach would have the potential of bridging the gap of unmet surgical needs in developing countries and reduce the unacceptably high level of maternal and surgical mortality in these contexts".

1.2.3 South African perspective

South Africa is currently in the process of introducing the National Health Insurance commonly known as NHI (RSA DoH 2011:4-29). The current system of healthcare financing in South Africa is two-tiered, with a relatively large proportion of funding allocated through medical schemes, various hospital care plans and out-of-pocket payments. This current funding arrangement provides cover to private patients who purchased a benefit option with a scheme of their choice or as a result of their employment conditions. It only benefits those who are employed and are subsidised by their employers – state and the private sector. The other portion is funded through the National Treasury and is mainly for public health sector users. This means that those with medical scheme cover have a choice of providers operating in the private sector, which is not extended to the rest of the population. The NHI is intending bringing reform that will improve service provision. It will promote equity and efficiency and ensure that all South Africans have access to affordable, quality healthcare services regardless of their socio-economic status (RSA DoH 2011:4-29).

As part of the NHI, overhaul of the healthcare system and improvement of the health system and of its managements, hospitals in South Africa will be re-designated as follows (RSA DoH 2011:4-29):

- District hospital;
- Regional hospital;
- Tertiary hospital;

- Central hospital; and
- Specialized hospital.

The smallest type of hospital is the district hospital or rural hospital that provides generalist medical services (medical services provided by general practitioners). In terms of specialist care, they are limited to four basic areas, namely:

- Obstetrics and Gynaecology;
- Paediatrics and Child Health;
- General Surgery; and
- Family Medicine.

Consequently, in the South African context, these facilities will have services delivered at general practitioner level with district specialist team support. The specialities in this team will include:

- A principal obstetrician and gynaecologist;
- A principal paediatrician;
- A principal family physician;
- A principal anaesthetist;
- A principal midwife; and
- A principal primary healthcare professional nurse.

The role of these teams will be to provide clinical support and oversight, particularly in those areas with a high disease burden. Others will be added over time as the need arises. Currently, this team does not include a surgeon (RSA DoH 2011:4-29). The burden of the surgical services will fall squarely on the shoulders of the GP working in rural areas with only support in obstetrics.

Jaques, Reid, Chabikuli and Fehrsen (1998:online) found that general surgical procedures was the major component of surgical procedures, that had been performed in rural hospitals in the Northern Province and Kwazulu Natal. De Villiers (2003:15-19) had comparable results in district hospitals in the Western Cape (cf. 2.2).

The specific skills required to carry out this function have yet to be defined for doctors working in the rural areas of South Africa. This problem is further compounded by the lack

of specialist support in the public sector and the fact that the type of surgical procedures that undergraduate students get exposed to in training institutions, differs tremendously from the day-to day-need of the general practitioner in rural areas (Jaques *et al.* 1998:online).

1.2.4 CPD programme development

A number of years ago, the Continuing Professional Development (CPD) system was introduced in South Africa by the Health Professions Council of SA (SAMA 2012:online). Doctors who wished to maintain their Registration with the Council had to upkeep a specific number of CPD points as was instructed by the Council (HPCSA 2011:2-19). The purpose of CPD is "to assist health professionals to maintain and acquire new and updated levels of knowledge, skills and ethical attitudes that will be of measurable benefit in professional practice and to enhance and promote professional integrity".

In the executive summary of Criteria and Guidelines for CPD Programmes and Skills Programmes (2004:5-6) of the South African Qualifications Authority, CPD Programme provisioning is described as one of the most dynamic features of the emerging education and training system of South Africa. This kind of provisioning is particularly associated with 'just in time', and 'just enough' learning to meet a specific need in workplace environments. Therefore, it is considered a viable and common method for optimal workplace functioning in all contexts and greatly facilitates access to learning in a manageable manner in terms of cost, time, energy and resources, for both the employer and employee.

In addition, CPD Programme provisioning has a wider focus than workplace contexts: where research findings are disseminated and new knowledge is shared, it is also associated with continuing professional development (SAQA 2004:5-6). A third area where CPD Programme provisioning is important is where learners require a targeted learning programme, to upgrade skills and knowledge to ensure success in their chosen field of learning. With the new approach to education and training, CPD Programme provisioning has a very particular place in the system and has an important role to play in the development, up-skilling and multi-skilling of human resources. It is clear that it is relevant to all sectors and bands including medicine (SAQA 2004:5-6).

A CPD programme is developed through similar steps (UFS 2012:online) to a short learning programme. A written proposal (including its rationale and purpose) to develop a CPD

programme must be approved by decision of the appropriate faculty sub-committee. After faculty level approval, the Academic Planning Unit (APU) of Directorate for Institutional Research and Academic Planning (DIRAP) is consulted for guidance to compile a formal application on the format determined by the UFS. The APU ensures that the application meets all the institutional requirements. After clearance by the APU, the programme is submitted to the Faculty Board, after which it is referred to the Senate. The programme is then submitted to the HPCSA for CPD accreditation (SAMA 2012:online). A more detailed discussion of the CPD guidelines will follow in Chapter 2.

1.2.5 Conclusion

We have to acknowledge the fact that the delivery of rural surgical services is a worldwide problem. Various strategies have been formulated - which range from training specialist surgeons for rural surgery to training nurses and even non-medical personnel to perform a limited scope of procedures. General practitioners, however, form the backbone of most strategies. The literature clearly states that expertise and specialization are not necessary synonymous. There are also enough reports to support the notion that expertise can be developed in a relatively short time in a limited field. The only question that remains unanswered is: What is the essential surgical skill set for rural practitioners in rural South Africa?

1.3 PROBLEM STATEMENT AND RESEARCH QUESTIONS

The following concepts are key to the problem statement and formulation of the research questions and therefore defined contextually for the sake of clarity. The current problem that was addressed is the absence of a training programme available for the development of essential skills in specific surgical procedures for general practitioners in rural South Africa. There was also very little available current data about the surgical skills, scenarios (e.g. available equipment and consumables) and challenges facing doctors in rural areas. This was addressed by developing a curriculum for a CPD programme to train GPs in essential surgical skills.

No recent studies in South Africa could be traced as far as a CPD programme is concerned to train and equip GP's in rural areas with essential skills in specific surgical procedures. McKenzie, Beaton, Hollins, Jukka and Hollins look at problems in training of advanced rural skills among general practitioners. No mention of surgical skills training was made in this

study, as they focussed more on supporting measures to rural training. A simulation-based curriculum for training for ward based surgical care was developed by Pucher, Darzi and Aggarwal. The purpose of this curriculum was to improve patient surgical outcomes. Although it addresses surgical care, it was aimed at improving ward round based care.

Questionnaires have been used successfully to determine the contents of various medical and healthcare curricula (Holloway & Webster 2013:992-7; Lisk, Flannery & Loh 2014:135-143; Slusser, Rice & Miller 2012:385-392). Herbener (1994:292-298); Morihara, Jackson and Chun (2013:908-913); Gonsalves, Ajjawi, Rodger and Varpio (2014:422-429) and Curran, Ned and Winkleby (2014:271-280) have also made use of this method to determine curriculum contents. None of these studies looked at rural surgical skills under general practitioners.

For the literature review Academic Search Complete, BioMed Central, ERIC, MEDLINE, Medical Matrix were the most important databases that the researcher consulted. The researcher made use of EBSCOhost and Google scholar academic search engines, adjunct by Google and Yahoo.

In conclusion there seems to be no recent scientific data available or research done to determine the essential surgical skills needed in surgery to cope with the demands of rural South Africa. In order to address the problem stated, the following research questions were addressed in order to attain the outcome, the main research question, therefore, was namely:

i. What should the contents of a CPD programme in addressing essential surgical skills in South African rural areas for GP's be?

Sub-questions that emanate from the main research question are:

ii. What is the current level of surgical skills of GPs in rural areas?
iii. What are the essential surgical procedures skills set that are needed by GP's in rural areas?

The research was carried out and completed based on these research questions.

1.4 OVERALL GOAL, AIM AND OBJECTIVES OF THE STUDY

1.4.1 Overall goal of the study

The overall goal of this study was to conduct a critical analysis of the surgical skills required by general practitioners in rural South Africa, with the final product of providing a curriculum for an accredited CPD learning programme addressing these specific needs. This may be used to train GPs in the required surgical skills, ultimately improving healthcare in rural areas in South Africa.

1.4.2 Aim of the study

The aim of the study was the development of essential surgical skills in rural areas and hospitals in South Africa by means of an accredited CPD learning programme.

1.4.3 Objectives of the study

To have achieved the primary aim and address the principal research questions of the study, the following objectives were pursued:

i. *Conceptualising and contextualising the development of a CPD programme to address surgical skills as required by GP's in rural areas. This was done via a literature study and an analysis of related international and national documents.*
ii. *The objective to determine the current surgical procedures that are performed by GP's in rural areas were achieved through a literature review and a Likert type questionnaire that was sent out to general practitioners.*
iii. *A thorough insight into the challenges faced and needs in terms of essential surgical skills for GPs in rural South Africa was gained through the use of the questionnaires.*
iv. *The contents of a CPD programme for addressing the identified shortcomings in required surgical skills were identified and proposed. This objective was achieved by the use of the questionnaires and analysis of documents.*

These objectives addressed the main and subsequent research questions i-iii in view of a holistic and scientific development of a CPD programme.

1.5 DEMARCATION OF THE FIELD AND SCOPE OF THE STUDY

This study will be done in the field of Health Professions Education and lies in the domain of academic programme development. This study is interdisciplinary as it reaches across Health Professions Education and Surgery.

My intended target population and the participants in the questionnaire survey were general practitioners that were either in practice in rural areas or had previous experience in this area of practice. It was important to me to gain information from the true experts in rural practice, the practitioners that work there, or previously did so. The details of this process will be detailed in Chapter 4.

As a general surgeon practicing in the Eastern Cape servicing a rural community in the public and the private sector, I travel to some rural towns to do visiting clinics and endoscopy lists. I am also involved with the lecture program for interns and medical officers in the Uitenhage Provincial hospital, a district hospital according to the current classification. Over the past ten years I have seen the decline in number of GPs in my referral area that still perform surgical procedures due to retirement and immigration. This has sparked my interest in this field of study.

This study was done between 2013 and 2016 with the empirical research phase in 2015.

1.6 VALUE AND SIGNIFICANCE OF THE STUDY

The value of this study will reside in that general practitioners in rural hospitals in South Africa are correctly equipped with the necessary surgical skill set to deliver and perform essential surgical services through the development of a CPD programme.

The research performed will contribute significantly not only to developing and implementing a CPD Programme to train general practitioners in South Africa, but will also be of great value to the rest of the developing world, especially in countries that does not have measures in place to address this issue.

1.7 RESEARCH DESIGN OF THE STUDY AND METHODS OF INVESTIGATION

Creswell (2009:6-7) see worldview as " a general orientation about the world and the nature of research that a researcher holds". Creswell adopts this term from Guba (1990:17) that describes worldview as "a basic set of beliefs that guide action. Mertens (1998) and Lincoln and Guba (2000) called it *paradigms*. Crotty (1998) used the terms *epistemologies* and *ontologies* whereas Neumann preferred *broadly conceived research methodologies.* Creswell alludes to the fact background, prior experience and the type of discipline among other factors influences the researcher's worldview. With my background in surgery it comes as no surprise that I am firmly set in a post-positivist worldview. Creswell summarises post-positivism with the following characteristics namely:

- Determination; and
- Reductionism; and
- Empirical observation and measurement; and
- Theory verification.

Phillips and Burbules (2000) as cited by Creswell further provides the following detail of the assumptions of this worldview:

- "Knowledge is conjectural – absolute truth can never be found";
- "Research is the process of making claims and then refining or abandoning some of them for other claims more strongly warranted";
- "Data, evidence and rational considerations shape knowledge";
- "Research seek to develop relevant true statements"; and
- Competent inquiry is based on being objective.

These assumptions are more suited to quantitative than qualitative research. This was kept in mind with the research design and methodology as is discussed in Chapter 3.

A questionnaire for quantitative evaluation with built-in qualitative control was used for research. Furthermore, a focused, yet in-depth literature study was done to identify the principal key issues regarding surgical skills in rural areas and the developing of a curriculum for a CPD programme for general practitioners in essential surgical skills.

The results from the literature study, the questionnaire survey were used to inform the CPD programme for GP's in rural areas related to their essential surgical skills. "A detailed description of the research design, target population, sampling methods, data collection, data analysis and ethical consideration are given in Chapter 3".

1.7.1 Design of the study

This descriptive study making use of a quantitative design augmented by a qualitative component. The design will be discussed in more depth in Chapter 3.

1.7.2 Methods of investigation

The two main methods of research was a literature study done to develop a conceptual framework, this was followed by a questionnaire survey to gain insight in the views, current practices and opinions of the target population. Chapter 3 will cover this in more detail.

1.8 SCHEMATIC OVERVIEW OF THE STUDY

The following figure provides Figure 1.1 provides a schematic overview of the study. The various stages of the important elements are displayed.

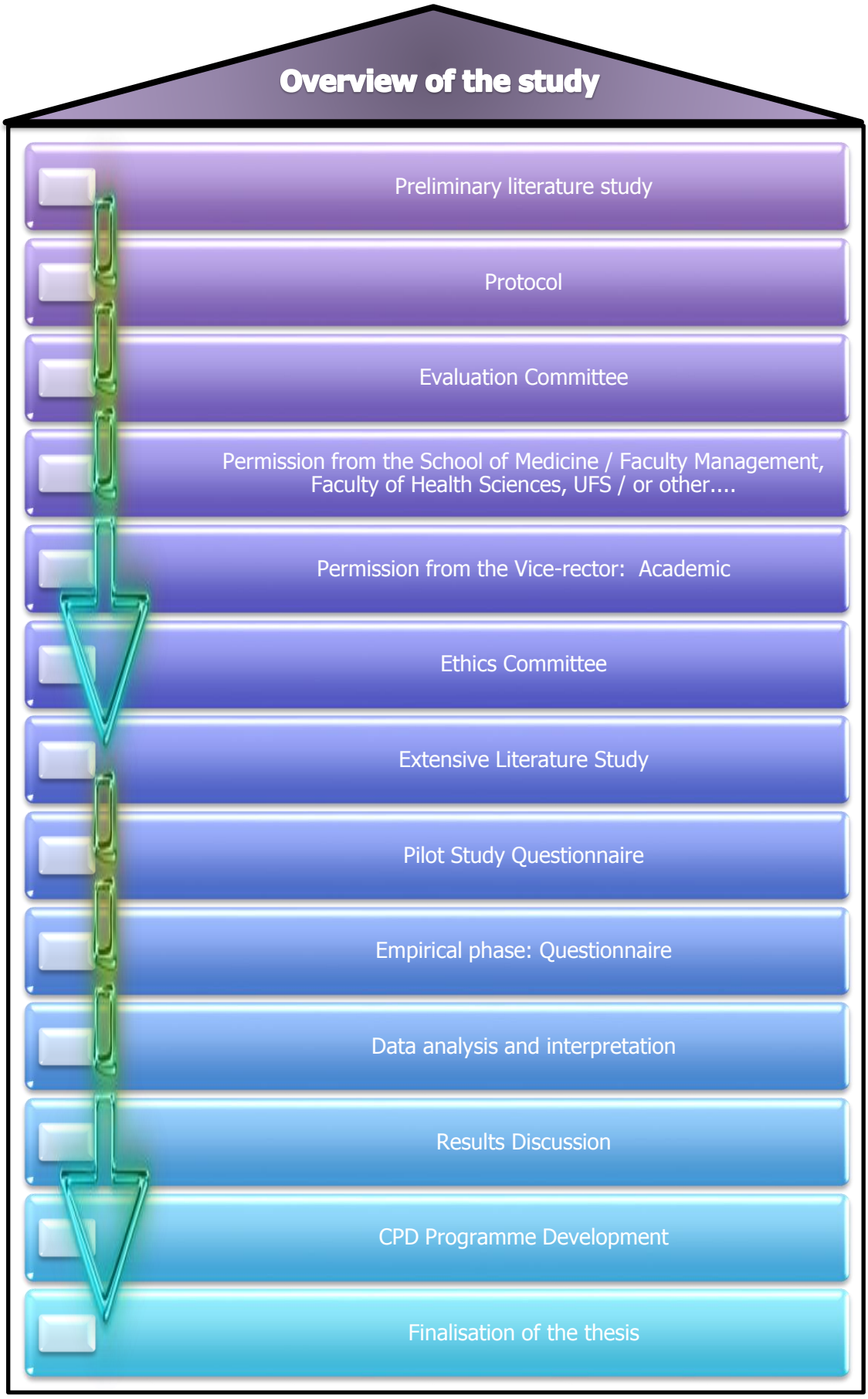

FIGURE 1.1 SCHEMATIC OVERVIEW OF THE RESEARCH PROCESS
(Compiled by the researcher, Porter 2016)

1.9 IMPLEMENTATION OF THE FINDINGS

The research report and findings of the research will be used to determine the contents of a short learning programme to develop essential surgical skills for rural South Africa. It is further recommended that the programme form part of the Continued Professional Development programme of the HPCSA through accreditation for CPD points.

Research findings will be submitted to academic journals mainly dealing with Health Professions Education with a view to publication. Research findings will further be used in workshops, seminars and will be presented at conferences.

1.10 ARRANGEMENT OF THE REPORT

To provide more insight into the topic under investigation, the research methods used to find solutions and the final outcome of the study, the report are set out as follows: Title Page, Declaration, Acknowledgements, Table of contents, List of tables, List of figures, List of acronyms and a Summary and Opsomming. The layout of the chapters are discussed in the following order.

In this chapter, Chapter 1, ***Orientation to the study***, an introduction and the background of the study was provided. The problem statement and research question and sub research questions were stated. The overall goal, aim and objectives were stated and the philosophical perspective, research design and methods that were employed were discussed briefly to give an overview of content of the research report. It further demarcated the field of the study and the significance and need for the research.

Chapter 2 deals with the ***Conceptualisation and Contextualisation of Essential Surgical Skills and CPD Programme Development.*** A short introduction of Bloom's taxonomy was given. This is followed by a discussion of curriculum design, essential surgical skills in rural areas and some insight into surgical skills development. Continued professional education was discussed with special mention of the HPCSA guidelines and regulations. Outcomes based education, learning situations and tools and assessment was also alluded to in Chapter 2. The chapter ends with mention of the processes of programme accreditation and alluding to the South African Qualifications Authority's requirements with mention of the level descriptors.

In Chapter 3, ***Research Design and Methodology***, will be described in detail. The data-collecting methods and data analysis will be discussed. This discussion will include the way in which the questionnaires were constructed and distributed by means of the sophisticated EvaSys educational internet-based survey-management system of the UFS. The EvaSys system not only provided the email-based hyperlink to the questionnaires, but also contributed to the data gathering and processing.

In Chapter 4, ***Data analysis, interpretation and discussion of results*** where the results from the questionnaire were given and discussed. The chapter started with a description of the methodology of the empirical research phase of the study. The demographic data of participants was discussed, before quantitative data regarding current surgical procedures performed and opinion regarding essential surgical skills in rural South Africa were shown and discussed. The chapter is concluded with feedback on qualitative data that was gathered with the questionnaire.

In Chapter 5, ***The CPD Programme on essential surgical services in South African rural areas,*** as the final outcome of the study will be provided, contextualised and discussed in detail.

In Chapter 6, ***Conclusions, recommendations and limitations of the study,*** an overview of the study, conclusion, recommendations and limitations of the study will be discussed.

Following upon this will be a list of references as consulted and the attached appendices.

1.11 CONCLUSION

Chapter 1 provided the introduction and background to the research undertaken regarding the development of a CPD programme in essential surgical skills for GP's in rural areas in South Africa.

The next chapter, Chapter 2, entitled ***Conceptualisation and Contextualisation of Essential Surgical Skills and CPD Programme Development*** will be a study on the relevant literature.

CHAPTER 2

THE CONCEPTUALISTION AND CONTEXTUALISATION OF ESSENTIAL SURGICAL SKILLS AND CPD PROGRAMME DEVELOPMENT

2.1 INTRODUCTION

Over the course of this chapter a short introduction to curriculum design will be given. Emanating from this are current procedures that are performed in rural areas, concepts like adult learning, outcome based education, distant learning, e-learning and assessment will be discussed. Short learning programme development and accreditation with the South African Qualifications Authority's and Council of Higher Education's policies and criteria for accreditation and registering qualifications and programmes would be alluded to Continued Professional Development (CPD) with reference to the HPCSA guidelines will also be discussed.

2.2 BLOOM'S TAXONOMY

Bloom's taxonomy refers to a classification of different learning objectives that are set for students (Bloom, Engelhart, Furst, Hill & Krathwohl 1956:4). These educational objectives are divided into three domains namely: **cognitive, affective** and **psychomotor**. Within each of these domains learning at the higher level is dependent on mastery of the prerequisite knowledge at the lower levels. The focus is on a holistic approach in education.

Anderson and Krahtwohl (2001:114-123) revised the taxonomy in the **cognitive** domain. There are six levels moving from lowest to highest level in the **cognitive** domain:

- Knowledge – remember and recall facts;
- Comprehension – understanding, translating, interpreting and extrapolating facts;
- Application – applying facts to solve new problems;
- Analysis – analysing the relationships, elements and principles and identifying causes or motivation;
- Synthesis – combining elements in new pattern or structure; and
- Evaluation – making judgements about information.

There are five levels in the **affective** domain as revised by Anderson *et al.* (2001:212-218) The skills in the **affective** domain address the emotional responses and attitudes of students. From lowest order to highest order they are:

- Receiving – passively paying attention;
- Responding – actively participates in learning process;
- Valuing – associates value to acquired knowledge;
- Organising – can put together different information and ideas; and
- Characterising – the value or belief held by the student becomes part of his/her behaviour.

Although Bloom never created subcategories for the **psychomotor** domain, Simpson (1966:110-144) and later Harrow (1972:12-32) proposed the following seven levels in lowest to highest order for the **psychomotor** domain:

- Perception – sensory cues guiding motor activity;
- Set – readiness to act;
- Guided response – beginning of learning a complex skill through imitation, trial and error;
- Mechanism – intermediate stage of learning a complex skill. Habitual learned responses;
- Complex overt response – complex movement patterns performed skilful;
- Adaptation – well developed skill modified to fit special requirements; and
- Origination- creating new movement patterns to a specific problem or situation.

Bloom's taxonomy serves as the backbone for specifically teaching philosophies concerned with teaching skills rather than contents (Krathwohl 2002:212-218).

2.3 CURRICULUM DESIGN

The Council for Higher Education describes a curriculum as "the syllabus for a specific learning programme" (CHE 2011:13). "What you Teach" would be a simple way according to Tyler (1949) of defining a curriculum as cited by Maher (2004:46-54). This however is a very simplistic way of defining a curriculum as stated by Maher in referring to Clacton (2001). In Claxton's words "a curriculum can be defined as experiences that are provided to students by institutions with the aim to foster learning".

Numerous models for curriculum development has been developed. Cervero (1992:91-101) mentions the following three models.

2.3.1 Content-based model

In a strictly content-based model of curriculum, the faculty focuses almost entirely on selecting content. Their main task is to prepare lectures. Such an approach can be appropriate if the course is responsive to the needs of the potential learners, if the faculty members teach so that the content is relevant to learners, and if the experience enables learners to better perform their professional responsibilities. And sometimes that is indeed the case. This approach is often poorly executed. The central question for the faculty becomes "*What topics shall I cover?"* rather than "*What can I do to help learners develop the abilities they need?".* Teaching can become merely "telling" where the faculty member only conveys information to passive learners.

2.3.2 Knowledge-based model

A knowledge-based curriculum centers on the knowledge gained from the perspective of the learner. It places great emphasis on developing clear and sound learning objectives. By organizing the information to be learned into manageable objectives, planners can then design activities that help learners master the objectives. The planners can sequence the topics to be dealt with, can choose the appropriate teaching methods, and can select the necessary instructional resources. Through designing courses in terms of learning objectives, a curriculum becomes oriented to learning outcomes rather than simply "covering content". However, a knowledge-based curriculum done poorly has major shortcomings. The central question becomes "What are the objectives of this course?" This emphasis on the development of objectives sometimes leads to reductionistic thinking on the part of planners (and learners). Knowledge becomes broken down into smaller and smaller pieces. Such a process conjures up the image of "gathering" knowledge similar to squirrels gathering nuts. The squirrel that gets the most nuts has the most knowledge. Falling into reductionistic thinking frequently happens, even though all faculty and learners agree that programs should help learners to think more deeply, interpret data, and solve problems, rather than ask them to accumulate information. As Cervero (1992:91-101) phrased it, good continuing educational programs are those which help professionals learn "to take wise action." It is important, however, not to caricature knowledge-based curriculum and to denigrate its accomplishments. Thinking in terms of objectives and

learning outcomes is a leap forward compared with content-based curriculum planning. A well-developed curriculum, with carefully devised objectives, can and does help learners do more than learn discrete facts. It helps them develop ways of thinking required for high performance.

2.3.3 Outcome/competency/developmental-based model

A developmental curriculum model in no way minimizes the need to have specific information and skills. It, too, is based on an assessment of learners' needs, and it emphasizes helping participants learn the information they need in order to perform day-to-day tasks. It differs from content-based models and knowledge-based models in that it seeks to help participants learn practical information in the service of further development of abilities deemed necessary for outstanding performance. In a developmental curriculum, the central question is "How can I help the learners engage with content in ways that help them develop the abilities they need to be excellent performers?". According to Dent and Harden (2013:34-44) planning a medical curriculum can be considered in ten steps namely:

- **Identify the Need:** A range of approaches can be used to identify the curriculum need (Dunn, Hamilton & Harden 1985:15-25). Approaches in medical curriculum design varies from the "wise men" approach to consultation with stake holders, making a study of errors in practice to identify problem areas, task analysis, a study of star performers and critical incident studies. All of these approaches alone or in combination has been used successfully.
- **Establish the learning outcomes:** A big move in medical education over the past decade has been to use an outcome or competency-based approach to education (Harden 2007:625-629).
- **Agreeing the content:** The content of a curriculum (Dent *et al.* 2013:34-44) can be presented from a variety of views for an example: subjects or discipline, the life-cycle, problems or clinical presentations or tasks. The *declared* curriculum is the curriculum that is set out by the institution in policies and documents, the curriculum that is actually presented in practice. The *learned* curriculum is what is actually learnt by the student. There is also a *hidden* curriculum. This is informal learning that takes place and that is different from what is taught.
- **Organising the Content:** Harden and Stamper (1999:141-143) states that the contents should be organized in such a way that topics are revisited throughout the course, at different levels of difficulty, and that new learning should also be related to

previous learning so that the competence of the student increases with each revisit the topic.

- **Deciding the educational strategy:** The SPICES model offers a guide to planning and evaluating a curriculum (Harden, Sowden & Dunn 1984:284-297). Each of the possible strategies is treated as a continuum, allowing and acknowledging that institutions may vary in the approach. Figure 2.1 is a schematic representation of the SPICES model.

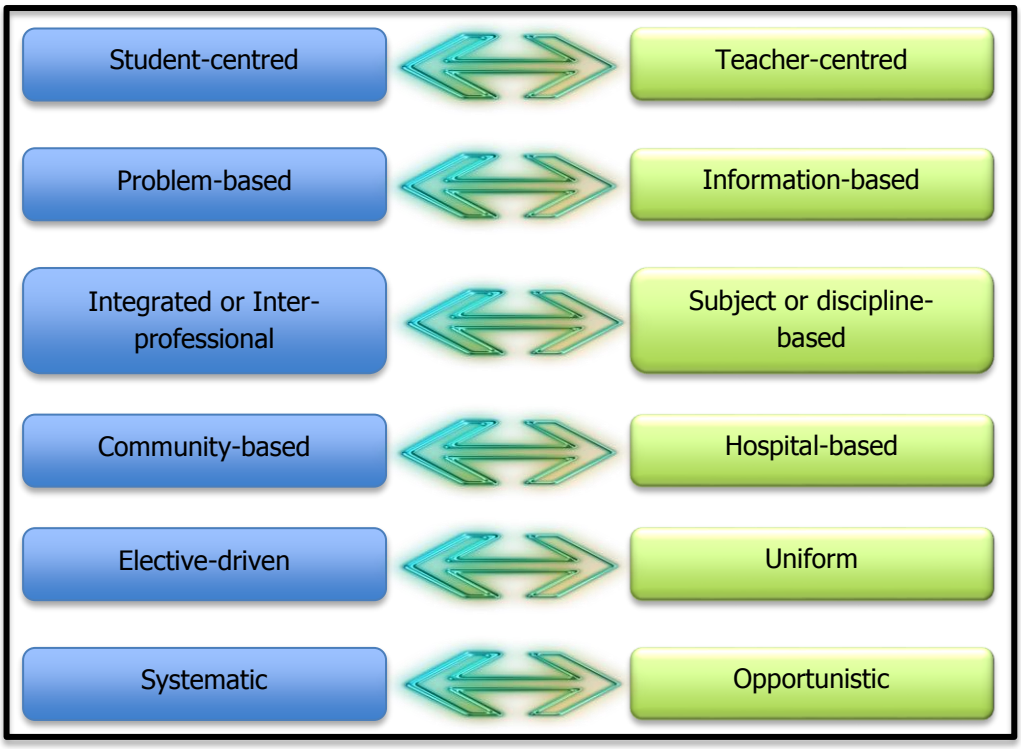

FIGURE 2.1: SPICES MODEL (HARDEN *et al.* 1984)

- **Deciding the teaching methods:** The teacher makes use of a range of methods to facilitate the students learning. Some tools that are available are lectures, small group work and independent learning. New learning technologies such as simulation training and e-learning can contribute significantly to teaching (Ellaway & Masters 2008:455-473).
- **Preparing the assessment:** Assessment of students is a key component of any curriculum. This leads to a number of questions some of which: what methods should be used, what are the aims of the assessment process, when should the students be assessed and who should assess the students? (Dent *et al.* 2013:34-44)
- **Communication about the curriculum:** Failure in communication is a common problem in medical teaching. It is important to realize that the teacher has the responsibility to ensure that the student has a clear understanding of the learning outcomes, the access to learning experiences, how to match the available learning

experiences with their own needs, and to give them guidelines to decide whether they mastered the topic (Dent *et al.* 2013:34-44).

- **Promoting an appropriate educational environment:** A collaborative rather than a competitive environment is the ideal educational environment for medical teaching (Dent *et al.* 2013:34-44).
- **Managing the curriculum:** Due to increased complexity of curriculums because of integrated and interdisciplinary teaching there is a significant increase in pressure on staff with regard to their clinical duties. Attention needs to be given to the financial burden, time constraints and staff development to assure academic standards and quality (Dent *et al.* 2013:34-44).

After considering this approach it is clear that the first step in planning and developing a curriculum should be to **identify the need**. This approach has a lot of similarities with the six-step approach cited by Sweet and Palazzi (2015:138-41) that was designed at John Hopkins (Kern, Thomas, Howard & Bass (1998). Interesting enough their first step also comprises of identification of the need (cf. Figure 2.2).

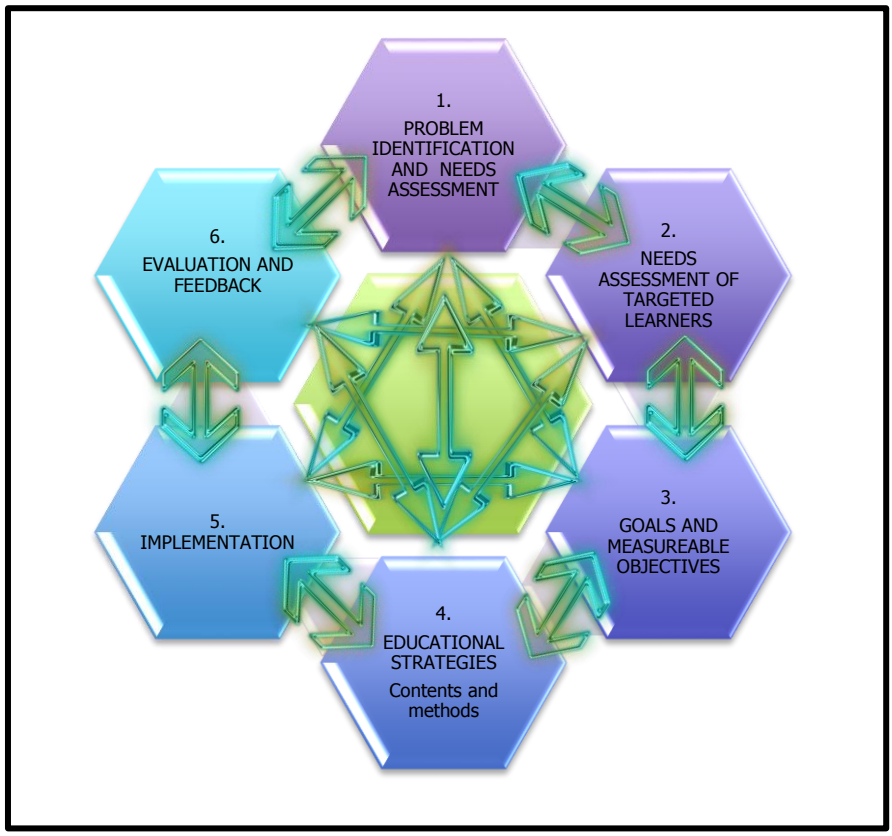

FIGURE 2.2: SIX-STEP APPROACH TO CURRICULUM DESIGN [(KERN *et al.* 1998) as cited by Sweet and Palazzi 2015:138-41]

To **identify the need** comprises of a few aspects for this research project, the essential surgical skills needed in rural areas, the development of surgical expertise and the need for Continued Professional Education. This will be discussed under the next three headings

2.4 ESSENTIAL SURGICAL SKILLS IN RURAL AREAS

To **identify the need** the researcher looked at various studies and documents that described and lists procedures that would comprise essential surgical skills in rural areas in developing countries and in South Africa. Looking at the data from January 1998 to December 2001 retrieved and descriptively analysed and by Alvi (2011:57-63) confirms the important part that surgery plays in rural surgery. Thirty-one thousand seven hundred and eighty-two patients were seen during this period at Aga Khan Medical Centre, Singul (AKMCS) in a rural part of Pakistan; 53% were medical; 24% surgical; 16% obstetric and 7% with psychiatric illness.

In this descriptive analysis Alvi (2011:57-63) reports that out of 1990 surgical operations at 32% were general surgery; 31% orthopaedic; 21% paediatric; 12% obstetric and 4% urological cases. The most common surgeries were exploratory laparotomy, caesarean sections, open prostatectomy, urological stone surgeries, appendectomy, hernia repairs and surgery for osteomyelitis. Figure 2.3 below represents the data from this study.

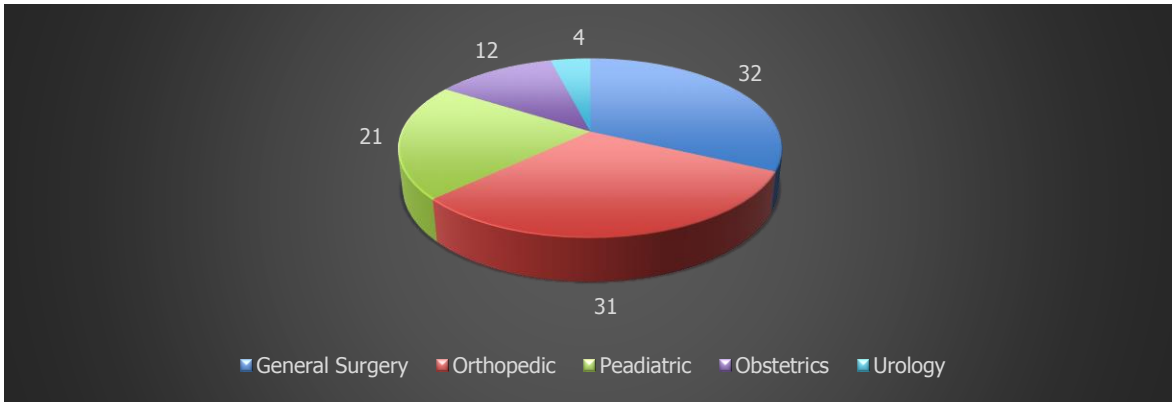

FIGURE 2.3: PROCEDURES IN PAKISTAN (ALVI 2011:57-63)

One of the components of primary health care is the treatment and care of common health conditions in the community, but due to severe shortage of surgical skills and manpower, this is currently not happening in Nigeria (Monjok & Essien 2009:1-4). The following surgical diagnosis would ideally be treated in rural and remote communities:

- Inguinal hernias (small and medium size);
- Epigastric hernias;
- Lumbar hernias;
- Femoral hernias (small);
- Hydroceles (small, medium and large);
- Onchocercal nodules (large and prominent);
- Lipomas (small, medium and large);
- Cysts (ganglion, sebaceous, batholins);
- Chronic infective granulomas;
- Abscesses (pyomyositis, breast, scrotal and injection abscesses);
- Corneal Foreign Bodies;
- Pterygium (large);
- Panopthalmitis with blindness;
- Foreign body in the ear and nose;
- Vaginal foreign body;
- Incomplete abortion;
- Cutaneous warts; and
- Hemorrhoids.

In another look at sub-Saharan Africa Chu, Rosseel and Gielis divided the surgical workload between three groups namely: Surgeons in group one, in the second group general practitioners and Assistant medical officers, and in the third community health workers (2009:online). The second group was the same group that was identified as the target population in South Africa. In this division the following procedure were in the lieu of general practitioners:

- Incision and drainage of abscesses;
- Wound debridement;
- Acute burn care;
- Skin graft;
- Circumcision;
- Hernia repair;
- Caesarean section;
- Exploratory laparotomy for ectopic pregnancy and ovarian torsion;
- Hysterectomy;
- Appendectomy;

- Bowel resection;
- Stoma creation;
- Cholecystectomy;
- Splenectomy;
- Repair of a perforated gastric ulcer;
- Limb amputation;
- Thoracoscopy;
- Closed fracture reduction; and
- Skeletal traction.

Jaques, Reid, Chabikuli and Fehrsen (1998:online) analysed a total of 2643 records in 14 KwaZulu-Natal hospitals, and 4575 in the four Northern Province hospitals; giving an overall total of 7209 procedures. They looked at the theatre records for a period of 2 to 6 months for these randomly chosen hospitals over a period of January to December 1995. The procedures were then grouped into the major disciplines (cf. Figures 2.4 & 2.5).

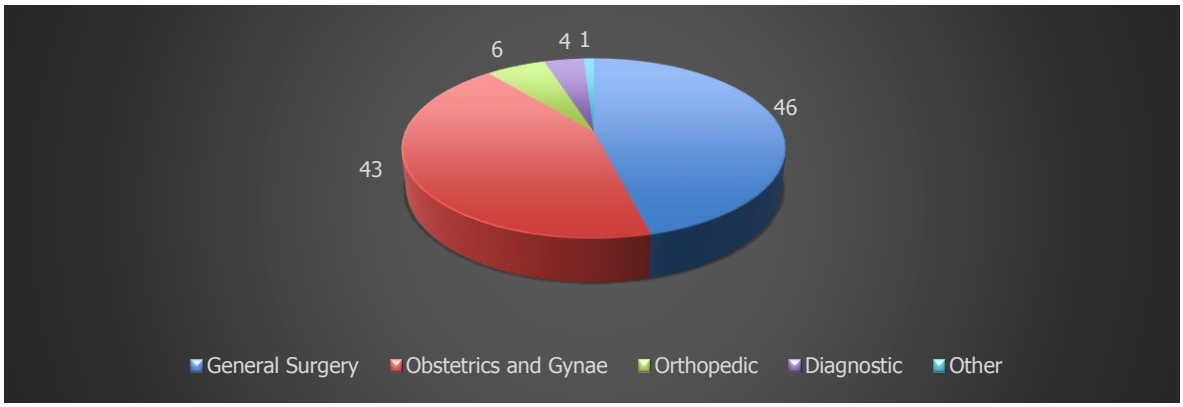

FIGURE 2.4: PROCEDURES IN KWAZULU-NATAL (JAQUES 1998:online)

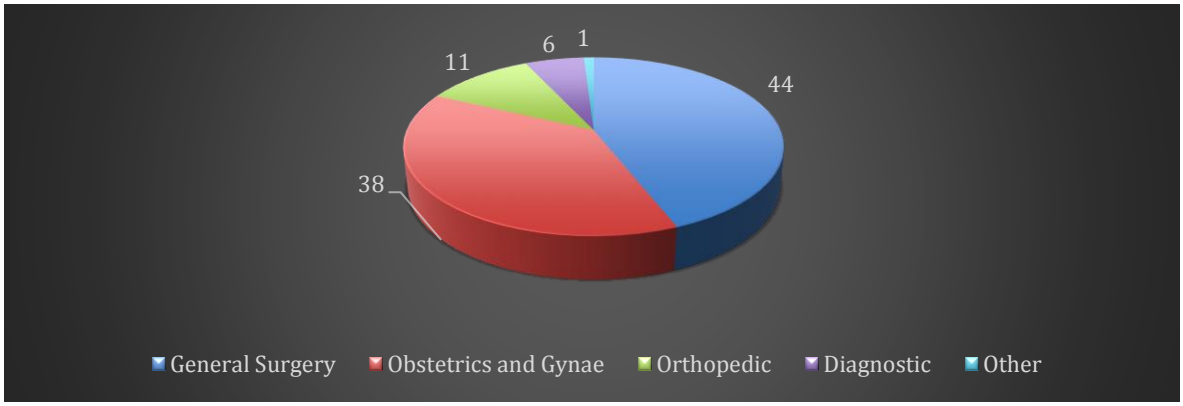

FIGURE 2.5: PROCEDURES IN NORTHERN PROVINCE (JAQUES 1998:online)

Although these data are not current, General Surgery was the most performed surgical procedures in both provinces at 46% and 44%, followed by Obstetrics and Gynaecology at 43% and 38%.

De Villiers (2003:15-19), looking into theatre and emergency services rendered in 22 district hospitals in the Western Cape over period of one month, had comparable results. The results are shown in Figure 2.6.

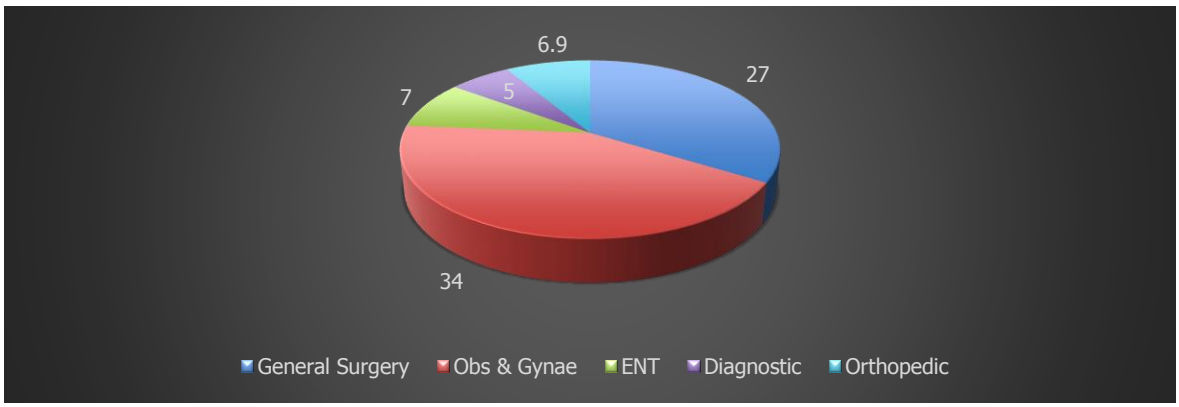

FIGURE 2.6: PROCEDURES IN WESTERN CAPE (DE VILLIERS 2003:15-19)

Despite the fact that general surgery is historically a large part of surgical procedures performed in rural hospitals, there is no training in the specific procedures currently available in South Africa.

The Department of Health published a set of norms and standards for district hospitals surgical services in 2002 (RSA DoH 2002:33-36). The expected range of surgery includes but are not limited to the following procedures:

Minor surgery

- Biopsy of lumps and other lesions;
- Excision of lumps;
- Circumcision;
- Incision and drainage of abscesses and Meibomian cysts;
- Debridement of wounds;
- Secondary closure of wounds;
- Aspiration/injection of knee, ankle, wrist, and shoulder;
- Reduction of paraphimoses;

- Suprapubic catheter insertion;
- Cautery/cryotherapy of warts and skin lesions;
- Anal stretch; and
- Sclerotherapy for hydrocoeles.

Major surgery

General surgery:

- Debridement;
- Appendectomy;
- Laparotomy (selected cases);
- Amputations;
- Skin grafts;
- Inguinal hernia repair;
- Umbilical hernia repair;
- Hydrocoelectomy;
- Vasectomy; and
- Enucleation.

Orthopaedic surgery

- Drainage of acute osteomyelitis; and
- Clubfoot plasters.

The Western Cape Department of Health revisited this list in 2009 and defined the competencies required for surgery at district level hospitals including, but not limited to the following procedures (WC DoH 2009:53-65):

- Basic examination under anaesthesia;
- In-grown toenail removal;
- Biopsy of lumps and other lesions;
- Excision of lumps;
- Circumcision;
- Incision and drainage of abscesses;
- Debridement of wounds;

- Secondary closure of wounds;
- Reduction of paraphimoses;
- Suprapubic catheter insertion;
- Cautery/cryotherapy of warts and skin lesions;
- Appendicectomy (selected cases);
- Laparotomy (selected cases);
- Skin grafts;
- Debridement and closure of open scalp injuries;
- Debridement and suture of all types of skin lacerations;
- Lymphnode biopsy; and
- Fine needle aspiration biopsy.

2.5 SURGICAL EXPERTISE DEVELOPMENT

The Basic Surgical Skills course that covers very basic surgical skills was developed in collaboration between the Postgraduate Institute of Medicine of Sri Lanka and the Royal College of Surgery Of England (Thomas 2006:429-432). This course has been introduced in more than 50 countries to upscale surgical skills (Murphy, Aluwihare, Guiton, Hope & Kwan 2005:32-53). It does not address specific procedures, but rather the suturing skills needed to perform surgery.

There have been numerous efforts to provide different types of surgical training to various healthcare providers (Greun 2006:232-233), from general practitioners (Loufti, McLean & Pickering 1995:22-26), medical officers, and nurses (Longombe 1997:43-47).

David Alderson (2010:830-836) acknowledges that the concept of expertise in surgery is widely embraced, but poorly defined. Alderson points out that the Shorter Oxford English Dictionary (Brown 2007:301) makes a clear distinction between expertise as authority and expertise as experience. Bereiter and Scardamalia as cited by Alderson see expertise as a journey rather than a destination. In this model, the way that a surgeon approaches potential learning experiences is more important than the length of experience.

Gawande, in Complications, Notes on an Imperfect Science (2002:75) refers to the principal that non-medical practitioners can become 'experts' producing good results within a limited, routine range. To be a true expert, a practitioners needs to be adaptive and have the ability to deal with unusual situations and manage uncertainty (Baxter Magolda 2004:31-42).

The highest level reflects performance 'in the zone', seen rarely at the highest levels of endeavour. A key feature missing from this model is that expertise in surgery is domain, context and time specific. A surgeon may be an expert at open surgery, but a novice at endoscopic surgery. Skills will vary within team members and tiredness or stress will have an influence (Aggarwal, Undre, Moorthy, Vincent & Darzi 2004:27-32). Expertise is not synonymous with specialization (Jarvis 2006). Research on the development of motor skills supports the concept of innate ability as an indication of 'achievement potential' in specific categories (Magill 2006:221-244).

Expertise may also be seen as a relative, graduated concept. It is then helpful to conceptualize development steps. Howell (1982:29-33) developed a two-dimensional matrix of cognizance and competence (cf. Figure 2.7).

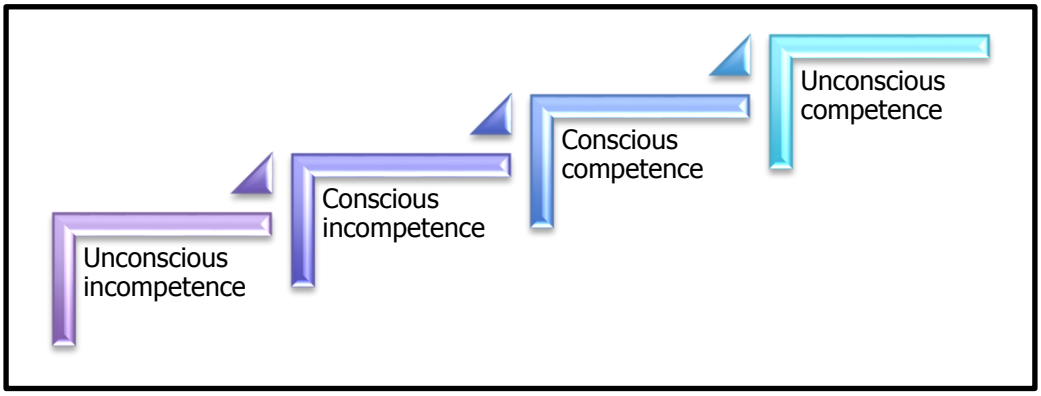

FIGURE 2.7: HOWELL'S (1982:29-32) MODEL OF THE DEVELOPMENT OF COGNIZANCE AND COMPETENCE

It cannot be assumed that surgical expertise is dependent on extraordinary talent, just as outstanding height is not a prerequisite for winning Olympic gold at the high jump (Rikers & Verkoeijen 2007:1115-1116). Widely-quoted studies have attempted to set lower limits on the time needed to achieve expertise (Chase & Simon 1973:215-281; Ericsson Ericsson, Krampe & Tesch-Romer 1993:363–406). These figures of 10,000 h and ten years have been widely quoted within the context of the reduced hours available for trainees to learn surgery (Jackson & Tarpley 2009:1062-1064). These have largely been based on a norm-referenced view of expertise (chess grand masters, concert level musicians, famous composers). The practice of surgery is about achieving a criterion level of expertise and the exact figures may be less applicable in this context. Perhaps, more importantly, the nature of the practice appears to be more important than the absolute amount (Ericsson *et al.* 1993). Basic competence in an area of surgery can be achieved after a relatively short time.

"Expertise may be considered as the end point in the step wise development of cognitive, psychomotory and affective skills" (Dent & Harden 2013:156) The Dreyfuss (2005) brothers (described five levels of expertise as set out in Table 2.1 and referenced by Dent and Harden).

TABLE 2.1: THE LEVELS OF EXPERTISE

Level 1	**Novice**	• Rigid adherence to taught rules and plans • Little situational perception • No discretionary judgment
Level 2	**Advanced beginner**	• Guidelines for action based on attributes and aspects of situation • Situational perception limited • All attributes and aspects treated separately and given equal importance
Level 3	**Competent**	• Coping with crowdedness • Sees action in terms of longer term goals • Conscious deliberate planning • Standard routine performance
Level 4	**Proficient**	• Sees situation holistically • Sees importance in situation • Perceives deviations from normal • Decision-making less labored • Users guidance but recognises variation
Level 5	**Expert**	• Intuitive grasp of situations based on tacit understanding • Analytical approach used only novel situations • Vision of what is possible

Expert operative information is a prerequisite for any form of surgical training. Ahmeda, Coughlanb, Edwards and Morarb (2009:269–279) evaluated the efficacy of a multimedia CD-ROM designed for teaching minor skin surgery to trainees in plastic surgery. This is a potential solution in training courses hampered by reduced or short surgical training time.

However, high-tension environments, such as the operating theatre, are known to inhibit the learning of motor skills (Pelligrini 2006:335-342).

2.6 CONTINUING PROFESSIONAL DEVELOPMENT

Dent *et al.* outlines a four step "knowing" process as an effective way in which CPD can be made more effective for the student and provider. The four steps are:

i. Know the audience;
ii. Know the topic;
iii. Know the format; and
iv. Know the outcome.

Knowing the audience means "knowing the discipline, training, practice environment and continuing education or CPD requirements of the physician-learner involved in the event". A short discussion of the HPCSA CPD guidelines will follow to outline the need and requirements for Continuing Professional Development. Later in the chapter adult learning will be discussed. Knowing the topic, format and the outcome will be dealt with later in this chapter under E-learning, distant learning, outcome based education and assessment.

2.6.1 HPCSA CPD Guidelines

"Ethical practice of health professions requires consistent and on-going commitment from all concerned to lifelong learning to update and develop the knowledge, skills and ethical attitudes that underpin competent practice" (HPCSA 2011:2-19). "The purpose of CPD is to assist health professionals to maintain and acquire skills and knowledge and to enhance professional integrity".

Over a twelve-month period a health professional should accumulate 30 CEUs (Continued Education Units) through CPD activities. CEUs are valid for 24 months. Two years post registration a health professional should have a balance of 60 CUEs, 10 of which for ethics, human rights and medical law. All health professionals must maintain at least 60 CUEs and a record of" (HPCSA 2011:2-19).

2.6.2 CPD accreditors

"Accreditors are groups or institutions appointed by a Professional Board on the basis that they meet the criteria set out by the HPCSA CPD Committee" (HPCSA 2011:2-19). The accreditor must review and approve applications for the provision of CPD activities. The guidelines for the criteria and processes to be followed are contained in the Criteria and Guidelines for Accreditors document. These guidelines standardise the process of accreditation (HPCSA 2011:2-19).

2.6.3 CPD service providers

"Accredited Service Providers are the profession specific higher education institutions and departments, professional associations or formally constituted professional interest groups who meet the specified criteria and have been accredited by the Board/Accreditor to present learning activities for Continuing Professional Development" (HPCSA 2011:2-19). Service

providers must apply annually for accreditation to offer CPD activities. They receive a specific identification number that is linked to the relevant profession (HPCSA 2011:2-19).

2.6.4 HPCSA CPD committee

The HPCSA CPD Committee develops policy in collaboration with the Professional Boards. This ensures a uniform but flexible system to accommodate the diversity of health professions.

2.6.5 HPCSA CPD section

The CPD Section of the HPCSA administrates and monitor the CPD system. The CPD Section randomly selects health professionals for compliance checks. The results of the compliance check are submitted to the HPCSA CPD Committee and the relevant Professional Boards (HPCSA 2011:2-19).

2.6.6 CPD hierarchy

"There are three levels of activities according to the HPCSA (HPCSA 2011:2-19), those with non-measurable outcomes, those with outcomes that do not necessarily constitute a full year of earned CEUs, and those associated with formally structured learning programmes". A health professional may obtain CEUs at any level depending on personal circumstances and individual learning needs.

Looking at which HPCSA hierarchy of CPD activities, this short learning programme in rural surgery is a level 3 activity that comprises of a minimum of 25 hours and additional hands-on training. Successful completion will carry at least 30 CEUs.

2.7 LEARNING SITUATIONS AND TOOLS

2.7.1 Introduction

Lectures are the oldest method of learning medicine. They are economical proven to be as effective as other methods of teaching according to Bligh (2001) as cited by Dent and Harden (2013:124). Various other situations such as small group teaching, clinical skills centre training, ambulatory care training, community based training, distance education and peer assisted learning. As we are dealing with practitioners in full practice, and most

of them distant from learning centres, the correct and applicable learning situations and tools need to be employed. As a matter of interest for this project an overview of distance education, clinical skill centre training and peer assisted learning will be given.

2.7.2 E-learning

Within health care continuous education has become of special importance due to the rapid advancement in medical sciences (Clark 2001:25-34; Pulido, Cravioto, Pereda, Rondon & Pereira 2006:24-29; Ruiz, Mintzer & Leipzig 2006:207-212). Distance education meets the need of physicians to catch up with these developments even in geographically scattered locations, and at their own convenience to fit in with work and personal commitments. Using e-learning tools also allows for mediation of process and practical knowledge by presentation of authentic medical cases in a simulative environment (problem-solving approach or evidence-based medicine) (Clark 2001:25-34; Boeker & Klar 2006:785-789; Colsman, Sticherling, Stopel & Emmrich 2006:1-6; Schilling, Wiecha, Polineni & Khalil 2006:126-132). E-learning is not seen as replacing traditional classroom or residency teaching and learning, but as a complement or prerequisite to it, forming part of a blended-learning strategy (Boeker & Klar 2006:785-789) and promoting life-long learning behaviours (Boeker & Klar 2006:785-789; Ruiz *et al.* 2006:207-211). Especially for countries without infrastructure or difficult access to printed databases of information, e-learning will even more become an innovative tool in continuing professional education (Schilling *et al*. 2006). Julie Brink**,** director of via Learning, a provider of e-learning services for global companies has developed e-learning courseware and blended training programs for a vast client base, including Cisco, Microsoft, Comcast, Nike and The Pampered Chef. Brink (2011:26-29) discusses the benefits, tools and considerations in the open market system.

E-learning offers many potential benefits (Brink 2011:26-29):

- It provides an easy way to get current and up to date information to your target population;
- It accelerates reinforcement of training courses and follow-up strategies;
- It accesses a population who otherwise may not fully participate in training;
- It is efficient; learners can complete training on their own time and at their own pace;
- It provides increased productivity and revenue due to time saved from other training methods.

For e-learning to be effective, it needs to be short, accessible and relevant. Text should be short and concise. Simplify visual design. According to Eren Rosenfeld, director of global markets and investments banking learning and development at Merill Lynnch as cited by Brink (2011:26-29) "*Training via the Blackberry succeeds or fails based on design. The technology can be revolutionary, but if people can't pick it up and use it with little or no explanation, then they won't use it".*

When creating e-learning, be sure to consider your audience members: How do they use their mobile devices? What are their roles? What would be valuable for them to access from a mobile device? Also, keep localization in mind: How does it affect e-learning content and design?

Mp3 files can be easily uploaded to and downloaded from course management systems like Blackboard or an educator's personal website. Students do not need a portable mp3 player, as they can listen to the podcasts directly from a computer. Most types of standard, commercially available audio/video software (Windows Media Player, QuickTime & RealPlayer) will play these files automatically (Souza-Hart 2011:171-175).

Sandars (2009:387-389) give the following twelve tips for using podcasts in medical education:

- Tip 1. Be aware of the potential for using podcasts in medical education.
- Tip 2. Decide if you only want to provide simple podcasts.
- Tip 3. Decide if you want to provide enhanced podcasts.
- Tip 4. Decide if you want to provide podcasts that contain video.
- Tip 5. Decide if you want to use existing podcasts.
- Tip 6. Decide if you want to encourage students to develop their own podcasts.
- Tip 7. Develop a storyboard for the podcast.
- Tip 8. Use high quality recording equipment.
- Tip 9. Edit podcasts to create maximum educational impact.
- Tip 10. Decide where to publish podcasts.
- Tip 11. Decide if you wish to use RSS (Really Simple Syndication) feeds.
- Tip 12. Be prepared to quickly evaluate and develop the use of podcasts in medical education.

Bhatti, Jones, Richardson, Foreman, Lund and Tierney (2011:459-462) gave a baseline questionnaire to two groups of third year medical students to establish their knowledge of haemorrhoids. Following this first assessment group A was given a formal lecture and group B was asked to use a website containing text and pictures augmented by a podcast. The students were reassessed using the same pre-intervention questionnaire. The e-learning group scored better, and satisfaction was high in the e-learning group. Bhatti concluded that e-learning supplemented with a podcast resulted in greater knowledge acquisition when compared to a traditional lecture.

A short, educationally sound self-administered e-learning intervention had similar results in enhancing the paediatric prescribing ability, confidence and practice among junior doctors (Gordon, Baker & Chandratilake 2011:A22-A23).

Schormair, Sweitlik, Hofmann, Wilm and Witte (1992:283-286) have shown that the heavy burden of patient care and increasing administrative tasks has put added pressure on clinicians, which results in poor motivation and enthusiasm to teach. E-learning techniques may relieve some pressure on clinical time.

Kalludi, Punja, Pai and Dhar performed a study under first year dental students. Students benefited when podcasts was used to supplement live lectures and textbook contents. This was indicated by better student performance in a MCQ test in the podcast group. Students also had a favourable attitude towards podcasts used as a supplementary teaching aid.

White, Sharma and Boora (2011:941-943) developed a series of ten podcasts of ten to fifteen minutes including appendicitis, breast cancer, gallstones, hernias, bowel obstruction, gastro-intestinal bleeding, trauma and thyroid masses. A tenth introducing the course was also made available as part of learning resource to undergraduate medical students completing their six weeks surgical internship. The "Surgery 101" podcast series was made available on iTunes. Their study demonstrated that podcasts can be integrated and enhanced current study methods. "Surgery 101" was downloaded more than 160 000 worldwide so far.

A study by Vogt, Schaffner, Ribar and Chavez (2010:38-42) however, has shown no significant enhancement in student performance with podcasts. The study concluded that, lack of familiarity with podcasts in the particular study group could have contributed to the demonstrated lack of knowledge acquisition.

In a study by Kalludi, Punja, Pai and Dhar (2013:171-175) most students felt that a significant advantage of the podcast was that they could listen to the lecture content repeatedly and at their own convenience. Ninety-one per cent of students pointed out this benefit of the podcast.

Among dental students, Jham, Duraes, Strassler and Sensi (2008:278-281) have shown that podcasts are useful for mobile learners who can listen to it while multitasking. The idea of being able to access information without being linked to a certain physical location is very attractive. Using podcasts, students can listen to exactly what they want, where they want and when they want.

Researchers have observed that most students accessed podcasts very frequently or frequently (Pilarski, Jhonstone, Pettepher & Osheroff 2008:630-632; Schlairet 2010:529-33). It was also observed that dental students find podcasts an acceptable method of learning and one-quarter of students used the podcast for examination review (Walmsley, Lambe, Perryer & Hill 2008:157-160). In a study by Pilarski *et al*. (2008:630-632) 89 per cent of students agreed that audio and media site recordings reduced levels of stress and anxiety. Meek, Lee, Jones, Mutea and Prizevoits (2012:426-439) noted significant course satisfaction among nursing students following podcast sessions.

Lyles, Robertson, Mangino and Cox found in their study that 91.2 per cent of students regularly listened to lecture podcasts and questionnaire survey suggested that the audio podcast was a useful tool for enhancing teaching and learning. In the same study, testimonials provided by three students revealed that podcasts helped them to prepare master notes. Kalludi (2013:450-457) reported similar positive results, it can be seen that students who had received the supplementary podcasting session had a significant advantage over the control group. Jhonson, Ross and Iwanenko (2012:365-367) observed a significant increase in post-test knowledge after a podcasting session was seen when compared with the pre-test. Augmented knowledge scores indicated that audio podcasts are an effective method for disseminating health information.

Better academic performances were recorded by students listening to the podcasts were also observed in a study by Mckinney, Dyck and Luber (2009:617-623). When textbook reading is supplemented with podcasts it stimulates multiple sensory pathways. Various studies concur that information that is received through one sensory pathway is not processed and stored as efficiently as information received from two, such as, for example,

auditory and visual (Scutter, Stupans, Sawyer & King 2010:180-191; Boulos, Maramba & Wheeler 2006:41).

A few good references that also help beginning podcasters are included here (Flanagan & Calandra 2005:20-25; Mikat, Martinez & Jorstad 2007:14-16). Podcasts also enable better correlation between lecture information and textbook or notes content.

2.7.3 Clinical skills centre training

According to Dent and Harden (2013:148-159) clinical skills centre training "provides the ideal setting for facilitating practitioners' technical and nontechnical skills while also protecting patients". A clinical skills centre can be defined in terms of facilities, specialist equipment and specialist faculty. Facilities should be flexible so that different simulations can be undertaken. The facility should be able to accommodate small group teaching.

Specialist equipment should be reflective of realistic practice. Sedlack and Kolars (2004) as cited by Dent and Harden provide evidence that virtual reality simulators can enhance cognitive skills. Simulator training has been used in the past for surgical skills training, especially for minimal invasive techniques. To develop the skills necessary to apply these techniques, box trainers and/or inanimate models may be used, but these trainers lack the possibility of inherent objective classification of results (Schreuder, Oei, Maas, Borleffs & Schijven 2011:105-115). In the past decade, virtual reality trainers were introduced for training minimal invasive techniques. The specific psychomotor skills and eye–hand coordination needed for minimally invasive surgery can be mastered largely using VR simulation techniques. It is also possible to transfer skills learned on a simulator to real operations, resulting in error reduction and shortening of procedural operating time. Simulator training cannot stand alone, but can supplement and add to traditional skills development. Dieckmann, Gaba and Rall (2007:183-193) stated that simulation is dependent on the situation created and the involvement of the learner.

Specialist faculty is another prerequisite for a successful clinical skills training centre. The faculty need to have a good grasp of what clinical skills are and have an understanding of the technical and non-technical components (cf. Table 2.2). Kohls-Gatzoulis, Glenn and Hutchison (2004:277) showed that the learning of technical skills in surgery is enhanced by the learning of non-technical or cognitive skills.

TABLE 2.2: EXAMPLES OF TECHNICAL AND NON-TECHNICAL SKILLS (DENT & HARDEN 2013:152)

TECHNICAL SKILLS	NON-TECHNICAL SKILLS
Communication skills (patient)	Team communication
History taking	Situational awareness
Physical examination	Information management
Procedural skills	Task management
	Decision making

Dent and Harden (2013:154) states that Ker and Bradley (2007) points out that clinical skills simulation can be applied for many purposes in skills training, of which many are applicable to this research project. Some of these are:

- Rehearsal;
- Reinforcement;
- Renewal;
- Redesign;
- Risk reduction;
- Regulation; and
- Research.

Gagne (1985) listed three phases in teaching of technical skills task where the student develops from a cognitive phase in which the student consciously develops a routine under guidance from the facilitator. This is followed by an associative phase where a concerted effort is made to integrate the component parts. The last phase is the final phase and is the autonomous phase (cf. 2.5).

There are a number of caveats in the use of clinical skills facilities among which the fact that it does not replace clinical practice. It does however provide a safe environment for deliberate practice and enhances preparedness for practice (Ker *et al.* 2010) as cited by Dent and Harden (2013:159).

2.7.4 Distance learning

Grant (2008:162-163) defines distance learning as: "Individual study of specially prepared learning materials, usually print and sometimes e-learning, supplemented by integrated learning resources, other learning experiences, including face-to-face teaching and practical experience, feedback on learning and student support". It is important to understand that

e-learning does not equate to distance learning, but that e-learning is just one method that can be applied if demanded.

Distance learning is characterized by the following:

- Clear aims, instructions and timings to ensure learners have clarity about the task and can plan their time;
- Simulates a tutorial in using a conversational style;
- The learner has a sense of progress with short sections, also ensuring that sections is not skipped;
- Clear page layout;
- Utilizes in-text activities with timings;
- Regular feedback to assure the learner that he or she is on tract;
- Modules can be self-contained, or may complement prescribed text in "wrap around" materials; and
- Blends different elements by providing a central guide with clear instructions and providing all learning resources.

(Dent & Harden 2013:220-229)

There are advantages and disadvantages to distance learning (Dent *et al*. 2013:220-229). The advantages entails that it is cost effective, it utilizes the teachers' time effectively and makes quality teaching available to all. It can reach doctors in remote locations and is very useful for doctors working full time or with limited time.

The disadvantages are the need for supervision of clinical experience, the initial skills needed to design and produce the course and the need of face-to-face teaching in clinical skill development.

2.7.5 Peer assisted learning

Peer assisted learning (PAL) can be defined as "People from similar social groupings who are not professional teachers helping each other to learn and learning themselves by teaching" (Topping 1996:321-345). Peer assisted learning has advantage for the tutor, the tutees and the institution.

Bargh and Schul (1980:593-604) demonstrated that learning content in order to teach gives you a better understanding than learning it to prepare for assessment. This cognitive benefit of peer assisted learning for the tutor was confirmed by Ten Cate and Durning (2007:546-552). Tutors are encouraged to reflect and look at their own prior learning, identifying and addressing their related needs on the topic. The tutor's communication, verbalization and assessment skills are developed through feedback received from the tutees.

Peer assisted learning offer an environment without intimidation where the tutee can disclose their misconceptions or ignorance without the concern that this might influence their assessment. A small number of studies (Perkins, Hulme & Bion 2002:698-700; Knobe, Munker & Sellei 2010:148-155) comparing peer assisted learning tutors with experts suggested that similar results could be obtained. If PAL is used as a supplemental to a core curriculum, tutees gain additional teaching.

The advantages of PAL for the institution is significant through addressing content gaps in the curriculum, it can lead to a cost saving and cultivates a culture of collaborative learning rather than competition between peers (Dent *et al.* 2013:230-244)

A number of concerns and potential disadvantages must be raised. Tutors may have an inadequate level of knowledge or they may lack the required teaching skills or find it difficult to maintain discipline. There are also concerns about the time and effort needed to organize peer assisted learning programs, and the fact that in is a way of compensating for insufficient staff (Dent *et al.* 2013:230-244).

If well planned and used with care PAL can be applied successfully in facilitation of self-directed learning and short course organization.

2.7.6 Simulation-Based Medical Education

"Traditionally medical treatment has been rooted in clinical practice and based on apprenticeship learning" (Dent & Harden 2013:351). A combination of factors and challenges has changed the way we train in the clinical setting today. The number of people in training hospitals has increased, the reduction in working hours also reduced training opportunities. Dent and Harden alludes to the fact that the modern patient do not

want to be trained on. Dent and Harden lists the following reasons as the rationale for simulation based medical education:

- To improve patient safety;
- To provide training opportunities for novices and experts;
- To facilitate learning at the individual level; and
- To facilitate learning in groups of health professionals.

Simulation-based skills courses are used to train people in procedures that are difficult to learn in real-life settings (Issenberg, McGaghie, Petrusa, Gordon & Scalese 2005:10-28). Arthur (1998:57-102), Druckman and Bjork (1991:23-56) converge on the problem of poor retention of learning outcome following simulation-based courses. This risk of decay of learning outcome is especially augmented when opportunities to practice the learned skills after the course are limited. As a result of this, it is recommended that in-hospital resuscitation courses, for example, are repeated frequently (Berden, Willems, Hendrick & Knape 1993:1576-1577; Woollard, Whitfield, Newcombe Colquhoun, Vetter & Chaimberlain 2006:237-247).

Issenberg, McGaghie and Hart (1999:861-866) stated that simulation-based skills courses are fairly expensive and are confined to a limited amount of time. Thus, it is important to determine whether learning outcomes are better if some of this time is spent on testing rather than on more training. A major review by Rosenbaum, Carlson and Gilmore (2001:453-470) found that 'intellectual and perceptual motor skills are acquired in fundamentally similar ways' in multiple areas like feedback, massed or blocked learning and transfer and retention. A study by Shin and Rosenbaum (2002:206-219) suggested that motor skills and intellectual skills are coordinated in the same manner.

2.8 OUTCOMES-BASED EDUCATION

"A good archer is not known by his arrows but by his aim"
(Thomas Fuller)

Identify the need and **establish the learning outcomes** are the first two steps in curriculum design as was discussed at the start of the chapter. According to Dent and Harden (2013:259-270) there has been a change in focus or emphasis moving from the process to the product (cf. Figure 2.8).

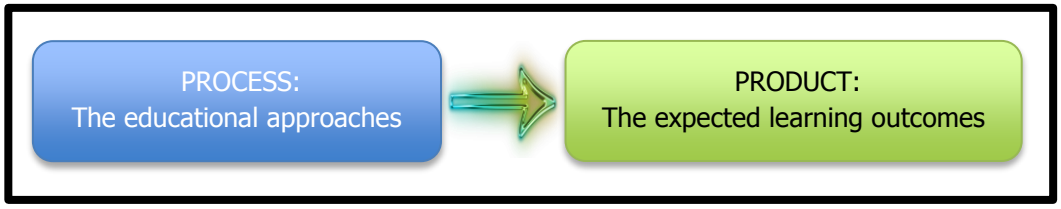

FIGURE 2.8: FOCUS ON THE PRODUCT IN OBE

Outcomes-Based Education (OBE) as defined by Spady means clearly focusing and organising everything in an educational system around what is essential for all students to be able to do successfully at the end of their learning experiences. This means starting with a clear picture of what is important for students to be able to do, then organising the curriculum, instruction, and assessment to make sure this learning ultimately happens. (Spady 1994:4). Spady (1994:8) also states that outcomes-based education is about a consistent, focused, systematic, creative implementation of four principles:

- **A clarity of focus on the learning outcomes** that ultimately students need to demonstrate; Spady (1994:11-12) calls these complex role performance abilities and the corresponding South African conception could possibly be the critical cross-field education and training outcomes. Spady's mapping of SAQA's critical cross-field outcomes to his complex role performance abilities is attached as Appendix A.
- **The design-down / build-back approach** to building the curriculum; the curriculum design starts with the abilities, skills, knowledge, attitudes that one ultimately wants students to demonstrate and ensures that the assessment is focused on what the learner has achieved in relation to these learning outcomes rather than focused on what was presented in the course of delivery (Spady 1994:10).
- **High expectations**; the expectation must be that learners are able to achieve these outcomes and therefore it is necessary for those who work in the system to behave and structure what they do in working with learners, in such a way that they are enabled to achieve these outcomes (Spady 1994:17-18);
- **Expanded opportunity**; there is a necessity to move beyond the rigid blocks we have created around education e.g. blocks of time and the traditional organisation of learning institutions (Spady 1994:13-16).

Dent and Harden (2013:259-270) mentions the following arguments for and advantages of OBE:

- **Attention to neglected areas of competence.** The consideration of the expected learning outcomes leads to questioning of the validity of the current curriculum. This process specifies the needs of the student and the abilities, knowledge and skills needed by the student.
- **The problem of information overload:** With the advances made in medicine and the doubling of information every two years we need to specify more clearly what is expected to be learnt by the student.
- **Assessment of the learner's progress and the continuum of education:** Harden (2007) stated that various perspectives could be used to look at this progress. Increased breadth, increased difficulty, increased utility and application and increased proficiency are the most important perspectives.
- **Student-centred and individualised learning:** OBE leads to a better understanding of the learning outcomes and therefore more suitable to student-centred learning.
- **Accountability:** The expected learning outcomes can be used to judge the programme, recognizing excellence, as well as failure.

In OBE all decisions should be based on the specified learning outcomes. This includes decision about teaching and learning methods, curriculum content, educational strategies and assessment (Harden, Crosby & Davis 1999:7-14). There are two requirements for successful implementation of OBE, and both conditions must be met for successful implementation of OBE (Spady 1994:19-22). Firstly the learning outcomes must clearly be defined, and secondly all decisions relating to the curriculum must be made on the specified outcomes.

2.9 ADULT LEARNING

In the medical context most training and education involves adults, it is therefore logical to focus on adult learning theories. According to Amstuzt as cited by Abela (2009:11-18) the many adult learning theories can be grouped into five main classes namely: Instrumental learning, self-directed learning, experimental learning, perspective transformation and situated cognition. Abela further states that of these five self-directed learning in particular primarily focuses on the individual learner. Prominent amongst these self-directed theories is androgogy (*andra* – meaning "man" and *agogos* – meaning "learning"). Knowles (1984) as referenced by Kaufman (2003:213-216) elaborated on the concept of Androgogy assuming that adults:

- Are independent and self-directing;
- Have (various degrees of) experience;
- Integrate learning to the demand of their everyday life;
- Are more interested in immediate problem centred approaches; and
- Are motivated more by internal than external drives.

Brookfield as referred to by Abela deemed that mutual respect between teacher and learner is another characteristic of adult learning catalyzing a safe learning environment. Reflection is another important component of adult learning (Walker & Harris 1998:21-41; Cantilon, Hutchington & Wood 2013:2-3). Reflection enhances adult learning by increasing motivation to learn. Theories about motivation, another important pillar of adult learning are categorized in two major groups – content and process theories (Abela 2009:11-18). Content theories describes what motivates people and process theories describes how people are motivated.

Maslow's Hierarchy of Needs is one of the most popular content theories (cf. Figure 2.9). A safe learning environment and respect is important for safe progression of the learner through the hierarchy. Maslow's model is very rigid, and a more appealing content theory for motivation is three needs, ERG, put forward by Alderfer as reported by Morrison (1998:41-57).

- **E**xistence – equivalent to physiological and safety needs;
- **R**elatedness – interpersonal and social relationships; and
- **G**rowth – desire for personal growth.

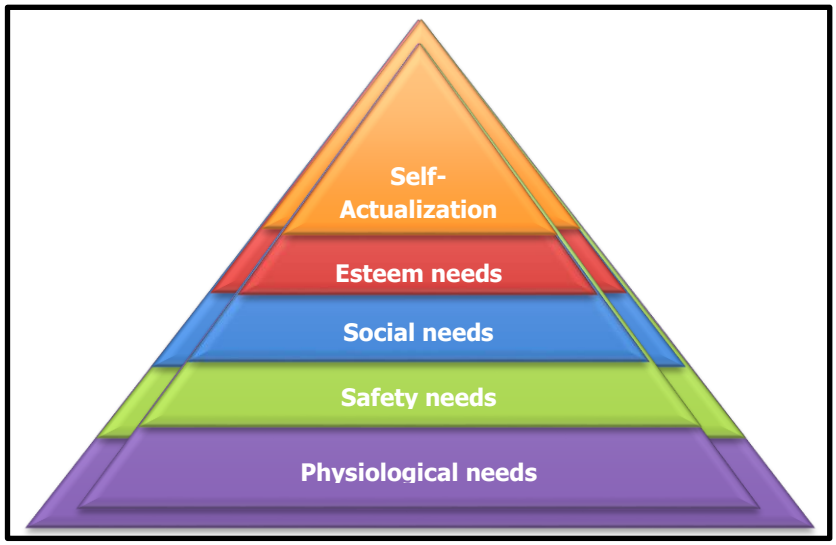

FIGURE 2.9: MASLOW'S HIERARCHY OF NEEDS

Process theories of motivation as in the case of Paplov's dog theory are based on the idea that certain behaviours are produced by particular stimuli. The Expectancy Theory is one such theory (Vroom 1964:1-331). According to this theory motivation depends on two perceptions:

- An expectation that an outcome will bring the desired reward.
- That the required performance is within the capability of the person.

Not all adult learners are equally intrinsically motivated as stated by Knowles. He also fails to mention extrinsic motivation. Given the fact that andragogy fails to adequately address motivation and reflection, Transformative Learning might be more appropriate (Mezirow 1997:5-14). Transformative learning aims to effect change in established reference points used by the adult learner. It stresses the importance of learners to question and reflect on their own and others' assumptions. The need exists for a mix of learning strategies (Merriam 2001:3-13).

2.10 ASSESSMENT

2.10.1 Introduction

Van der Vleuten (1996:41-67) and McLachlan (2006:716-717) confirmed the general assumption that 'assessment drives learning' through its format, content and programming. This is generally believed to be the result of the influence on students' learning strategies (Schoonheim-Klein, Habets, Aartman, van der Vleuten, Hoogstraten & van der Velden 2006:226-235). Assessments that incorporate feedback, for example, an objective structured clinical examination (OSCE) may induce learning (Brazeau, Boyd & Crosson 2002:932-936). Roediger and Karpicke states that in addition to these extrinsic effects of assessment and examinations on students' learning, it has been demonstrated that testing can also have an intrinsic effect on the memory of studied materials.

Roediger and Karpicke in a review of studies on the intrinsic effect of testing, provided evidence that testing students on studied material results in improved retention of that material compared with spending an equivalent amount of time restudying the material. This so-called testing effect has, in both laboratory and classroom studies, been demonstrated to be a robust and independent phenomenon that applies to a variety of test formats and levels of knowledge learning (Roediger & Karpicke). According to Wheeler,

Ewers & Buonanno (2003:571-580) two strengths are involved in the act of remembering: storage strength and retrieval strength. Storage is the process induced by study sessions whereas retrieval is induced by testing (Wheeler *et al.*). There is agreement between studies (Wheeler *et al.*; Kuo & Hirshman 1996:451-464; Karpicke & Roediger 2007:151-162) that repeated retrieval is the key to the testing effect. The effect of testing is enhanced the more elaborative the retrieval process is (Carpenter & DeLosh 2006:268-276).

Consequently, including testing as part of a course might be an efficient strategy to improve learning outcome. This is especially relevant for courses on topics that cannot be left to individual study, as is the case for a variety of procedural skills. Kromann, Jensen and Ringsted (2009:21-27) searched the extensive literature on skills learning and assessment and found that whether the intrinsic testing effect applies to skills learning had never been thoroughly investigated.

Kromann *et al.* found that testing as a final activity, in an in-hospital resuscitation skills course for medical students increased learning outcome compared with an equal amount of time spent practicing.

2.10.2 Criteria for methods of assessment

Bezuidenhout (2014:1) states that for effective and efficient evaluations, assessments must comply with certain conditions. Assessments must be reliable, valid, feasible and balanced.

- Reliability of an assessment method according to Bezuidenhout mean that "*the same result will be obtained with repeated repetition of the same test or measurement. Furthermore, the degree of difficulty of the test should be such that students with more or less the same abilities will perform more or less similarly in the test. This again, boils down to the discrimination value of the test being of such a nature that it will discriminate reasonably and fairly among students with different abilities (in terms of cognitive skills and effort)".*
- Validity refers to the assessment testing or measuring that which it is supposed to test or measure. Validity of **scope** is achieved if the student is assessed on the total scope of contents, as well as on the focus of the different themes. **Content** validity is achieved when the responses expected of students are in line with the content that has been dealt with in the programme. **Item** validity refers to the correct type of test item being used to assess the relevant abilities of the students, e.g. it is not possible

to test a skill through a written exam; short answer questions are better suited to test reproduction of knowledge; communication skills can only be tested by means of an oral (*viva voce*), etc. Validity of **construction** is achieved if the time allowed for the test is sufficient for the average student to complete it (Bezuidenhout 2014:1-3).

- Feasibility has to do with the practicability of the test (Bezuidenhout 2014:2-3). Are there sufficient patients available? Are the facilities suitable/ adequate for an OSCE? Have the standardised patients been adequately prepared/ trained? Is the student fully at home in the language the oral examiner will use.
- To measure the achievement of all outcomes in a clinical examination, different methods of assessment will have to be applied, they must be used in a manner congruent with the demands of item validity, and there should be a particular (predetermined) balance in the use of the different types of assessment. Thus, orals will be used to determine whether students can think on their feet; short answer questions to test factual knowledge; long (essay type) answers to test critical and creative thinking abilities, problem-solving skills; practical/ clinical assessments to test skills, etc.

2.10.3 Types of assessment

Bezuidenhout (2014:2) highlights that various assessment methods are used in medical education. This includes SAQ's (short answer questions), essay type questions and OSCE's (Objective structured clinical examination) and oral examinations. Bezuidenhout also states that each one has its own advantages and disadvantages.

2.10.3.1 *Essay type questions*

Traditionally essay type questions offer a way to test a student's creative thinking, their understanding, their reasoning skills, ability to express themselves and integration of knowledge. Table 2.3 shows the advantages and disadvantages of essay type questions:

TABLE 2.3: ADVANTAGES AND DISADVANTAGES OF ESSAY TYPE QUESTIONS
(Table continue on next page)

ADVANTAGES	DISADVANTAGES
• Students tend to use better study methods when they know they have to provide essay type answers, e.g. they may read more and wider. • Essay type answers contribute to the development of communication skills and	• High degree of subjectivity in the assessment. • Only a limited amount of learning content or number of outcomes can be measured.

the ability to express themselves (language in general and the language of science). • Essay type answers offer the examiner the opportunity to measure higher cognitive skill (analysis, synthesis, evaluation) effectively. • It offers students the opportunity to select and order relevant information. • It is less time consuming and easier to set the exam paper than most other types of examination papers.	• Usually there are options to choose from - thus all the candidates are not evaluated similarly. • The compilation of the memorandum and marking are time consuming for the examiner.

Bezuidenhout advises the examiner to keep the following in mind to counter the disadvantages:

- **Assessing students' responses with objectivity and consistency:** Factors influencing the reliability of scoring are: fatigue of examiners; physical and emotional condition of candidates; influence of handwriting; value attached to the length of answers rather than quality; the unconscious influence of answers read previously; bluffing or waffling.
- **Unreliability of scoring**: The usual measures taken to counteract the unreliability of scoring tend to undermine the value of the essay-type answer, namely using rigid and detailed marking schemes, and setting straight-forward questions which do not allow for creative thinking or problem-solving. The more an essay-type question is structured, the more it resembles a non-essay type question.
- **Original thinking and evaluation skills**: The fact that the student is asked to write an essay in itself is no guarantee that the student will become engaged in original and critical thinking, problem-solving, etc. - much depends on the formulation of the question and the way students have been prepared for the examination.
- **Time factor**: Candidates are required to answer a limited number of questions in an essay-type exam. This raises doubts as to whether the sampling is sufficient to be accepted as representative of a student's ability and knowledge.

2.10.3.2 *Short answer questions (SAQ's)*

There are different types of short answer questions according to Bezuidenhout (2014:4), each with its own advantages and disadvantages. This includes multiple choice questions (MCQ's), answer completion test items, alternative choice items and matching type items.

Multiple choice questions normally consists of a question or incomplete statement and a number of possible options of which one or more are correct, while the wrong option/options looks plausible, but are definitely wrong (cf. Table 2.4).

TABLE 2.4: ADVANTAGES AND DISADVANTAGES OF MCQ'S (BEZUIDENHOUT 2014:4-5)

ADVANTAGES	DISADVANTAGES
• Measurement at all the levels of the cognitive domain is possible, e.g. factual knowledge, insight and understanding, analysis and synthesis, problem-solving and evaluation. • The results are highly reliable. • A large amount of learning content and outcomes can be tested in a relatively short time. • Guessing is limited (in comparison with true/false items).	• Difficult and time-consuming to compile. • Examiners may give preference to questions that will only recall factual knowledge. • Examiner's ability to write good questions and the student's reading ability may have a decisive influence.

Answer completion test items requires the candidate to fill in a missing word or phrase. The advantages are that it is easy to compile, factual knowledge is tested thoroughly and guessing is limited because a specific response is required. This type of assessment tends to test only the lower cognitive levels. Another disadvantage is that as with MCG's the examiner's writing ability and the student's reading ability will have an influence.

In **alternative choice items** two possibilities are given and the students have to choose the correct answer. The advantages and disadvantage as discussed by Bezuidenhout is listed below in Table 2.5.

TABLE 2.5: ADVANTAGES AND DISADVANTAGES OF ALTERNATIVE TEST ITEMS (BEZUIDENHOUT 2014:5)

ADVANTAGES	DISADVANTAGES
• Easy to compile; however, do not use direct quotes from the textbook. • More learning content can be covered than with most other types. • Correct, reliable allocation of marks is guaranteed. • Measurement at all levels of the cognitive domain is possible. • Objectivity is ensured.	• 50% possibility that the correct answer may be guessed. • Care must be taken not to use vague statements, or items that are partly right/ partly wrong - statements must be undeniably right or wrong. • Items must be limited to one concept only and stated briefly.

Matching type items consists of two columns, one with stimuli, and the second with possible responses. It is an objective method, with reliable results that can test a large amount of learning content in a short time. Bezuidenhout points out that it is difficult to formulate, and that it is difficult to measure more than just recalling facts. To have reliable results the list must be homogenous, the response must be ordered chronologically or numerically, short phrases or single words used in the list of responses, limit the list of stimuli to 10 (the response can be more) and avoid grammatical hints e.g. singulars or plurals.

2.10.3.3 *Oral examinations*

Bezuidenhout (2014:6) agrees that an oral remains an acceptable method of assessment. The examiner is afforded the opportunity to evaluate the candidate's communication skills, ability to think on his/her feet and attitude. The student's appearance, self-confidence, reaction to stress and personality can also be assessed. The other advantage is that the contents and nature of the examination can be adapted during the oral as guided by the student's response.

The oral is the most subjective of all methods. To guarantee reliable results a structured oral with clear decision on the content that should be covered must be made, a similar degree of difficulty for all students be ensured with a checklist on allocation of marks provided to all the examiners. Examiners must be well trained and focus on what the student knows as opposed to what they do not know. Some candidates may feel uncomfortable and might not perform well under pressure. This might influence the validity of this method.

Planning an oral will ensure a less subjective result, with the advantages of a face-to-face evaluation.

2.10.3.4 *OSCE*

The Objective Structured Clinical Examination (OSCE) is used widely in medical training. Bezuidenhout (2014:7) states that with an **OSCE** two measureable outcomes are involved. The procedure, skill or technique and the product, outcome or result can be evaluated. The examiner may be interested in one or both. Table 2.6 gives a list of advantages and disadvantages of an **OSCE**.

TABLE 2.6: THE ADVANTAGES AND DISADVANTAGE OF AN OSCE (BEZUIDENHOUT 2014:6-7)
(Table continue on next page)

ADVANTAGES	DISADVANTAGES
• The OSCE is reliable, valid, feasible, objective and acceptable to students. • It is an extensive and standardised method of assessment. • It tests a wide range of clinical skills. • It can measure outcomes at all the cognitive levels. • It can be readily repeated.	• OSCEs demand long and careful preparation. • Logistic problems, e.g. venues, time, availability of patients, etc. • May be boring and tiring for examiners. • It demands excellent observation skills on the side of the examiner. • Patients may become tired and irritable.

• The assessment can be standardised by means of checklists. • Assessments are the same for all candidates. • It is easily adaptable depending on the circumstances, resources (e.g. patients available), number of stations, discipline, etc. • Standard criteria can be easily determined. • Examiners can give feedback promptly. • It is a learning opportunity.	

For reliable and objective results give clear directions to the students regarding the sequence of the stations and the manner of response. Checklists are useful, stations should be set up with independent problems and time limits should be observed. A memorandum providing all acceptable responses and procedures should be prepared together with a checklist when the stations are set up. Simulated patients or models should be used as far as possible. Under ideal circumstances there should be two examiners per station. One per station is acceptable if a pre-determined checklist is used. Feedback is important and is an added learning opportunity.

2.11 PROGRAMME ACCREDITATION

The Higher Education Quality Committee (HEQC) is a sub-committee of the Council for Higher Education (CHE). "The HEQC has the legal obligation to ensure quality in higher education and is the only quality assurance authority for higher education programmes. In executing its accreditation function the HEQC evaluates programmes in terms of a set of criteria and minimum standards" (CHE 2009:1-22).

This is a peer reviewed evidence-based process to ensure quality in higher education. Programmes, and not institutions are accredited by the HEQC (CHE 2009:1-22).

2.11.1 Accreditation Process

The accreditation process starts at institutional level with Faculty approval followed by Faculty Board approval for the development of a programme. DIRAP (Directorate for Institutional Research and Academic Planning) and the faculty assist with the development phase before approval from the relevant professional bodies (HPCSA in this case) is applied for before moving unto the faculty management. The faculty management sets out rules and a budget before seeking approval from the Faculty Board for implementation. After

this approval the programme is moved to the Planning Unit. The programme is then presented to the Academic Planning Committee before sending it off to the Department of Higher Education. After Department of Higher Education and Training approval (PQM Approval for subsidy) an application for accreditation is made at HEQC. The programme is screened, and after recommendations by the evaluator to the accreditation committee the HEQC board decides on accreditation (CHE 2009:1-22). This might be in the form of provisional accreditation with no conditions, provisional accreditation with conditions or no accreditation. Nine input criteria are used for the provisional evaluation (candidacy phase) and accreditation. If all conditions is met, students are enrolled and the first cohort is produced. The reaccreditation is based on grounds of this first cohort of students on the nine input criteria and a further ten (CHE 2009:1-22). Figure 2.10 below is a schematic diagram of the process.

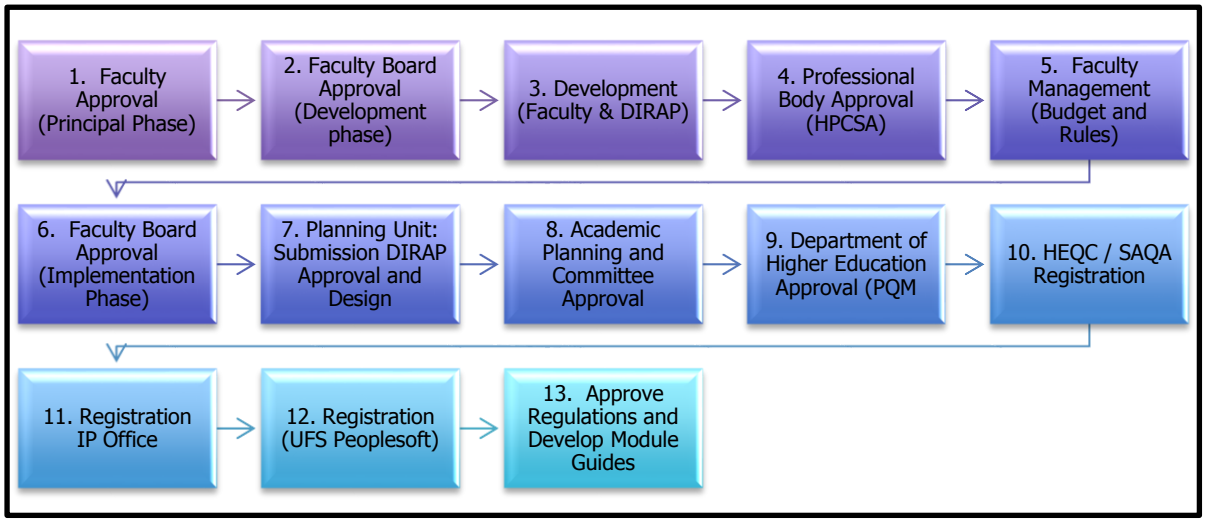

FIGURE 2.10: NEW PROGRAMMES: APPROVAL PROCESS FACULTY OF HEALTH SCIENCES 2014 (UFS 2014:online)

2.11.2 Criteria for accreditation

As mentioned above the first nine input criteria is used for initial evaluation. All nine these criteria need to be met or the programme at least needs to show the potential to do so. With the reaccreditation, all 19 these criteria are employed:

- **Criterion 1** (Programme Design) looks at the value, relevance and purpose of the programme. It also takes in account if accreditation was obtained from relevant professional bodies as in this study the HPCSA.
- **Criterion 2** (Admission Requirements) verifies that the admission requirements of the programme are meeting with the national requirements specified in the *Government Gazette* (July 2008:1-15).

- **Criteria 3 and 4** (Staffing) are concerned with the availability and the qualification, and workload of staff that would be involved with presenting the course.
- **Criterion 5** (Teaching & Learning) states that the teaching and learning strategy should be applicable to the level, the mode of delivery, and student profile of the programme.
- **Criterion 6** (Assessment) gives attention to the mode, security and capturing of results of assessment.
- **Criterion 7** evaluates the infrastructure available for presenting the programme.
- **Criterion 8** takes a look at the availability of administrative services.
- **Criterion 9**: Postgraduate Research.
- **Criterion 10** is to ensure that programme coordination and strategies to ensure academic development are in place.
- Student academic support is the focus of **Criterion 11**, while teaching and learning interaction enjoys attention in the next criterion (**Criterion 12**).
- Student assessment practices, feedback to teachers and the assessment process integrity is also looked at (**Criteria 13 & 14**).
- Work integrated learning which is of importance for this study is the basis of **Criterion 15**, whereas
- **Criterion 16** discusses the management of postgraduate studies. The competence of study leaders is mentioned here and very important.
- Maintaining standards in student retention and output is the goal of the next criterion (**Criterion 17**), and
- Demonstrating programme impact in terms of employability also receives attention (**Criterion 18**).
- It is important to conduct regular programme reviews to ensure relevance (**Criterion 19**).

2.11.3 Short learning programme

The HEQC delegates the authority to accredit a short learning programme (SLP) to the specific academic facility. In this case the UFS, but expects an internal quality management system to be in place. The application and approval process as followed at the UFS is a nine-step process as shown in Figure 2.11 (UFS 2014:6).

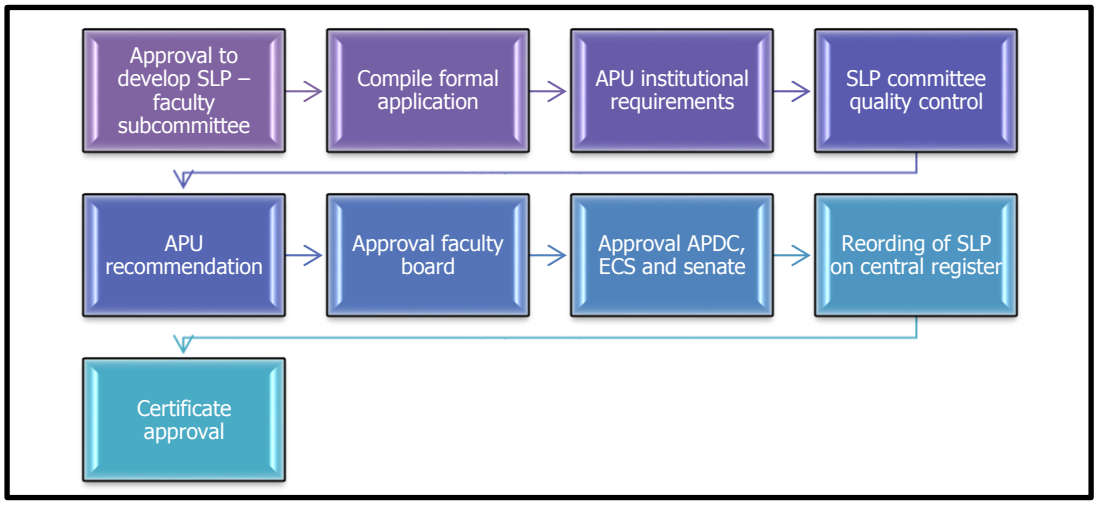

FIGURE 2.11: SCHEMATIC REPRESENTATION OF SHORT LEARNING PROGRAMME APPLICATION AND APPROVAL PROCESS (UFS 2014:6)

The first step happens at faculty level and consists of a written proposal explaining the purpose and rationale for developing the SLP. After approval by the appropriate faculty sub-committee, the Academic Programme Unit (APU) of DIRAP assists with compiling a formal application. During step 3 the APU ensures that all institutional requirements are met by the application. As a fourth step an ad hoc SLP expert committee assists the APU in evaluating the application. Step 5 is clearance by the APU for submission to the Faculty Board. Step five and six consists of Faculty Board approval followed by the Senate approval. The Senate delegates to either the APDC (Academic Planning and Development Committee) or the ECS (Executive Committee of the Senate). The APU registers the approved SLP and approves the layout of certificates as step 8 and 9 (UFS 2014:6).

The UFS's policy on short learning programmes is stated and explained in *Policy on Short Learning Programme Provisioning at the UFS* as amended by DIRAP in September 2014 (UFS 2014:6-8). It sets out the important steps to follow to accredit a short learning programme. A SLP focuses on a predetermined and demarcated field of study within a qualification, as in this case, surgical skills in rural GP practice. There are three types of SLPs that are offered at UFS namely:

- Competency based (credit bearing);
- Competency based (non-credit bearing); and
- Attendance based (non-credit bearing).

Credits are calculated on the basis that one (1) credit is equal to ten (10) notional hours of learning (SAQA 2013:4). It is this different from CEUs where one hour equals one CEU (HPCSA 2011:2-19).

This short learning programme in rural surgical skill is a competency based non-credit bearing programme as it is formally assessed, certificates of competency are issued after successful completion, and it is not credit bearing towards a UFS qualification. It will however bear CEUs.

2.12 SOUTH AFRICAN QUALIFICATION AUTHORITY (SAQA)

The South African National Qualifications Framework (NQF) is a comprehensive system approved by the Minister of Higher Education and Training for the classification, registration, publication and articulation of quality-assured national qualifications and part qualifications. The NQF was established under the SAQA Act, Act 58 of 1995, and continues under the NQF Act, Act 67 of 2008, which came into effect on 1 June 2009 (SAQA 2013:1). It was an important consideration in planning a *Short Learning Programme in Essential Surgical Skills in Rural South Africa* to look at various aspects of NQF. The relevant points are shortly mentioned.

The NQF were designed with the full personal development of each learner in mind and to contribute to the social and economic development of the nation as a whole (SAQA 2013). It was designed to create a single integrated national framework for learning achievements, to facilitate access and progression in education, training and career paths, enhance the quality of education and training and accelerate the redress of past unfair discrimination in education, training and employment opportunities.

The NQF is a single integrated system that comprises of three co-ordinated qualifications Sub-frameworks (SAQA 2013:1), for:

- General and Further Education and Training;
- Higher Education; and
- Trades and Occupations.

2.12.1 Objectives of the National Qualifications Framework

- *"Facilitate the registration of qualifications and part qualifications on the NQF, which have been recommended to SAQA by the Quality Councils, where they meet the criteria set out in this policy*
- *Ensure that registered qualifications and part qualifications are relevant to the world of work and promote responsible citizenship in a democratic society and advance knowledge and innovation for a prosperous South Africa*
- *Establish and maintain coherence between the three Sub-frameworks in order to clarify and strengthen articulation between qualifications within each Sub-framework and between the Sub-frameworks*
- *Promote public understanding of, and trust in, the NQF through the registration of high quality, nationally relevant, and internationally comparable qualifications and part qualifications*
- *Support the coherence of purpose between education, training and development nationally Create a basis for and promote lifelong learning.*
- *Support the development of a national career development system".*

(SAQA 2013:5-6)

2.12.2 Policy for the Registration of Qualifications and Part Qualifications on the NQF

- "*SAQA will register a qualification or part qualification on the NQF on the recommendation of the Quality Council provided that the criteria for registration on the NQF are fulfilled (cf. 2.12.3).*
- *Qualifications and part qualifications for registration on the NQF must:*
  - *Include clear specifications of outcomes, using the level descriptors*
  - *State the minimum requirements to obtain the qualification*
  - *Identify the relevant Sub-framework on which it is recommended for registration on the NQF.*
- *Part qualifications registered on the NQF should indicate the registered qualification(s) of which they are part, or will form part.*
- *Qualifications and part qualifications submitted to SAQA for registration, but which do not meet the registration criteria, will be returned to the relevant Quality Council for amendment.*

- *The SAQA Board is the final authority that registers qualifications and part qualifications on the NQF.*
- *Quality Councils will advise SAQA, in writing, of qualifications and part qualifications that will no longer be offered. These qualifications, even though no longer offered, still form part of the NQF.*
- *All qualifications and part qualifications registered on the NQF will be on the SAQA website.*
- *Foreign qualifications being offered by providers in South Africa must meet these criteria for registration on the South African NQF".*

(SAQA 2013:6)

2.12.3 Criteria for the Registration of Qualifications and Part Qualifications on the NQF

General criteria regarding qualifications and part qualifications for registration on the NQF (SAQA 2013:6-7):

- Be recommended and submitted to SAQA for registration by a Quality Council;
- Comply with the Criteria for registration;
- Be written in English; and
- Meet the criteria as laid down by the Sub-framework for the qualification/part qualification type.

Criteria of format in which qualification and part qualification must be submitted for registration (SAQA 2013:6-7):

- **Title** -The qualification title must comply with the qualification type description provided for in the relevant Sub-framework of the NQF.
- **Sub-framework**- The Sub-framework on which the qualification is to be registered must be provided.
- **Field and Sub-Field** [this may include, where applicable, the Classification of Educational Subject Matter (CESM) category and/or Organising Framework for Occupations (OFO) code].
- **Level of the Qualification** - The published level descriptors must be used to help determine the level of the qualification.

- **Credits** - The credits must be calculated on the basis of one (1) credit is equal to ten (10) notional hours of learning. The minimum credit allocation for a qualification must comply with the requirements for the qualification type as determined within the relevant Sub-framework of the NQF. This short learning programme will not be credit bearing.
- **Rationale** - A statement explaining the reasoning that led to identifying the need for the qualification and describe how it meets this specific need. Details of research and consultation must be provided. The profile of the typical learner and the specific area where they will operate must be identified and described. The rationale should also indicate the learning pathway where the qualification resides, and the benefits to the learner and society.
- **Purpose** – This should be a description of what is to be achieved in a national and career context and should capture what the qualifying learner will know and be able to do on achievement of the qualification or part qualification. The purpose statement must be linked to the Exit Level Outcomes.
- **Rules of Combination** - There must be coherence between the constituent parts of the qualification.
- **Entry Requirements** - The minimum entry requirements to the qualification must be stated and should be aligned to the approved institutional/provider admissions policies.
- **Exit Level Outcomes and Associated Assessment Criteria** – The exit level outcomes should indicate the qualified learner would be able to do and know as a result of completing the qualification or part qualification. The exit level outcomes are framed against the level descriptors. Criteria indicating the nature and level of assessment must be set derived from the level descriptors.
- **International Comparability** -"*A statement on how the qualification compares with or relates to similar qualifications or best practices or standards offered in other parts of the world must be given. The Quality Councils will apply this in a manner appropriate to their relevant sector and Sub-framework. Qualifications that are internationally comparable could assist in determining the articulation possibilities of the qualification with qualifications in other national and regional qualification frameworks".*
- **Integrated Assessment –** A statement regarding the summative assessment that is undertaken to determine the learners' competence and successful completion of the course.
- **Recognition of Prior Learning (RPL) –** "*Institutional RPL policies must clearly state how RPL will be applied to gain entry to or achieve the qualification*". These policies must be available upon request of SAQA.

- **Articulation** - *"A statement describing the horizontal, vertical and diagonal articulation possibilities within the relevant Sub-framework and between Sub-frameworks, must be provided, where appropriate".*

2.12.4 The revised Higher Education Qualifications Sub-Framework (HEQSF) (As revised January 2013)

As approved by the Minister of Higher Education and Training (Notice 1040 of 2012; Government Gazette No. 36003 of 14 December 2012) in terms of the National Qualifications Act, 2008 (Act No. 67 0f 2008) and as contemplated in the Higher Education Act, 1997 (Act No. 101 of 1997).

"The implementation of the HEQF – since 1 January 2009 all new programmes submitted to the Higher Education Quality Committee (HEQC) for accreditation have had to be compliant with the HEQF – confirmed that despite the robust nature of the design of the HEQF, there remained, as the CHE advised the then Minister of Education in April 2007, "unresolved concerns about the number, nature and purposes of the qualification types" set out in the HEQF" (HEQSF 2013:4).

The revised Higher Education Qualifications Sub-Framework (HEQSF)

i. *"Recognises three broad qualification progression routes with permeable boundaries, namely, vocational, professional and general routes and provides greater clarity on the articulation possibilities between these qualification routes.*
ii. *Introduces two additional qualification types to the existing nine, and includes additional variants of particular qualification types.*
iii. *Clarifies the interpretation of some existing qualification types, namely, the Bachelor's degree, as having two potential orientations – professional and general academic.*
iv. *Provides for greater flexibility and options with respect to professionally- oriented qualifications.*
v. *Facilitates the potential convergence of diploma and degree study routes at the Honours level instead of at the Master's level as was previously the case".*

(HEQSF 2013:5-6)

2.12.5 Qualification types

There are eleven qualification types in the framework (HEQSF 2013:13). These are mapped onto the six higher levels of the NQF. Some levels have more than one qualification type. The framework comprises the following qualification types:

Undergraduate

i. Higher Certificate
ii. Advanced Certificate
iii. Diploma
iv. Advanced Diploma
v. Bachelor's Degree

Postgraduate

i. Postgraduate Diploma
ii. Bachelor Honours Degree
iii. Master's Degree
iv. Professional Master's Degree
v. Doctoral Degree
vi. Professional Doctorate

Each qualification type is expected to meet the level of competence described by the level descriptor it is pegged onto.

Table 2.7 represents the qualification types with their relevant NQF levels.

TABLE 2.7: QUALIFICATION TYPES, THEIR NQF LEVELS AND CREDITS (ADAPTED FROM CHE 2013:6; 27-41)
(Table continue on next page)

NQF LEVEL	QUALIFICATION TYPES
	Post Graduate
10	Doctoral Degree Doctoral Degree (Professional)
9	Master's Degree Master's Degree (Professional)
8	Bachelor Honours Degree Postgraduate Diploma

	Undergraduate
8	Bachelor's Degree (Professional)
7	Bachelor's Degree Advanced Diploma
6	Diploma Advanced Certificate
5	Higher Certificate

A degree (bachelors, masters and doctors) is given a second name called a designator. This is the second layer of qualification specialisation. As an illustration: A Bachelor of *Commerce* (B.Com) degree is the generic bachelor's degree in the commerce field. Designators apply only to degrees and not to certificates and diplomas. The designator of the degree must comply with the generic specification for the qualification type.

The qualifier is the third name given to a qualification. This forms the last and most specific layer of the qualification specialisation nested in the qualification type and is used with all qualification types and not limited to degrees. The qualifier is used to indicate specialisation. For example a Bachelor of *Commerce in Law* (B.Com (Law)) indicates that the person holds a Bachelor of *Commerce* degree with specialisation in *Law.* Bachelor degrees may have a second qualifier.

For qualifications that do not have a designator the qualifier is stated immediately after the qualification type e.g. Post Graduate Diploma in Drama (PG DIP (Drama)). This will be applicable to a short learning course.

A Short Learning Programme in Essential Surgical Skills in Rural South Africa is pegged at a NQF level 8 and table 2.8 gives the specific level descriptors (HEQSF 2013:13-15).

TABLE 2.8: NQF LEVEL DESCRIPTORS FOR LEVEL 8 (HEQSF 2013:30)
(Table continue on next page)

NQF level descriptors	Level 8
Scope of knowledge	• Knowledge of and engagement in an area at the forefront of a field, discipline or practice; • An understanding of the theories, research methodologies, methods and techniques relevant to the field, discipline or practice; and an understanding of how to apply this knowledge in a particular context.
Knowledge literacy	• An ability to interrogate multiple sources of knowledge in an area of specialisation, and to evaluate knowledge and processes of knowledge production.
Methods and Procedure	• An understanding of the complexities and uncertainties of selecting, applying or transferring appropriate standard procedures, processes or techniques to unfamiliar problems in a specialised field, discipline or practice.

Problem solving	• An ability to use a range of specialised skills to identify, analyse and address complex and/or abstract problems drawing systematically on the body of knowledge and methods appropriate to a field, discipline or practice.
Ethics and Professional practice	• An ability to identify and address ethical issues based on critical reflection on the suitability of different ethical value systems to specific contexts.
Assessing, processing and managing information	• An ability to critically review information gathering, evaluation and management processes in specialised contexts in order to develop creative responses to problems and issues.
Producing and communicating information	• An ability to present and communicate academic, professional or occupational ideas and texts effectively to a range of audiences, offering creative insights, rigorous interpretations and solutions to problems and issues appropriate to the context.
Context and systems	• An ability to operate effectively within a system, or manage the system based on an understanding of the roles and relationships between elements within the system.
Management of learning	• An ability to apply in a self-critical manner learning strategies which effectively address own and others' professional and ongoing learning needs.
Accountability	• An ability to take full responsibility for own work, decision making and use of resources, and full accountability for the decisions and actions of others where appropriate.

2.13 Conclusion

In this chapter an overview was given to the need for a short learning programme in rural surgical skills in South Africa. The approach to developing a curriculum was discussed, mention was made of various educational strategies and tools. The specific CPD requirements put down by the HPCSA were highlighted before the chapter was ended off with reference to the relevant SAQA frameworks and sub-frameworks.

Chapter 3 will give an overview of the ***research methodology*** that was applied in this study.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

As mentioned in Chapter 1 the aim of this study was to develop essential surgical skills by determining the contents of CPD programme in essential surgical skills for general practitioners in rural areas, therefore this was a descriptive study. The context and background to CPD programme development was provided in Chapter 2. This chapter will provide some theoretical perspectives on the design and methods used for research in this study. The ethical considerations and ways that was used to ensure the quality of this study will be discussed.

3.2 THEORETICAL PERSPECTIVES ON THE RESEARCH DESIGN

3.2.1 Theory building

Research designs are procedures (models) for collecting, analysing, interpreting and reporting data in research studies and help guide methodology decisions and provide the logic by which results are interpreted (Creswell & Plano Clark 2011:53). According to Delport and Fouche in de Vos, Strydom, Fouche and Delport (2011:433) Quantitative and Qualitative research approaches are not mutually exclusive. Although qualitative research methods utilise small samples (which are often selected with a purpose) and quantitative research is concerned with testing theories (which include variables that are measured numerically and analysed statistically), these approaches can be used in a complementary way. This will be a descriptive study.

According to Jackson (2009:85-93) there are three main types of descriptive methods: observational methods, case-study methods and survey methods. With the the two main categories in observational studies namely: naturalistic or laboratory observational methods, behaviour is closely observed. This is a time-consuming and therefore an expensive research method. Case-study research involves an in-depth study of an individual or group of individuals. Case-studies often lead to testable hypotheses and allow us to study rare phenomena. Case-studies should not be used to determine cause and effect, and they have limited use for making accurate predictions. Jackson (2009:85-93) states that the two biggest problems with case studies are expectancy effects and atypical

individuals. Clearly observational and case study descriptive methods is not suited to curriculum design. In survey method research, participants answer questions administered through interviews or questionnaires. After participants answer the questions, researchers describe the responses given. In order for the survey to be both reliable and valid, it is important that the questions are constructed properly (Jackson 2009:85-93). Questions should be written so that they are clear and easy to comprehend.

Jackson also alludes to the fact that when designing questions, another consideration is whether to include open-ended, closed-ended, partially open-ended, or rating-scale questions. Advantages and disadvantages can be found with each type: Open-ended questions allow for a greater variety of responses from participants, but are difficult to analyse statistically because the data must be coded or reduced in some manner. Closed-ended questions are easy to analyse statistically, but they seriously limit the responses that participants can give. Many researchers prefer to use a Likert-type scale because it is very easy to analyse statistically. It is important to emphasize that descriptive research methods can only describe a set of observations or the data collected.

3.2.2 Types of methods

The two main research methods used was a questionnaire and a literature review. Descriptive studies making use of questionnaires has been used with great success to determine the contents of various curricula in medicine (Holloway & Webster 2013:992-7; Lisk, Flannery & Loh 2014:135-143; Slusser, Rice & Miller 2012:385-392).

A literature study of related South African and international literature and an analysis of related national documents were performed with the aim of conceptualising and contextualising the development of a CPD programme to address surgical skills as required by GP's in rural areas.

3.2.3 The research design in this study

After a conceptual framework was delineated for the research through a literature review a survey by means of a questionnaire consisting of mainly quantitative, supplementary qualitative components was utilised. The purpose of the quantitative component of the study was to obtain the knowledge, experiences, and opinion from the participants regarding aspects identified by the researcher in the literature. This was achieved by using Likert scale type questions. The purpose of the qualitative component was to identify

problem areas, key issues and critical points raised by the respondents with regard to the research topic. Open-ended questions addressed this component.

3.3 RESEARCH METHODS

3.3.1 Literature review

The literature review accomplishes several purposes. It shares with the reader the results of other studies that are closely related to the one undertaken. It relates a study to the larger, on-going dialogue in the literature, filling in gaps and extending prior studies (Cooper 1984; Marshall & Rossman 2006) as cited by Creswell (2009:25-47). A literature review should provide a contextual and conceptual framework for the research and should reflect research performed by accredited researchers. The researcher will aim to use studies that are valid and unbiased.

The following aspects have be explored in the literature search:

i. Surgical procedures performed in rural hospitals in Africa;
ii. Frameworks for CPD Programmes; and
iii. NHI perspectives for surgery in rural hospitals.

Electronic databases and appropriate keywords (rural surgical skills/National Health Insurance/CPD Programme) were investigated with search engines such as Medline, Google scholar and Pubmed. Searches have been performed for years since 1990, focusing mainly on publications since 2007. Only ground-breaking articles by renowned authors prior to 1990 were retrieved. In the references cited, appropriate articles were accessed using the University of the Free State library link for electronic journals. An analysis of documents pertaining to NHI, HPCSA CPD guidelines, Council for Higher Education (CHE) and South African Qualifications Authority (SAQA) was done. The researcher also looked at existing models used elsewhere.

3.3.2 The Questionnaire survey

Factual information, values, preferences, attitudes, beliefs and the past and present experiences and expectations was obtained from participants by questionnaire. The questionnaire was distributed electronically via internet through use of the EVASYS system. The questionnaire was in English as this was the only common language used by all the participants.

3.3.2.1 *Theoretical aspects*

As previously discussed questionnaires have been used successfully to determine the contents of various medical and healthcare curricula. (Holloway *et al* 2013:992-7; Lisk *et al.* 2014:135-143; Slusser *et al.* 2012:385-392). Herbener (1994:292-298); Morihara, Jackson and Chun (2013:908-913); Gonsalves, Ajjawi, Rodger and Varpio (2014:422-429) and Curran, Ned and Winkleby (2014:271-280) have also made use of this method to determine curriculum contents.

3.3.2.2 *Questionnaire survey in this study*

The questions in the survey that was used in this study was determined and refined by the researcher after a literature review was done. It consists of four sections **A-D** that was divided as follow:

A	Biographical data related to practice location, experience and postgraduate training.
B	This section comprised of questions relating to the general practitioners' current surgical practices.
C	This section explored participants' views on proposed essential surgical skills
D	Open ended questions in this section allowed for further input regarding essential skills needed, but was also aimed at identifying other factors that might impact surgical practice in rural areas

3.3.2.3 *Target population*

A population consists of a group of individuals who possess certain characteristics (De Vos 2011:223) or a specific group of sampling units directly linked to the research question (Maree 2012:147). "A population is the universe of units from which the sample is selected" (Bryman 2012:187). The target population was doctors working in rural hospital or GPs in areas where their referral hospital is a rural or district hospital. The target population is the specific pool of cases/participants you want to include in the study (Neuman 2012:151-153). Doctors working in rural areas and in district hospitals were the target population.

3.3.2.4 *Sample size*

It was decided to select 20% of respondents per province, using the random numbers table by selecting every "x" number of participants to serve as part of the survey population, in this study it was every fifth individual. The survey population consisted of individuals who were willing to sign the consent forms and fill in the questionnaire. The sample consisted of approximately 720 doctors (different totals for different provinces) representing all nine

provinces selected through a proportionate stratified random sampling design. This represented four percent of the total of 17802 general practitioners (Econex 2010:1) in South Africa.

3.3.2.5 *Description of sample*

The distribution of GPs in the public and private sectors are almost equal (ANC 2010:14) at 2861 people per GP in public and 2723 people per GP in the private sector, but the population numbers between the 9 provinces varies greatly. The total population of Gauteng, the most populated province is 24 million and the Northern Cape, the least populated is 2,2 million (SSA 2013:3). The majority of the population in Gauteng live in urban areas, with only 3,8 % of the population in rural areas. The opposite is true for the Northern Cape were the majority of the population live in rural areas. Each province has its own unique proportions. The ratio of medical practitioners per 10 000 population also varies by province. The Western Cape has a ratio of 14,7 doctors per 10 000, whereas Limpopo Province only report a ratio of 1,8 per 10 000 population (RSA DoH 2006:online).

A sample unit is a unit that will be analysed and upon which measurements or research is performed (Maree 2012:146). A sample is a subset of a population (De Vos 2011:223). In this study, the sample will be randomly selected doctors from all nine provinces in the survey population of general practitioners form the HPCSA database.

With these factors in mind, a proportionate stratified random sampling design will be employed (Castillo 2009:online). The strata in this study are the nine provinces. The sample design in this study is a stratified sample. "In this method of sampling (d.i. stratified), the population is divided into a number of homogeneous, non-overlapping groups, called strata. Within each stratum, independent sampling (e.g. simple random or systematic sampling) is then conducted. The strata can be formed based on natural subgroups, for example the nine provinces in South Africa, or they can be based on available information, for example the job level of employees" (Maree & Pietersen 2007:171-181).

3.3.2.6 *The pilot study*

My pilot study consisted of three general practitioners working in the Uitenhage. This was performed to:

i. Ensure that all relevant questions have been included, the questions were, unambiguous, unbiased, and in an appropriate order; and

ii. To confirm the appropriate time it will take for completion of the questionnaire.

The data of the pilot study would have been omitted from the main study if any changes were made to the questionnaire as a result of the pilot study. I included these questionnaires in my study as no changes were made to the questionnaire.

3.3.2.7 *Data gathering*

Data was to be collected by means of a questionnaire. The EVASYS data collection system of the University of the Free State was to be used. The questionnaires were e-mailed to the participants. Paper copies of the questionnaires were posted at the request of participants. The questionnaire was to be closed after four weeks. If the response rates were low, an extension would be made and non-responders would be followed up every two weeks for at least three times.

3.3.2.8 Data analysis

All quantitative and qualitative data was gathered by means of the questionnaire via the EVASYS system. EVASYS provided the required statistics as it automatically calculates the requested statistics. Interpretation of the results was be done by the researcher and his supervisors Quantitative analysis was done on the following:

i. Demographical data (quantitative data);
ii. Experience regarding surgical procedures (quantitative data);
iii. General practice needs regarding surgical skills (quantitative and qualitative data); and
iv. Personal experiences, attitudes, opinions and beliefs regarding CPD Programmes (quantitative and qualitative data).

The researcher analysed the data under the following above mentioned broad categories and identify themes under each category. The qualitative and quantitative data was integrated to answer the research questions. Aspects that require further research or elucidation were identified for further investigation in a subsequent study. Participants will receive feedback from the researcher once the study has been concluded.

3.3.2.9 *Data interpretation*

The data that was gathered and analysed was used to propose the contents of a short learning programme in essential surgical skills for rural South Africa. The details of this

are discussed in Chapter 5 - *Description of Outcomes and Essential Content for a Short Learning Programme in Essential Surgical Skills.*

3.4 ENSURING THE QUALITY OF THE STUDY (Selection)

3.4.1 Trustworthiness

Trustworthiness is best defined as the "believability" of a researcher's findings (Maykut 1994:64). Trustworthiness, according to Bryman (2012:390-393,717) includes criteria advocated by Cuba, establishing four criteria for trustworthiness in qualitative research, namely credibility, transferability, dependability and conformability, as opposed to the four criteria for trustworthiness in quantitative research, namely: internal and external validity, reliability and objectivity. In this study trustworthiness was assured as the respondents were sharing the same characteristics and qualitative and quantitative data were collected simultaneously. An internet/electronic data and format was used to obtain response.

3.4.2 Credibility / Internal validity

Validity is defined as the extent to which the instrument measures what it purports to measure (Miller 2011:1-3) or how truthful the research results are (Golafshani 2003:3). Babbie (2007:146-147) defines validity regarding research to be an empirical measure that accurately or adequately reflects the real meaning of the concept it is intended to measure. By choosing an instrument that was specifically developed to assess the components of interest in this study by a reputable institution enhanced the validity. The internal validity in this study was further ensured by making use of the pilot study and selecting appropriate criteria for participants included in the survey. The response rate should be as high as possible to increase the validity. The use of international literature further contributed to external validity.

3.4.3 Data quality (reliability/dependability) and objectivity / conformability

Reliability is defined as the extent to which a questionnaire, test, observation or any measurement procedure produces the same results in repeated trials (Miller 2011:1-3). Joppe as cited by Golafshani (2003:2) defines reliability as the extent to which results are consistent over time and an accurate representation of the total population. According to Babbie (2007:143) and Leedy and Ormrod (2010:29) reliability (consistency in results) is that quality of measurement method that suggests that the same data would have been collected each time in repeated observations of the same phenomena or entity.

Unfortunately, reliability does not ensure accuracy, since individual bias may influence the result, despite a reliable measuring instrument being used. To enhance reliability, a structured researched instrument in the form of a questionnaire has been used. A specific target population has been selected and a literature survey was performed to guide the researcher with regards to the contents of the questionnaire. The pilot study also enhanced the reliability of this study. To ensure a high response rate, the participants was contacted electronically. The participants who did not respond was followed up as previously discussed.

3.4.4 Generalisation

"If we want more evidence-based practice, we need more practice-based evidence"
(Green & Glascow 2006:126-153)

Generalisation is an act of reasoning that involves drawing broad inferences from particular observations (Polit & Beck 2010:1451-58)**.** Generalisation is widely acknowledged as a quality standard in quantitative research. It is more controversial in qualitative research. Polit *et al.* state that goal of most qualitative studies is not to generalize, but to provide contextualised understanding of some aspect of human experience through the intensive study of particular cases. In medical practice where evidence for improving practice is held in high esteem, generalisation in relation to knowledge claims warrants careful attention by both qualitative and quantitative researchers. Polit and Beck proposes three models of generalisation:

- Sample-to-population (statistical) generalisation;
- Analytic generalisation; and
- Case-to-case transfer (transferability).

The classic sample-to-population or statistical generalization was used in this study. The selection of the sample population and use of a Likert type questionnaire that was designed after a literature study and document analysis ensured the requirements for generilisations was met.

3.5 ETHICAL CONSIDERATIONS

3.5.1 Approval

Approval for the research project was obtained from the Ethics Committee of the Faculty of Health Sciences at the University of the Free State and the Dean of the Faculty of Health

Sciences at the University of the Free State. As no patients were involved in this study, approval from the various provincial executives was not necessary. I, however, asked for permission from the Office of the Director General of the National Department of Health to conduct the survey.

3.5.2 Informed consent

Informed consent was necessary from participants. A paragraph was included in the questionnaire to inform participants that by filling in the questionnaire they are consenting to participation voluntary. A short overview of the study and its purpose was provided to the participants with an explanation of what was required from them. Participants was informed that the survey results would be published and that no renumeration was payable. Contact details of the researcher was provided.

3.5.3 Right to privacy and confidentiality

A number coding system was used to ensure confidentiality of the respondents' responses. No names or personal identifiers will appeared on the data sheets that awere captured for statistical analysis. EVASYS uses a bar code system to maintain confidentiality. All information in this study was treated in a professional and confidential manner.

3.5.4 Minimising of potential misinterpretation of results

The chances to misinterpret the results of the questionnaire was minimised by ensure a satisfactory response rate with the questionnaire survey. This was done by resending the questionnaires via e-mail, posting hardcopies and phoning the potential participants if their phone numbers were available. The results was analysed by the EVASYS system, and discussed with my promoters in a further attempt of preventing misinterpretation.

3.6 CONCLUSION

This chapter gave an overview of the research methodology that was employed to ensure robust data. In Chapter 4 - ***Data Analysis, Interpretation and discussion of the results*** the results gathered with the research design and methodology discussed will be given and discussed.

CHAPTER 4

DATA ANALYSIS, INTERPRETATION AND DISCUSSION OF THE RESULTS

4.1 INTRODUCTION

In this chapter, the results obtained from the research are presented in tables and graphs and discussed accordingly. Data for this study were collected utlilising two processes, namely a literature review and a questionnaire survey. The empirical phase of the study consisted of the distribution of a comprehensive questionnaire to general practitioners in rural areas. The discussion of the results from the questionnaires (quantitative) includes expositions of the response rate and the geographical distribution of the respondents. The demographic data of the respondents and their educational background is also discussed. Furthermore, the discussion includes information regarding the respondents' views and attitudes regarding HIV and litigation and the influence on surgical procedures in practice.

The overall goal of the study was to determine the needs and to define the contents of a CPD Programme to obtain the necessary skills as required by GP's in rural settings. This chapter deals with the analysis of the data gathered during the questionnaire survey to assess the above.

4.1.1 Summary of the methodology for the investigation

A comprehensive questionnaire survey was conducted to get a good understanding of the perceptions and current surgical practices of general practitioners in rural areas.

The in-depth literature study was focused on investigating the suggested surgical skills required in rural areas as proposed in legislative documentation from the Department of Health in South Africa and from research published on the topic by a number of authors (cf. 2.4). The information from the literature study assisted in the compilation of the questions for the questionnaire survey. The questionnaires consisted of four main categories namely:

i. biographical information of the participants;
ii. current surgical practice over the past 12 months;
iii. opinion regarding essential surgical skills needed in rural South Africa; and
iv. open-ended questions regarding rural surgery.

The closed questions in the questionnaires were statistically analysed by a statistician and presented in tables and graphs to facilitate easy understanding. The qualitative data derived from the open-ended or 'comments' sections in the questionnaires was summarised and categorized in themes and discussed with associated quantitative data. When reporting the results from the survey, the researcher not only depends on information gathered from the literature review but also searched for new data about the topic emerging from the results of the questionnaires.

As was mentioned in Chapter 3, the questionnaire was pilot-tested prior to distribution. The pilot sample was utilised to assess the clarity of the questionnaire prior to distribution. No changes to the questionnaire were necessary after analysis of the criticism of the pilot study.

The electronic questionnaire, using the EvaSys electronic survey system, was distributed on 28 June 2014 to a total of 300 general practitioners (less than planned due to difficulty in obtaining e-mail addresses) that was randomly selected from a list of practitioners working in rural areas and towns as per definition (cf. 1.2). The response after six weeks was very poor and only 22 respondents were registered. To get a better response rate the survey was send out again on 8 September 2014, hard copies were also posted to the potential respondents on the e-mail list.

The survey was send out a third time on 5 January 2015 and finally closed on 24 February 2015. A total of 102 completed surveys was received, 26 of which were in hard copy format, the rest were electronic.

The following section deals with the results of the questionnaire to general practitioners in rural areas.

4.2 DEMOGRAPHIC INFORMATION FROM THE QUESTIONNAIRE SURVEY

4.2.1 Age of participants

This question was answered by 98 of the 102 respondents. The youngest was 24 years (n=3) of age the oldest 73 years (n=1). The average age was 43,6 years and the median age was 46. Ten point five percent of the respondents were older than 60 and 89,5% were 60 years or younger (cf. Figure 4.1).

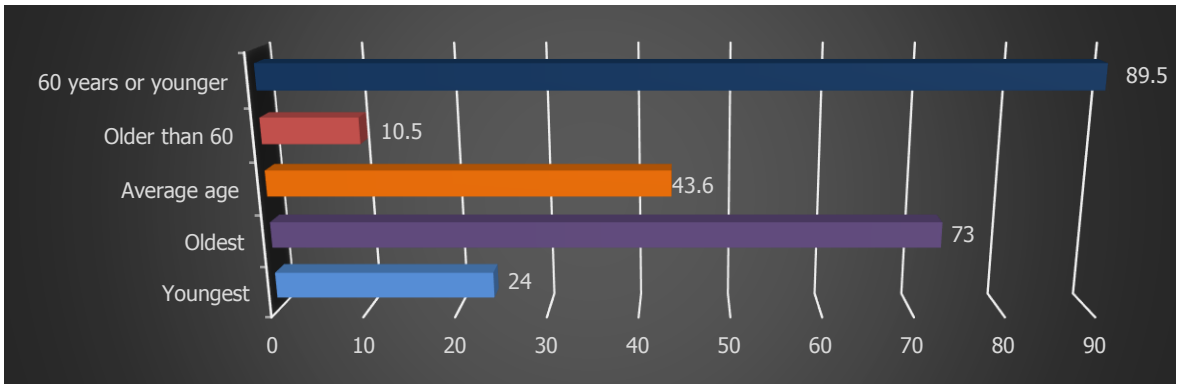

FIGURE 4.1: RECORDED AGES OF RESPONDENTS

As one can see in figure 4.1 there is a good spread across ages from 24 years to 73 years. The ages of the respondents were further broken down into decades, 20-29 years, 30-39 years, 40-49 years, 50-59 years and older than 59 years. Figure 4.2 shows a very even distribution of the respondents across the various age groups.

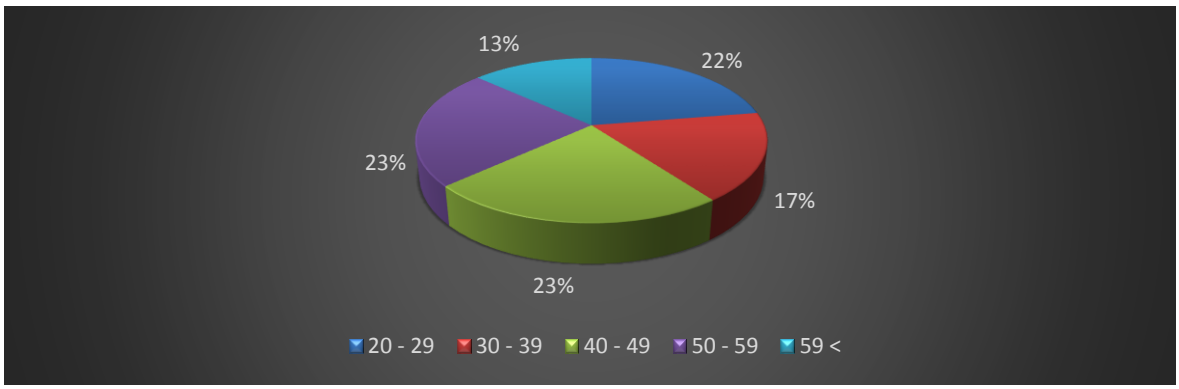

FIGURE 4.2: AGE GROUPS OF PARTICIPANTS (n=98)

4.2.2 Gender of Participants

Males made out 72,7% of the respondents (n=99) and female 27.3%. In three of the questionnaires this question was not completed (cf. Figure 4.3).

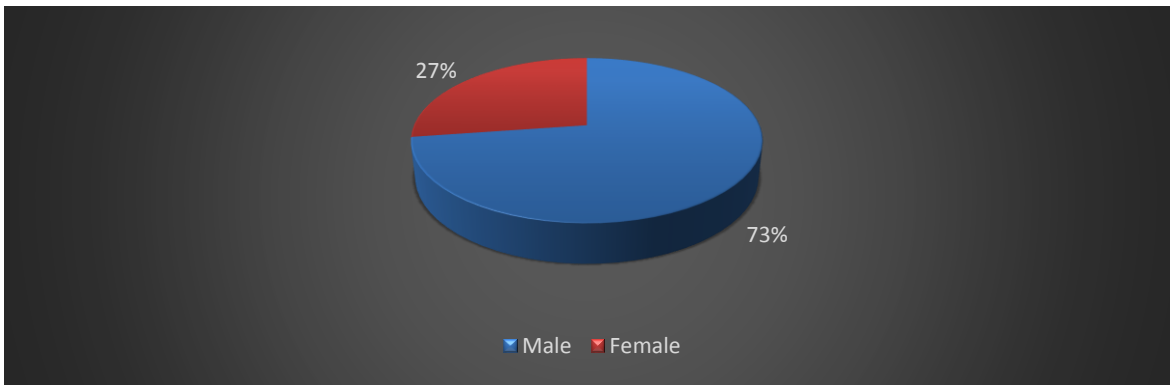

FIGURE 4.3: GENDER OF PARTICIPANTS (n=99)

4.2.3 Qualifications

4.2.3.1 *Basic Medical Qualification*

A total of 26,5% of respondents qualified at the University of Stellenbosch. This was followed in descending order by 15,3% qualifying at the University of the Free State, the University of Natal at 13,3%, the University of Cape Town at 12,2% followed by MEDUNSA at 9,2%. The University of Witwatersrand and the University of Pretoria made out 6,1% each of respondents. Unitra and other made up the remaining balance at 1% and 10, 2%. The following places were specified under "other": Cairo University (n=1), Ghana (n=1), Ibadan, Nigeria (n=1), Kuban Medical School (n=1) and the University of Zimbabwe (n=1). Two respondents each indicated that they qualified in India and Madrid, Spain. Three responses were recorded as not applicable (cf. Figure 4.4).

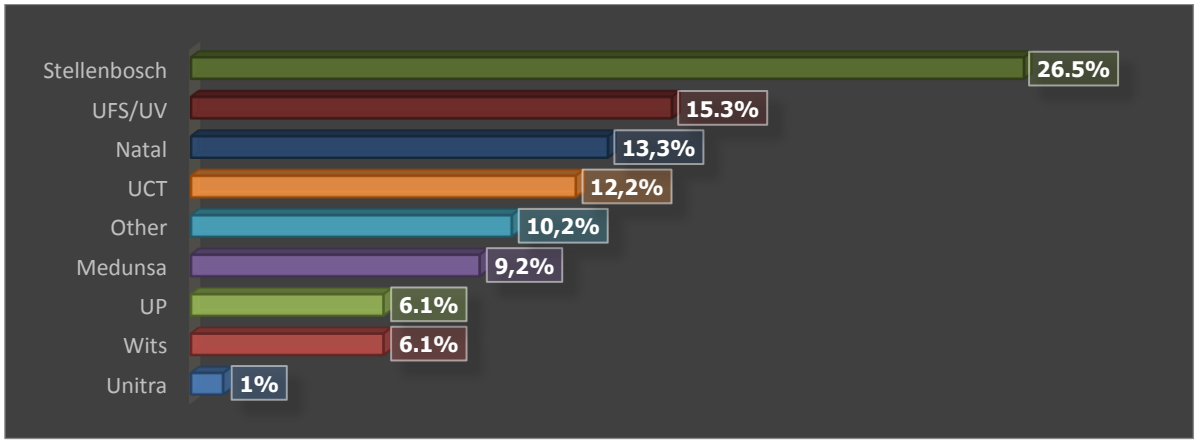

FIGURE 4.4: WHERE BASIC MEDICAL QUALIFICATION WAS ACQUIRED (n=98)

4.2.3.2 *Year of completion of Basic Medical Qualification*

Out of the total (n=97) that answered this question, 10 respondents qualified in 2013. Seven qualified in 1995, and five each in 1985, 1991 and 2002. During 1982, 1999 and 2012 four respondents qualified, while three per year obtained their degrees in 1981, 1994, 2000 and 2003. Two respondents per year were reported to complete their medical degree during 1971,1974,1977,1979, 1980, 1983, 1987, 1988, 1997, 1998, 2001, 2009, 2010 and 2011. The balance was made up of one per year during 1968, 1984, 1989, 1990, 1992, 1993, 1996, 2005, 2006 and 2008. Figure 4.5 displays the results per decade in graph form. More than 50% of the respondents had between 15 and 35 years experiences contributing to the reliability of the data.

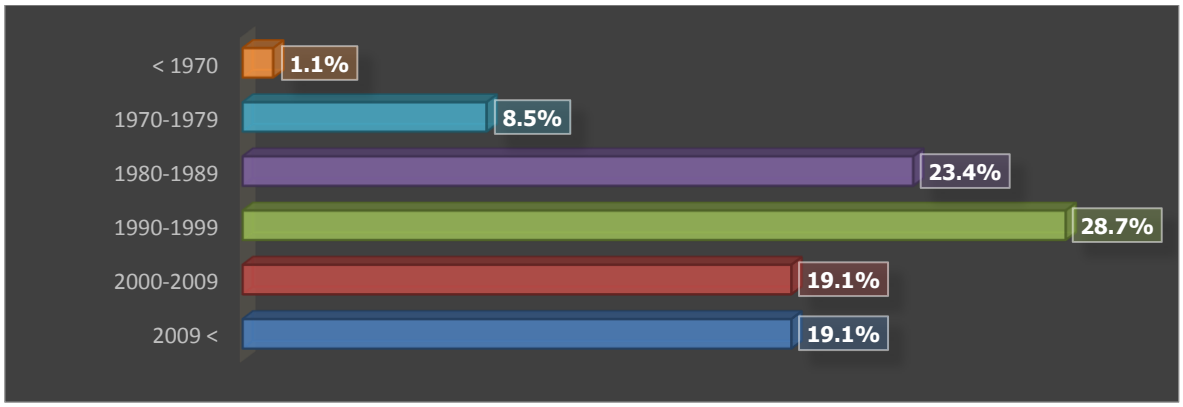

FIGURE 4.5: YEAR WHEN BASIC MEDICAL QUALIFICATION WAS COMPLETED (n=94)

4.2.3.3 *Completed Post Graduate Qualification*

Ninety eight participants answered this question. 54,1% of respondents indicated that they did not obtain a postgraduate qualification, 45,9% did obtain further qualification and they were asked to specify (cf. Figure 4.6).

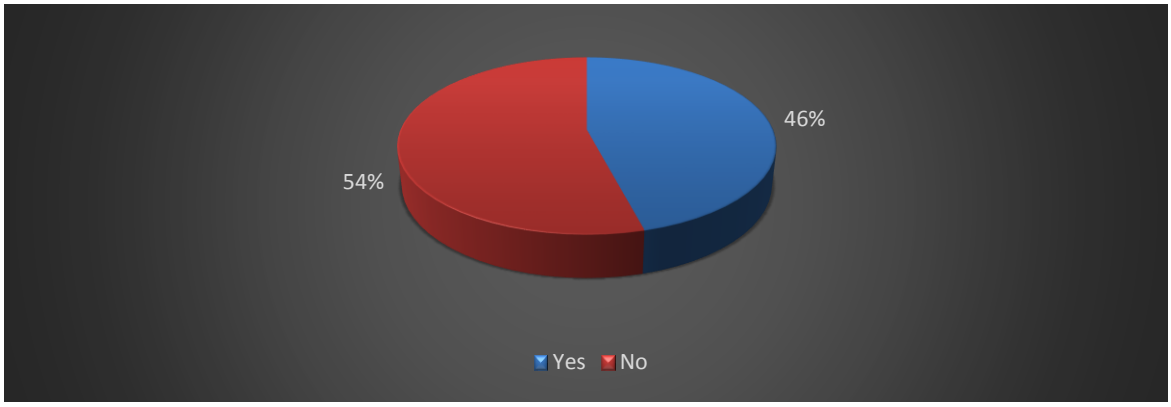

FIGURE 4.6: COMPLETED POST GRADUATE QUALIFICATION (n=98)

The following postgraduate qualifications were recorded:

- M.Fam.Med (n=16)
- M.Sports.Med (n=2)
- Diploma in anaesthetics (n=5)
- Diploma in HIV (n=6)
- Diploma in Dermatology (n=1)
- Certificate in Travel Medicine (n=1)
- Diploma in Obstetrics (n=2)
- Diploma in Diabetes (n=3)
- Diploma in Mental Health (n=1)
- Diploma in Public Health (n=1)

- Diploma in Palliative Care Medicine (n=2)
- Diploma in Occupational Health (n=1)
- Diploma in Aviation Medicine (n=1)
- Dive medical examiner (n=1)
- Certificate in Integrative Medicine (n=1)
- B.Sc.Med.Sc.Hons (Reproductive biology)

Some respondents listed ATLS (n=2) and ACLS (n=1), and other listed postgraduate degrees outside the medical filed like MBA (n=1), a Diploma in Strategic Management, B.Juris and Honours Degree in Psychology (n=1).

4.2.4 Employment

4.2.4.1 *Nature of Employment*

Respondents were given a choice of private practice, governmental (full-time), private hospital, governmental (part-time), unemployed or other. Respondents was requested to specify if they marked "other". Most of the respondents (61,4%) were in private practice, with 27,7% in full-time governmental appointment. None of the respondents were unemployed or in the employment of a private hospital. 5,9% of the doctors were in part-time governmental appointments and the remaining five percent responded as "other". All the respondents that indicated "other" indicated that they were in private practice with a sessional (part time governmental appointment) at a hospital or clinic or both (cf. Figure 4.7).

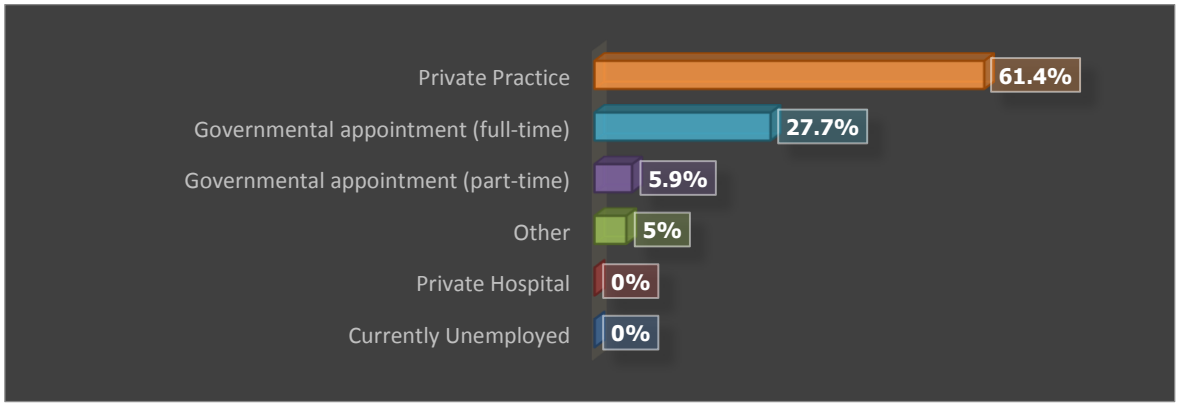

FIGURE 4.7: NATURE OF EMPLOYMENT (n=101)

4.2.4.2 *Area of Practice*

The questionnaires were sent out to general practitioners on available emails for addresses in small towns and rural areas in South Africa (cf. 1.1). The majority of respondents (83,2%) were from small towns (55,8%) and rural areas (27,4%). City/Urban was selected in 16,8% of the questionnaires (cf. Figure 4.8). This question was answered in 95 of the questionnaires (n=95) (cf. Figure 4.8).

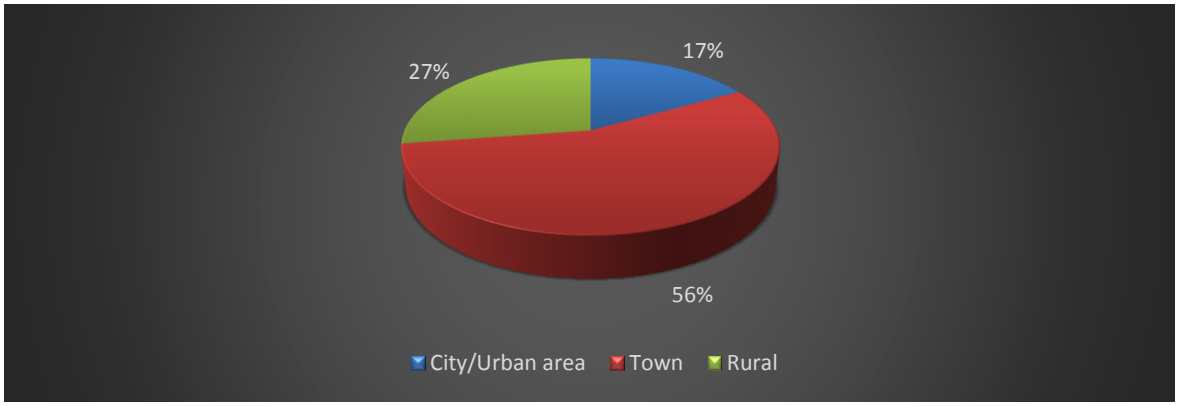

FIGURE 4.8: AREA OF PRACTICE (n=95)

4.2.4.3 *Province where practising*

The highest number of responses was from the Eastern Cape (42,4%), followed by the Free State (10,1%) and Gauteng (9,1%). The Western Cape, Kwazulu Natal and Northern Cape each recorded 8,1% of the responses. Limpopo (6,1%), Mphumalanga (4%) and Northern Province (4%) made up the remaining balance (cf. Figure 4.9).

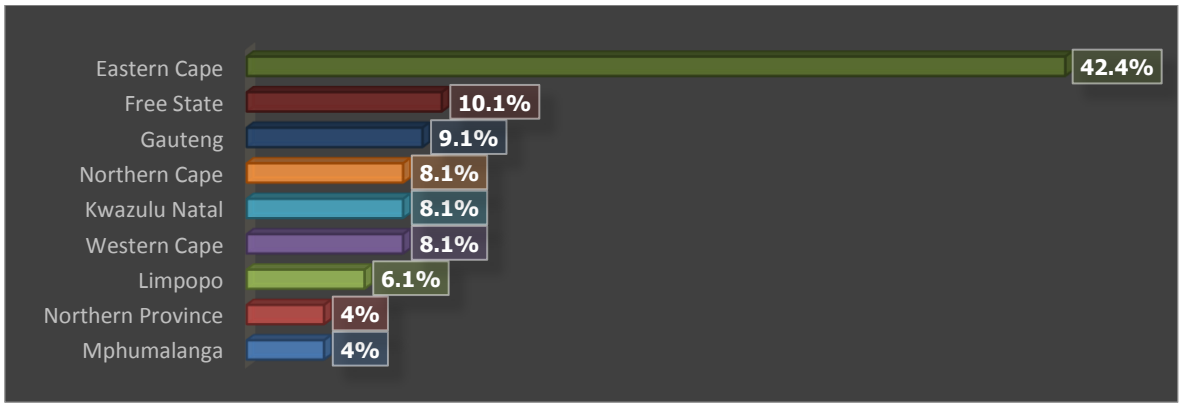

FIGURE 4.9: PROVINCE WHERE PRACTISING (n=98)

4.2.4.4 *Period at the current practice*

The average respondent was in his/her current practice for 13,85 years. The responses varied from less than 1 year in 4 cases to 40 years (n=2). A total of 97 respondents answered this question (cf. Table 4.1).

TABLE 4.1: PERIOD AT CURRENT PRACTICE

Less than 1 year: 4	**11 years:** 2	**23 years:** 4
1 year: 8	**12 years:** 1	**24 years:** 1
2 years: 2	**13 years:** 5	**25 years:** 2
3 years: 3	**14 years:** 4	**26 years:** 1
4 years: 5	**15 years:** 5	**27 years:** 1
5 years: 2	**16 years:** 2	**28 years:** 4
6 years: 2	**17 years:** 3	**30 years:** 3
7 years: 1	**18 years:** 2	**32 years:** 1
8 years: 2	**19 years:** 4	**34 years:** 2
9 years: 2	**20 years:** 3	**38 years:** 1
10 years: 12	**22 years:** 2	**40 years:** 2

Two thirds of the participants indicated that they were in practice for more than five years, 11,2% for less than a year and the rest one to five years (cf. Figure 4.10).

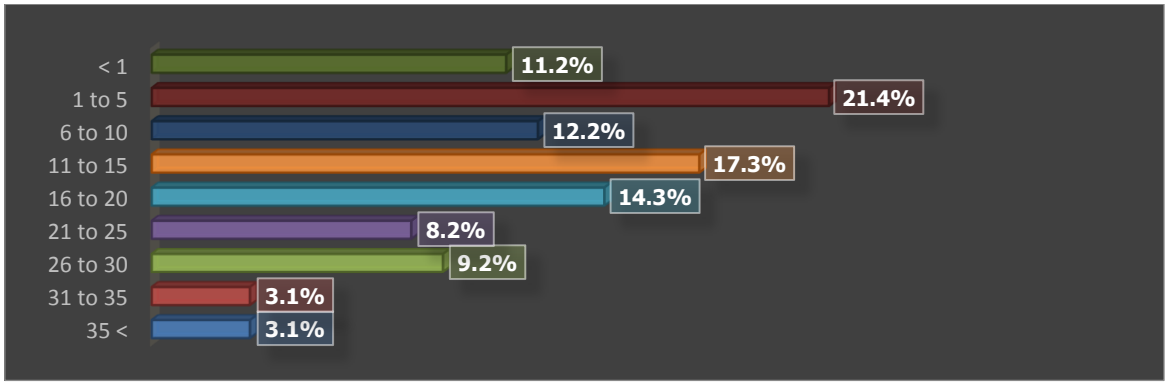

FIGURE 4.10: PERIOD AT CURRENT PRACTICE (n=98)

4.2.5 Discussion of demographic data

The age distribution was very even over the various decades and ranged from 24 to 73 years, with an average age of 43,6 and a median age of 46. This distribution was also present in the year of obtaining their basic medical qualification and the period the practitioners was in their current practice with an average of 13,85 years and 75% of respondents indicating that they were in their current practice for more than 5 years. This data is important to confirm the reliability of the data and also to bring under our attention that we are dealing with adult learners (cf. 2.9) with experience. A further confirmation of

this fact is the almost 50% of the respondents that has acquired a post graduate qualification.

Respondents from both genders were represented with 73% male and 27% female. There are respondents that qualified from all the major universities in South Africa, ten percent of the respondents qualified at international universities. All nine provinces were represented in the results and there is also good representation from the private and public sector. More than 80% of the respondents were from rural areas. The demographic data is confirmation of the trustworthiness of the study. The specific target population was sampled that further enhances the reliability of the data.

I am confident that the sample size and quality of the data is sufficient to use as a directive for a curriculum for a *Short Learning Programme for Essential Surgical Skills in Rural South Africa.*

4.3 CURRENT SURGICAL PRACTICE

4.3.1 Ophthalmology

This section of the questionnaire survey dealt with the current practice of commonly performed ophthalmology procedures. The individual procedures will be discussed below (cf. Figure 4.11).

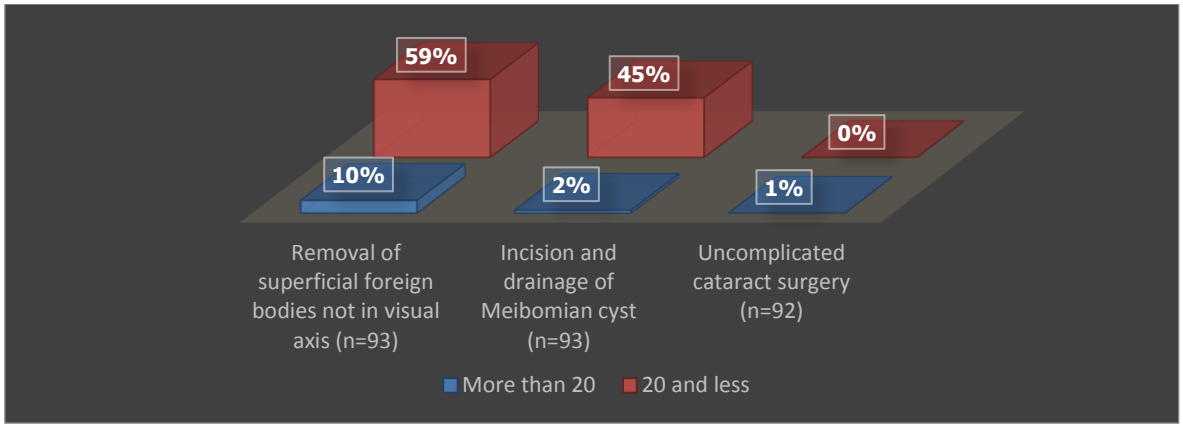

FIGURE 4.11: CURRENT SURGICAL PRACTICE – OPHTHALMOLOGY

Removal of superficial foreign body not in visual axis

This question was answered by 97 respondents in the questionnaire. Three respondents indicated that they performed this procedure in the past 12 months by answering yes, but

not indicating the number of cases. The remaining respondents all gave a specific number of cases performed. The average number of cases per respondent was 11,36 cases over the last 12 months (cf. Table 4.2).

TABLE 4.2: REMOVAL OF SUPERFICIAL FOREIGN BODIES NOT IN VISUAL AXIS

Yes : 3	**6 cases:** 2	**25 cases:** 3
1 case: 1	**8 cases:** 1	**30 cases:** 1
2 cases: 9	**9 cases:** 1	**35 cases:** 1
3 cases: 3	**10 cases:** 11	**40 cases:** 3
4 cases: 5	**15 cases:** 3	**100 cases:** 1
5 cases: 10	**20 cases:** 4	**Nil cases:** 30

Incision and drainage of Meibomian cyst

Fifty of the respondents did not perform this procedure over the past 12 months. Four respondents indicated by answering yes that they performed this procedure, and another 43 indicated the number of procedures that they performed over the past 12 months. A total of 97 respondents answered this question, with an average of 7 procedures performed by each of the 43 doctors that indicated a number of procedures over the past year (cf. Table 4.3).

TABLE 4.3: INCISION AND DRAINAGE OF MEIBOMIAN CYST

Yes: 4	**5 cases:** 11	**12 cases:** 1
1 case: 5	**6 cases:** 2	**15 cases:** 2
2 cases: 6	**7 cases:** 2	**20 cases:** 2
3 cases: 4	**8 cases:** 1	**30 cases:** 2
4 cases: 1	**10 cases:** 4	**Nil cases:** 50

Uncomplicated cataract surgery

One respondent of the 93 respondents that answered this question performed cataract surgery. This respondent performed 180 cataract procedures.

4.3.2 Ear, Nose and Throat Surgery

This section of the survey was concerned with the current practice regarding Ear, Nose and Throat Surgery. The procedure will be discussed separately and Figure 4.12 is a summary of the results in graph form.

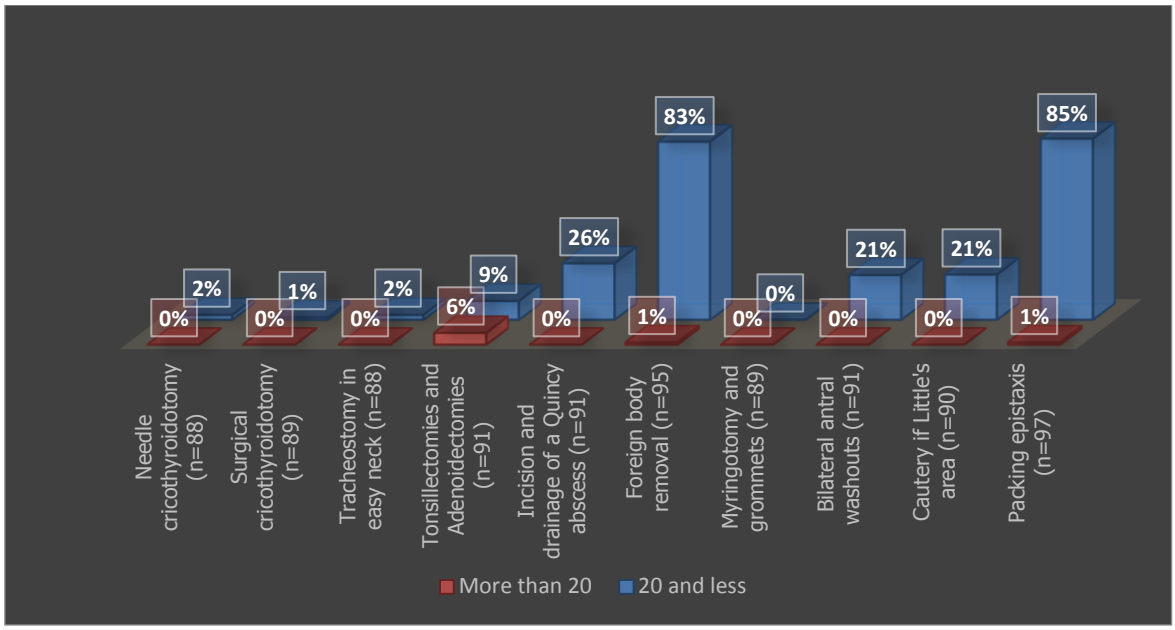

FIGURE 4.12: CURRENT SURGICAL PRACTICE – EAR, NOSE AND THROAT SURGERY

Needle cricothyroidotomy

Eighty nine of the 91 respondents did not perform this procedure in the past twelve months. One respondent performed one, the other respondent performed two.

Surgical cricothyroidotomy

A total of 91 respondents answered this question. Ninety respondents indicated that they did not perform surgical cricothyroidotomy during the time in question. The other respondent performed two procedures.

Tracheostomy in easy neck

Eighty eight respondents indicated that they did not perform this procedure. One respondent each indicated Yes, One and Two to make up the total of 91 respondents answering this question.

Tonsillectomies and adenoidectomies

Thirteen of the 93 respondents performed a total of 366 procedures over the time in question (cf. Table 4.4).

TABLE 4.4: TONSILLECTOMIES AND ADENOIDECTOMIES

Nil:80	**12 cases:** 1	**40 cases:** 1
3 cases: 2	**15 cases:** 2	**60 cases:** 1
6 cases: 1	**20 cases:** 1	**80 cases:** 1
10 cases: 1	**25 cases:** 1	**102 cases:** 1

Incision and drainage of a Quincy abscess

Hundred and one respondents answered this question, the majority (n=80) have not drained an abscess in the previous 12 months. A total of 53 procedures were performed by the respondents (cf. Table 4.5).

TABLE 4.5: INCISION AND DRAINAGE OF A QUINCY ABSCESS

Nil: 80	**2 cases:** 3	**6 cases:** 2
1 case: 13	**5 cases:** 2	**12 cases:** 1

Foreign body removal (ear and nose)

Of the total of 98 respondents answering this question 79 indicated that they have performed various numbers of this procedure over the past 12 months. A further 2 respondents indicated "yes", but did not indicated the number of procedures they have performed. A total of 456 procedures was recorded over the 12 month period (cf. Table 4.6).

TABLE 4.6: FOREIGN BODY REMOVED FROM EARS AND NOSE

Yes: 2	**4 cases:** 10	**10 cases:** 8
Nil: 17	**5 cases:** 18	**15 cases:** 1
1 case: 7	**6 cases:** 1	**20 cases:** 5
2 cases: 9	**7 cases:** 2	**30 cases:** 1
3 cases: 16	**8 cases:** 1	

Myringotomy or grommets

All the respondents, a total of 91 have indicated that they have not performed any myringotomies or grommet procedures.

Bilateral antral washouts

The respondents recorded a total of 133 procedures performed. These were performed by 19 practitioners of the total of 93 that answered this question. Seventy four have not performed any procedures (cf. Table 4.7).

TABLE 4.7: BILATERAL ANTRAL WASHOUTS

Nil: 74	**5 cases:** 1	**10 cases:** 5
1 case: 2	**6 cases:** 1	**20 cases:** 2
2 cases: 3	**7 cases:** 1	
3 cases: 3	**8 cases:** 1	

Cautery of Little's area

Nineteen of the total of 92 respondents answering this question performed a total of 78 cauterisations of Little's area. Seventy three practitioners have not performed any procedures in the previous twelve months (cf. Table 4.8).

TABLE 4.8: CAUTERY OF LITTLE'S AREA

Nil: 73	**3 cases:** 2	**6 cases:** 2
1 case: 2	**4 cases:** 2	**7 cases:** 1
2 cases: 4	**5 cases:** 5	**10 cases:** 1

Packing epistaxis

One hundred (n=100) respondents recorded answers at this question. Three indicated "Yes", two indicated "Few" and the rest a specific number. A total of 467 procedures were recorded (cf. Table 4.9).

TABLE 4.9: PACKING EPISTAXIS

Yes: 3	**2 cases:** 10	**6 cases:** 5	**11 cases:** 1
Few: 2	**3 cases:** 16	**7 cases:** 2	**15 cases:** 4
Nil: 14	**4 cases:** 7	**9 cases:** 1	**20 cases:** 2
1 case: 6	**5 cases:** 17	**10 cases:** 9	**26 cases:** 26

4.3.3 Abdominal Procedures

General practitioners were asked regarding their current practice regarding abdominal and general surgery procedures in this section of the questionnaire survey. Figure 4.13 is a bar graph representing the results, followed by a more detailed breakdown of the results.

Insert a Senstaken-Blakemore tube

None of the total of ninety (n=90) have performed this procedure over the previous twelve months.

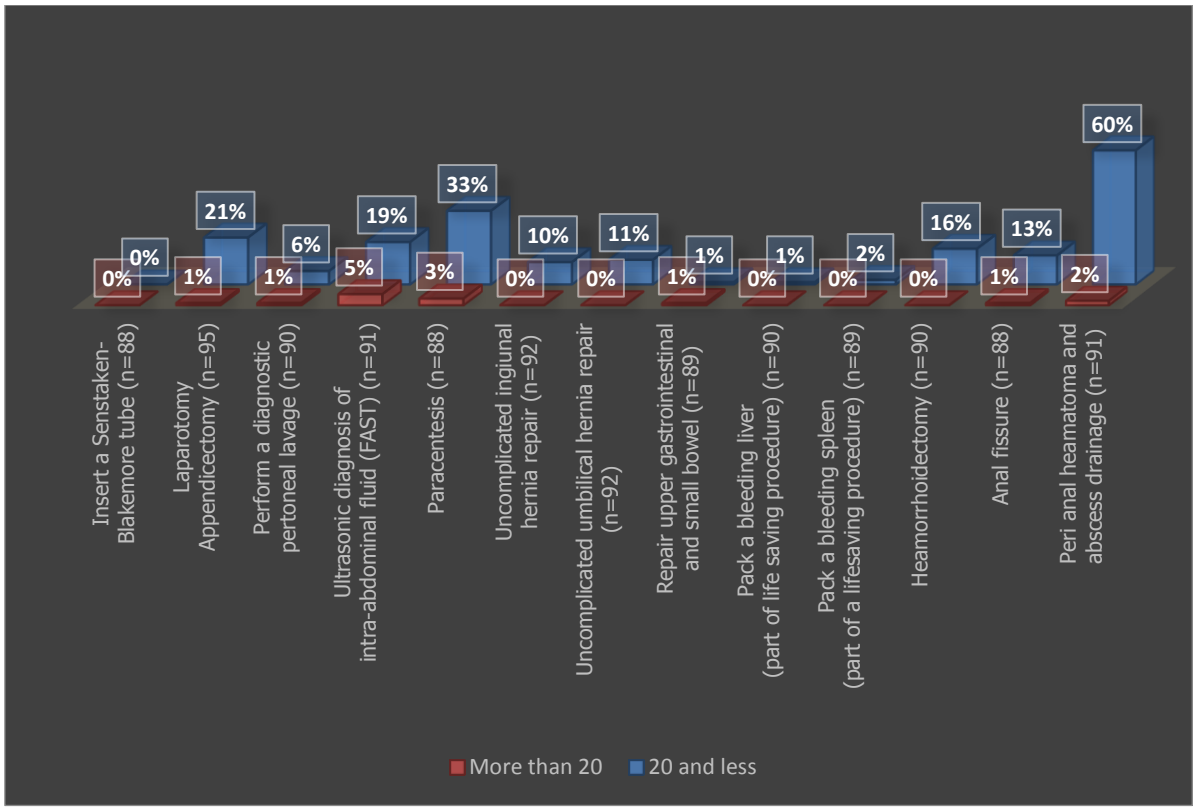

FIGURE 4.13: CURRENT SURGICAL PRACTICE – ABDOMINAL PROCEDURES

Appendectomy (open procedure)

Hundred and sixty-one appendectomies were performed by 21 of the 96 respondents that recorded responses. Seventy-five have not performed any appendectomies in the previous 12 months (cf. Table 4.10).

TABLE 4.10: OPEN APPENDECTOMIES PERFORMED

Nil: 75	**2 cases:**4	**5 cases:** 2	**10 cases:** 2	**15 cases:** 1
1 case: 7	**4 cases:** 2	**8 cases:** 1	**12 cases:** 1	**80 cases:** 1

Perform a diagnostic peritoneal lavage

The majority of practitioners did not perform this procedure, 88 of ninety-four indicated that they performed nil procedures. The practitioners that did perform diagnostic peritoneal lavages performed 60 procedures in total. Of this number 40 was performed by one respondent (cf. Table 4.11).

TABLE 4.11: DIAGNOSTIC PERITONEAL LAVAGE

Nil: 88	**5 cases:** 2	**40 cases:** 1
1 case: 2	**8 cases:** 1	

Ultrasonic diagnosis of intra-abdominal fluid (FAST)

Fifty-eight of the total of ninety-one (n=91) did not perform this procedure, a total of 349 procedures were performed by practitioners that indicated one or more procedures (cf. Table 4.12).

TABLE 4.12: ULTRASONIC DIAGNOSIS OF INTRA-ABDOMINAL FLUID (FAST)

Yes: 2	**1 case:** 3	**4 cases:** 4	**10 cases:** 4	**30 cases:** 1
Few: 1	**2 cases:** 2	**5 cases:** 6	**15 cases:** 1	**60 cases:** 1
Nil: 58	**3 cases:** 3	**7 cases:** 1	**20 cases:** 3	**75 cases:** 1

Uncomplicated inguinal hernia repair

Ninety-four of the respondents answered this question. Eighty-five practitioners did not perform any inguinal hernia repairs, the nine that did performed a total of 49 procedures between them (cf. Table 4.13).

TABLE 4.13: UNCOMPLICATED INGUINAL HERNIA REPAIR

Nil: 85	**2 cases:** 1	**4 cases:** 1	**10 cases:** 1
1 case: 2	**3 cases:** 1	**5 cases:** 2	**12 cases:** 1

Uncomplicated umbilical hernia repair

A total of 94 respondents (n=94) recorded responses to this question. Eighty-five did not perform any umbilical hernia repairs over the past 12 months. A total of 38 repairs were performed between nine practitioners (cf. Table 4.14).

TABLE 4.14: UNCOMPLICATED UMBILICAL HERNIA REPAIR

Nil: 85	**3 cases:**2	**9 cases:** 1
1 case: 3	**5 cases:** 2	**10 cases:** 1

Repair upper gastrointestinal and small bowel perforations

Only 2 of the respondents indicated that they performed this procedure. Eighty-nine of the 91 respondents did not perform any procedures in the past twelve months (cf. Figure 4.14).

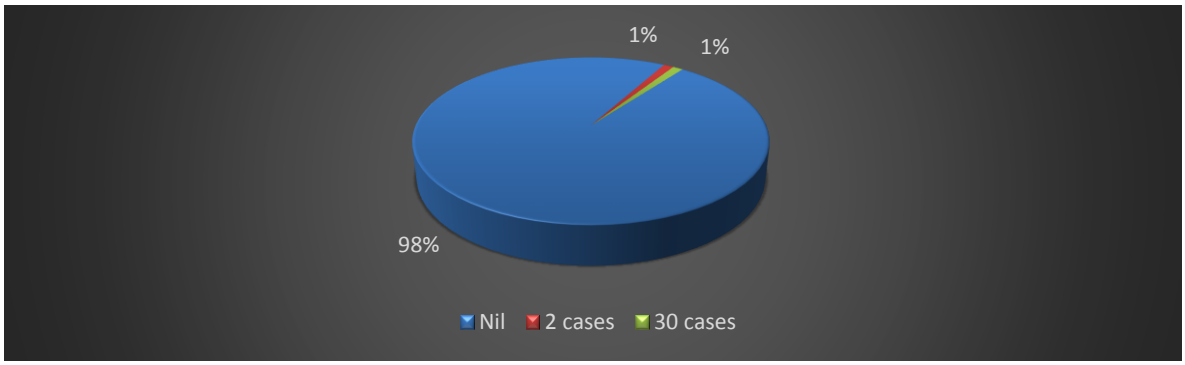

FIGURE 4.14: REPAIR OF UPPER GASTROINTESTINAL AND SMALL BOWEL PERFORATIONS

Pack a bleeding liver (part of life saving procedure)

Ninety-two (n=92) practitioners responded on this question, only one respondent indicated that he/she performed this procedure. The respondent performed 5 cases (cf. Figure 4.15).

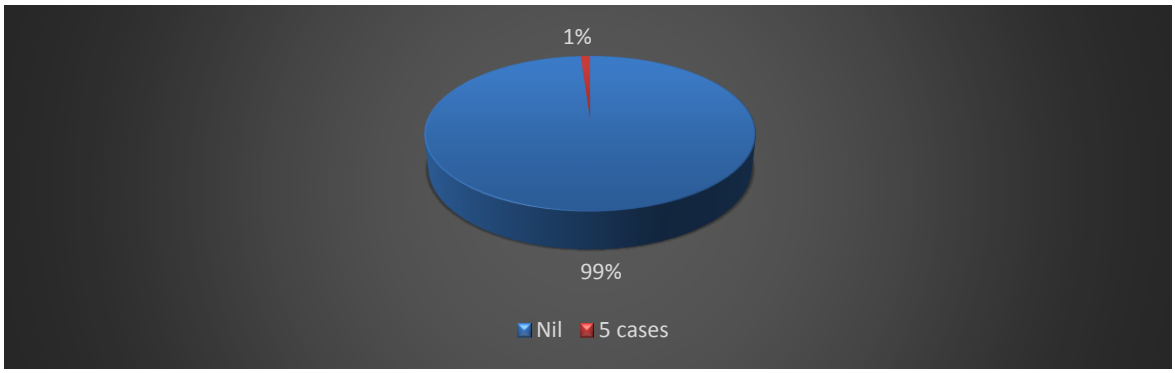

FIGURE 4.15: PACK A BLEEDING LIVER

Pack a bleeding spleen (part of a lifesaving procedure)

Two respondents of the ninety-one (n=91) that answered this question performed this procedure. A total of 4 procedures were performed (cf. Figure 4.16).

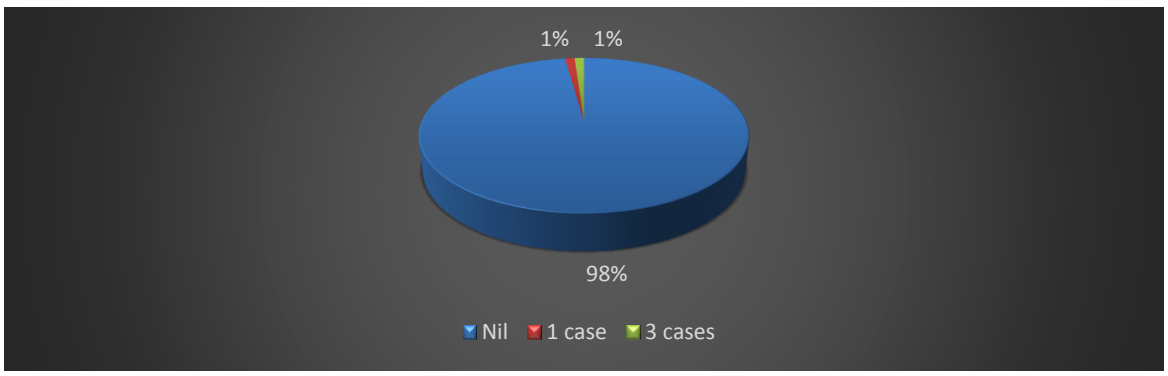

FIGURE 4.16: PACK A BLEEDING SPLEEN

Heamorrhoidectomy

A total of ninety-eight (n=98) practitioners responded on this question. The majority (78) did not perform any heamorrhoidectomies. Sixty-five procedures were performed by 11 respondents (cf. Table 4.15).

TABLE 4.15: HEAMORRHOIDEDECTOMY

Nil: 78	**3 cases:** 3	**5 cases:** 1	**10 cases:** 1
1 case: 5	**4 cases:** 2	**9 cases:** 1	**17 cases:** 1

Sphincterotomy for anal fissure

Once again only ninety-eight (n=98) of the respondents answered this question. Seventy-nine did not perform this procedure at all over the past twelve months. Seventy-four procedures was performed by the practitioners that reacted positively on this question (cf. Table 4.16).

TABLE 4.16: SPHINCTEROTOMY FOR ANAL FISSURE

Nil: 79	**2 cases:** 1	**7 cases:** 1	**13 cases:** 1
1 case: 1	**3 cases:** 1	**10 cases:** 2	**24 cases:** 1

Peri anal heamatoma and abscess drainage

This is one of the most commonly performed procedure among practitioners recording responses in this questionnaires. Ninety-two respondents performed a total of 511 procedures. A further two responded "Yes" and "Few" to this question (cf. Table 4.17).

TABLE 4.17: PERI ANAL HEAMATOMA AND ABSCESS DRAINAGE

Nil: 37	**3 cases:** 6	**6 cases:** 1	**12 cases:** 2	**20 cases:** 1
1 case: 13	**4 cases:** 4	**10 cases:** 4	**15 cases:** 1	**30 cases:** 1
2 cases: 13	**5 cases:** 6	**11 cases:** 1	**16 cases:** 1	**166 cases:** 1

4.3.4 Vascular Procedures

The participants were asked how many vascular cut downs and uncomplicated amputations they performed in the previous twelve months (cf. Figure 4.17).

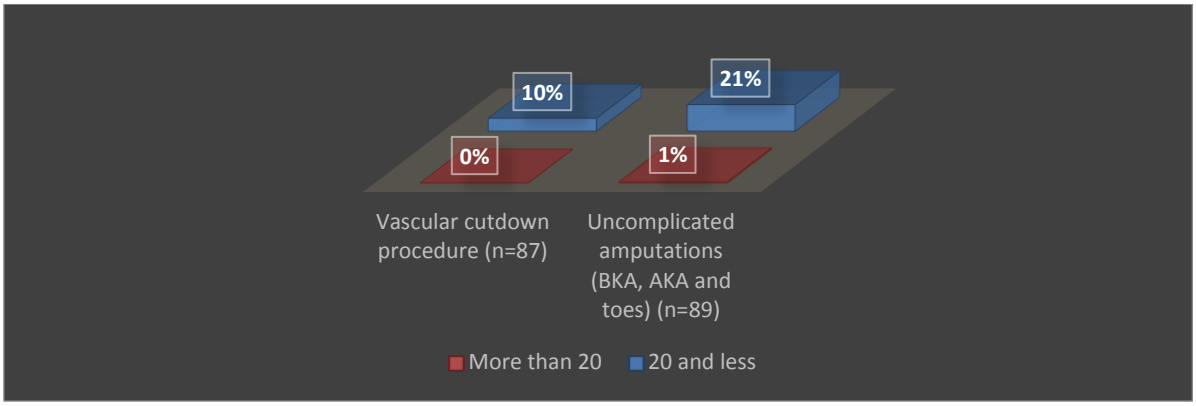

FIGURE 4.17: CURRENT SURGICAL PRACTICE – VASCULAR PROCEDURES

Vascular cut down procedure

Ninety respondents (n=90) recorded responses to this question. Thirty-five vascular cut downs were performed in total. One respondent answered "Yes" (cf. Table 4.18).

TABLE 4.18: VASCULAR CUTDOWN PROCEDURE

Nil: 80	**2 cases:** 2	**6 cases:** 1
1 case: 4	**4 cases:** 1	**17 cases:** 1

Uncomplicated amputations (BKA, AKA or toes)

Hundred and twenty-four amputations was performed by 20 of the ninety-two (n=92) respondents (cf. Table 4.19).

TABLE 4.19: UNCOMPLICATED AMPUTATIONS

Yes: 1	**2 cases:** 5	**5 cases:** 3	**12 cases:** 1
Nil: 71	**3 cases:** 2	**6 cases:** 1	**20 cases:** 1
1 case: 2	**4 cases:** 2	**10 cases:** 2	**25 cases:** 1

4.3.5 Skin and Soft Tissue Procedures

As with the previous questions in this section of the survey the results are first show in graph form before discussing each procedure individually. Figure 4.18 shows the percentage of practitioners that performed more than 20 operations in the previous 12 months falling under skin and soft tissue procedures.

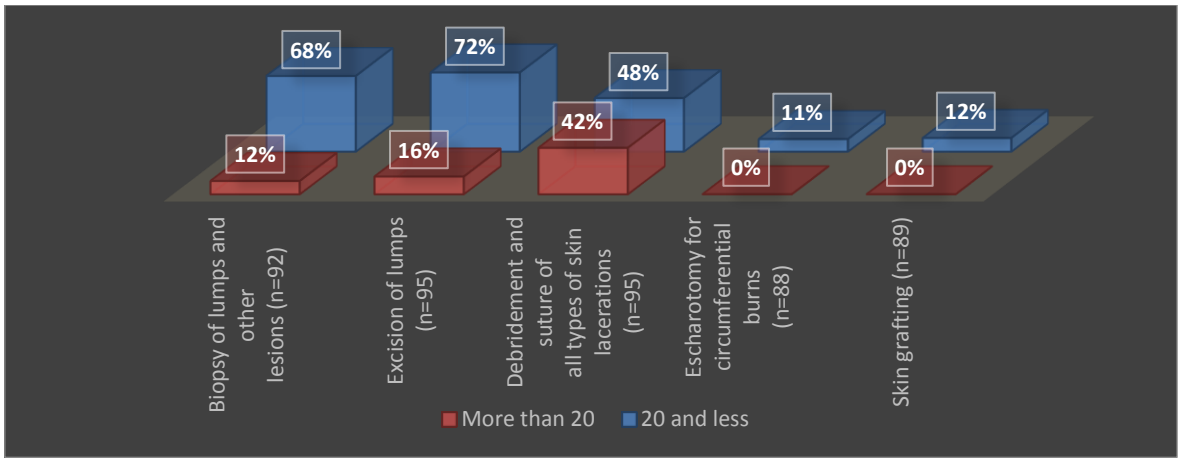

FIGURE 4.18: CURRENT SURGICAL PRACTICE – SKIN AND SOFT TISSUE PROCEDURES

Biopsy of lumps and other lesions

The majority of the respondents performed biopsies of lumps in the past twelve months. Only 17 of the 93 respondents did not perform biopsies. A total of 1018 biopsies were performed (cf. Table 4.20).

TABLE 4.20: BIOPSY OF LUMPS AND OTHER LESIONS

Yes: 1	**2 cases:** 4	**6 cases:** 5	**13 cases:** 1	**25 cases:** 1	**49 cases:** 1
Few: 1	**3 cases:** 3	**7 cases:** 3	**15 cases:** 1	**30 cases:** 4	**60 cases:** 1
Nil: 17	**4 cases:** 3	**10 cases:** 15	**20 cases:** 8	**40 cases:** 2	**100 cases:** 1
1 case: 2	**5 cases:** 15	**12 cases:** 2	**21 cases:** 1	**45 cases:** 1	

Excision of lumps

A total of 1158 excisions were performed by 83 of 98 respondents answering this question. Thirteen practitioners did not perform any excision, while one responded with "Yes" and another with "Few" (cf. Table 4.21).

TABLE 4.21: EXCISION OF LUMPS

Yes: 1	**2 cases:** 10	**6 cases:** 3	**15 cases:** 3	**25 cases:** 3	**54 cases:** 1
Few: 1	**3 cases:** 5	**8 cases:** 2	**19 cases:** 1	**30 cases:** 3	**60 cases:** 1
Nil: 13	**4 cases:** 6	**10 cases:** 15	**20 cases:** 6	**40 cases:** 1	**120 cases:** 1
1 case: 6	**5 cases:** 10	**12 cases:** 1	**24 cases:** 1	**50 cases:** 4	

Debridement and suture of all types of skin lacerations

Eighty-six respondents recorded answers on this question. Only 8 practitioners did not perform this procedure during the past twelve months. This is by far the most common

procedure performed with 2852 confirmed cases, and another respondent answering "too many." Another practitioner answered "yes" to the question (cf. Table 4.22).

TABLE 4.22: DEBRIDEMENT AND SUTURE OF ALL TYPES OF SKIN LACERATIONS

Yes :1	**3 cases:** 2	**9 cases:** 1	**20 cases:** 10	**50 cases:** 9	**132 cases:** 1
Too many: 1	**4 cases:** 2	**10 cases:** 10	**24 cases:** 1	**59 cases:** 1	**150 cases:** 1
Nil: 8	**5 cases:** 5	**11 cases:** 1	**25 cases:** 1	**96 cases:** 1	**160 cases:** 1
1 case: 1	**6 cases:** 4	**12 cases:** 3	**35 cases:** 1	**100 cases:** 6	**200 cases:** 1
2 cases: 2	**7 cases:** 2	**18 cases:** 1	**40 cases:** 3	**120 cases:** 1	

Escharotomy for circumferential burns

Eighty of the ninety-two (n=92) respondents did not perform this procedure in the twelve months prior to answering the questionnaires. One respondent recorded "few" at this question and the rest a specific number of procedures performed. Twenty-eight procedures were performed by the practitioners indicating a specific number (cf. Table 4.23).

TABLE 4.23: ESCHAROTOMY FOR CIRCUMFERENTIAL BURNS

Nil: 80	**2 cases:** 2	**4 cases:** 1
1 case: 2	**3 cases:** 1	**5 cases:** 3

Skin grafting

As with the previous question eighty of the respondents did not perform this procedure during the time in question. The total number of practitioners that answered this question was ninety-one (n=91). Forty-nine procedures were recorded (cf. Table 4.24).

TABLE 4.24: SKIN GRAFTING

Nil: 80	**2 cases:** 2	**5 cases:** 1
1 case: 1	**3 cases:** 4	**10 cases:** 3

4.3.6 Orthopaedic Procedures

Figure 4.19 is representing the percentage of general practitioners indicating that they performed more than 20 procedures that they were questioned on in the questionnaire survey. The procedures are also discussed separately.

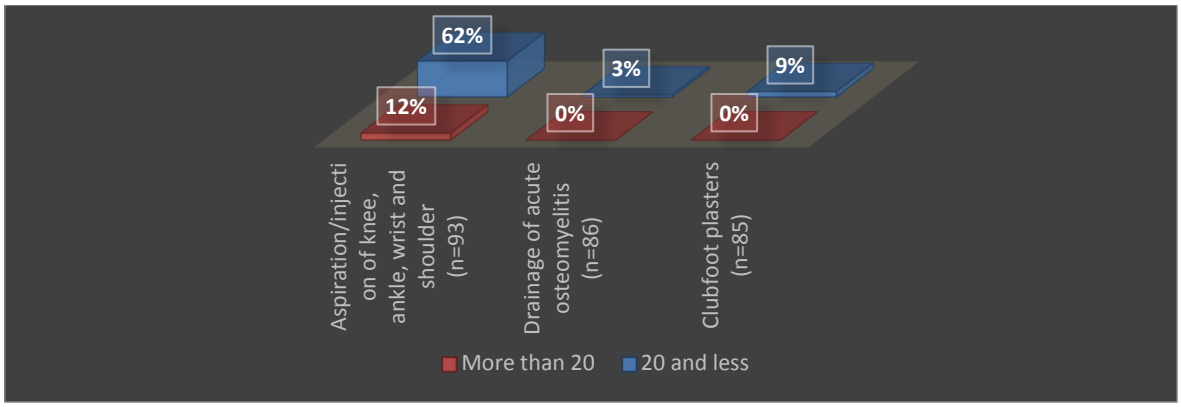

FIGURE 4.19: CURRENT SURGICAL PRACTICE – ORTHOPAEDIC PROCEDURES

Aspiration/injection of knee, ankle, wrist and shoulder

One thousand, three hundred and fifty-one procedures were recorded over the time in question. A total of ninety-five (n=95) answers were counted, 25 of which was "Nil" and one "Yes." The other respondents entered a specific number of procedures as indicated in Table 4.25.

TABLE 4.25: ASPIRATION OF KNEE, ANKLE, WRIST AND SHOULDER

(Table continue on next page)

Yes: 1	**9 cases:** 2	**40 cases:** 1
Nil: 25	**10 cases:** 9	**45 cases:** 1
1 case: 5	**11 cases:** 1	**46 cases:** 1
2 cases: 11	**12 cases:** 2	**50 cases:** 1
3 cases: 4	**13 cases:** 1	**55 cases:** 1
4 cases: 2	**15 cases:** 2	**100 cases:** 1
5 cases: 6	**20 cases:** 4	**200 cases:** 1
6 cases: 5	**28 cases:** 1	**300 cases:** 1
8 cases: 3	**30 cases:** 3	

Drainage of acute osteomyelitis

A total of eighty-seven (n=87) responses were recorded. Only 2 practitioners performed this during the twelve month period in questioning (cf. Table 4.26).

TABLE 4.26: DRAINAGE OF ACUTE OSTEOMYELITIS

Nil: 85	**1 case:** 1	**6 cases:** 1

Clubfoot plasters

As with the previous question very few practitioners indicated that they have performed this procedure in the year running up to the questionnaire. Eighty-eight (n=88) responses were registered. Seventy nine respondents indicated that they did not perform any clubfoot

plasters, one said "Yes", the other eight specified the number of procedures performed (cf. Table 4.27).

TABLE 4.27: CLUBFOOT PLASTERS

Yes: 1	**Nil:** 79	**1 case:** 5	**3 cases:** 2	**13 cases:** 1

4.3.7 Urological Procedures

A variety of urological procedures are performed in general practice (cf. Figure 4.0).

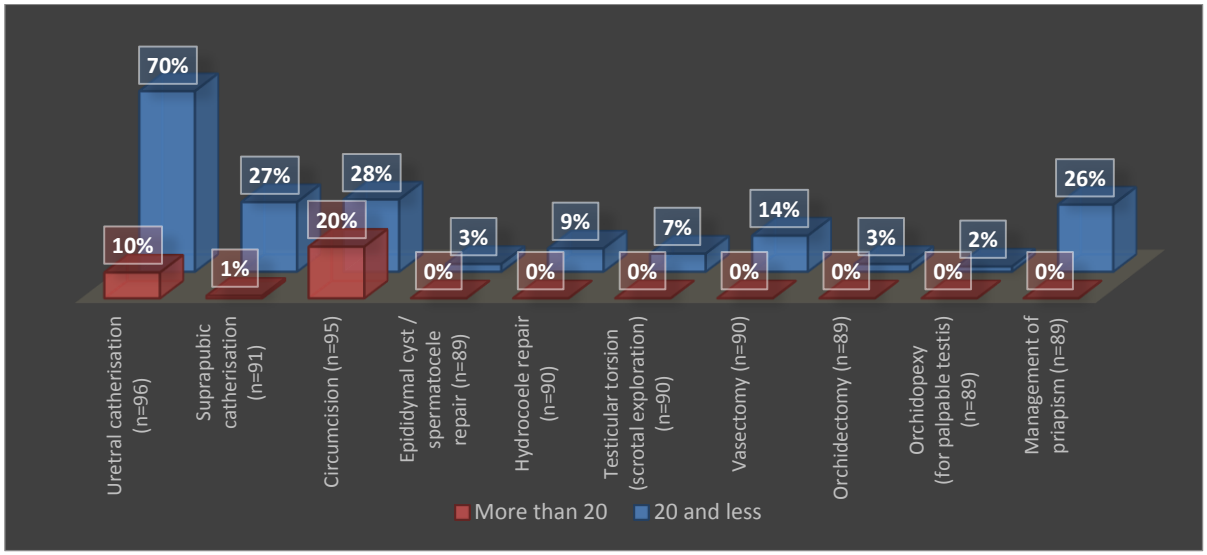

FIGURE 4.20: CURRENT SURGICAL PRACTICE – UROLOGICAL PROCEDURES

Uretral catherisation

Eighty-three of the ninety-nine (n=99) respondents recorded positive responses with this question. Of these, one respondent said "Yes", one "Multiple", two "Few" and the remaining respondents registered 947 procedures (cf. Table 4.28).

TABLE 4.28: URETRAL CATHERISATION

Few: 1	**1 case:** 4	**5 cases:** 9	**10 cases:** 15	**17 cases:** 1	**30 cases:** 1	**50 cases:** 3
Multiple: 1	**2 cases:** 8	**6 cases:** 4	**12 cases:** 2	**20 cases:** 7	**31 cases:** 1	**60 cases:** 1
Yes: 2	**3 cases:** 8	**7 cases:** 1	**15 cases:** 4	**24 cases:** 1	**34 cases:** 1	
Nil: 16	**4 cases:** 2	**9 cases:** 2	**16 cases:** 1	**25 cases:** 1	**40 cases:** 1	

Suprapubic catherisation

Twenty-six of the ninety-three (n=93) respondents performed 101 procedures during the time in question, two answered "Yes" and one respondent answered "2 in lifetime" (cf. Table 4.29).

TABLE 4.29: SUPRAPUBIC CATHERISATION

Yes: 2	**1 case:** 63	**4 cases:** 2	**10 cases:** 3
Two in lifetime: 1	**2 cases:** 7	**5 cases:** 2	**60 cases:** 1
Nil: 63	**3 cases:** 2	**6 cases:** 4	

Circumcision

A total of 1404 procedures were performed by forty three of the ninety-five (n=93) practitioners recording a response. Forty-nine did not perform any circumcisions, while one said yes, but did not indicated the number of procedures performed (cf. Table 4.30).

TABLE 4.30: CIRCUMCISION

Yes: 1	**4 cases:** 2	**12 cases:** 2	**24 cases:** 1	**38 cases:** 1	**100 cases:** 2
Nil: 49	**5 cases:** 5	**15 cases:** 1	**25 cases:** 1	**45 cases:** 1	**150 cases:** 1
2 cases: 3	**6 cases:** 2	**16 cases:** 1	**30 cases:** 2	**50 cases:** 6	**168 cases:** 1
3 cases: 2	**10 cases:** 4	**20 cases:** 6	**32 cases:** 2	**60 cases:** 1	

Epididimal cyst or spermatocele repair

Ninety (n=90) practitioners gave feedback on this question, only three performed this procedure in the twelve months in question (cf. Table 4.31).

TABLE 4.31: EPIDIDIMAL CYST OR SPERMATOCELE REPAIR

Nil : 87	**3 cases:** 1	**7 cases:** 1	**10 cases:** 1

Hydrocele repair

Ninety-two respondents answered this question. Eighty-three did not perform any procedure, nine practitioners performed a total of 33 procedures during the time in question (cf. Table 4.3).

TABLE 4.32: HYDROCELE REPAIR

Nil: 83	**1 case:** 3	**2 cases:** 2	**3 cases:** 3	**15 cases:** 1

Testicular torsion (scrotal exploration)

Ninety-three practitioners answered this question. Twenty seven procedures were performed by seven of the respondents (cf. Table 4.33).

TABLE 4.33: SCROTAL EXPLORATION FOR TESTICULAR TORSION

Nil: 83	**1 case:** 3	**2 cases:** 1	**5 cases:** 1	**8 cases:** 1	**9 cases:** 1

Vasectomy

Ninety-three (n=93) respondents answered this question. The majority (seventy-nine) indicated that they did not perform any vasectomies during the time in question. A total of 65 vasectomies were performed by fourteen practitioners (cf. Table 4.34).

TABLE 4.34: VASECTOMY

Nil: 79	**2 cases:** 6	**4 cases:** 2	**6 cases:** 1	**20 cases:** 1
1 case: 1	**3 cases:** 1	**5 cases:** 1	**10 cases:** 1	

Orchidectomy

Three practitioners out of a total of ninety two performed an orchidectomy. A total of nine procedures were performed by three respondents (cf. Table 4.3).

TABLE 4.35: ORCHIDECTOMY

Nil: 89	**2 cases:** 2	**5 cases:** 1

Orchidopexy (for palpable testis)

A total of ninety-two (n=92) respondents answered this question. One practitioner performed five and another performed eight orchidopexies. Ninety indicated that they did not perform this procedure during the twelve month period in question. Thirteen cases were recorded (cf. Table 4.3).

TABLE 4.36: ORCHIDOPEXY

Nil: 90	**5 cases:** 1	**8 cases:** 1

Management of priapism

Ninety seven cases were recorded by 34 practitioners. Ninety-nine practitioners recorded responses, 65 indicated that they did not perform this at all (cf. Table 4.37).

TABLE 4.37: MANAGEMENT OF PRIAPISM

Nil: 65	**1 case:** 7	**2 cases:** 15	**3 cases:** 3	**5 cases:** 3	**6 cases:** 6

4.3.8 Discussion of current surgical practice results

Looking at the **Ophthalmology** results confirmed essential nature of *removal of a superficial foreign object not in the visual axis* that was performed by two thirds and *incision and drainage of a Meibomian cyst* by half of the respondents in the previous twelve months. As opposed to this, *uncomplicated cataract surgery* was only performed by one respondent. This is in stark contrast to other developing countries like India, Nepal, Indonesia and rural China where rural cataract surgery is commonly performed (Li, Cui, Zhang, Liu & Yang, 2009:78-83; Bani, Wang & Congdon 2012:155-161; Li, Song, Wu, Xu, Jin, Wang & Liu 2014:161-168; Vijaya, George, Rashima, Raju, Arvind, Baskaran & Ve 2010:223-228 and Gurung, Shrestha, Müller & Ruit 2011:501-505).

Respondents were asked regarding their current practice in various **Ear, Nose and Throat** procedures. I was not surprised that most respondents did not perform a *needle cricothyroidotomy, surgical cricothyroidotomy* or *tracheostomy in easy neck*. Especially the first two procedures are used in life threatening emergencies, fortunately not something that general practitioners have to deal with on a regular basis, but still life-saving if needed. *Tonsillectomies and adenoidectomies* are elective procedures and were performed by 14 % of the respondents. Twenty-one of 101 respondents performed *drainage of a Quincy abscess* in the previous twelve months. This is a life-threatening emergency that can cause airway obstruction and an essential skill for rural areas. *Foreign body removal (ear and nose)* were performed by the majority of respondents confirming the common nature of this problem. *Grommets or myringotomies* and *bilateral antral washouts* are not emergency procedures, but performed for common conditions. Despite this, most respondents did not perform these procedures. The fact that dealing with nose bleeding is a common problem was confirmed by the recorded responses with 86% of participants indicating that they *packed a nose bleeding* in the previous twelve months. Very few participants performed *cauterization of Little's area* for nose bleeding.

The next section of the questionnaire dealt with current **Abdominal Procedures** performed. *Senstaken-Blakemore tube insertion* is used to control or arrest bleeding from variceal bleeding in the oesophagus and upper stomach area. Although this was included in the questionnaire after a literature study and document analysis I have personally never seen or used one before. The general condition of a patient in need of this is very ill (Child C) liver failure patient whose condition exceeds the capabilities of rural hospitals. The placement can however buy some needed time to transfer the patient to a referral centre.

The Blakemore-Senstaken tube is expensive and has a limited shelf life. Appendectomies were performed by 22% of the participants. With modern antibiotics non-perforated appendicitis is not a surgical emergency and can in selected cases even be treated with antibiotics alone (Sallinen, Akl, You, Agarwal, Shoucair, Vandvik, Agoritsas, Heels-Ansdell, Guyatt & Tikkinen 2016:656-667; Lima Rocha,Bianco Rossi,Souza Pessoa,Dias Campos, Fonseca Pires & Steinman 2015:1-6). This might explain the low numbers. A *diagnostic peritoneal lavage* and *ultrasonic diagnosis of intra-abdominal fluid (FAST)* are diagnostic aids for blunt abdominal trauma. The need to perform this will be dependent on the incidence of trauma and in case of FAST the availability of an ultrasound machine. The *repair of upper gastrointestinal and small bowel perforations* (including perforated peptic ulcers), *packing of bleeding spleen and liver (as part of life saving procedure)* was not commonly performed, but it is lifesaving. *Inguinal hernia and umbilical hernia repair* procedures are very simple procedures to perform, it is a surprise that so few procedures were recorded in the past few months. The fact that is mostly elective and can therefore safely be referred and the lack of adequate training can explain this result. *Sphincterotomies* and *haemorrhoidectomies* as with the hernia repairs were not commonly performed. The *drainage of perianal haematomas and abscesses* were the most commonly performed of all the procedures under **Abdominal Procedures** in the questionnaire.

Under **Vascular Procedures** participants had to indicate the number of *vascular cutdowns* and *uncomplicated amputations* they performed. *Vascular cut down* procedure is a very important skill that is needed to gain venous access for important treatment and an important skill although not commonly needed. Amputations are a very handy skill and toes can very often be amputated with local blocks. Above and below knee amputations can be lifesaving in cases of wet gangrene where time is of the essence.

Skin and Soft Tissue Procedures including *biopsy of lumps, excision of lumps* and *debridement and suturing of all types of skin lacerations* were commonly performed by the majority of the participants. The majority of respondents did not perform *skin grafts* or *escharotomies for circumferential burns*. Escharotomies in circumferential burns of limbs are limb saving although maybe not a common condition dealt with by general practitioners.

Aspiration/injection of knee, ankle, wrist and shoulder procedure was performed by the majority of respondents. This confirms the common need for this procedure. The other **Orthopeadic Procedures** (*drainage of acute osteomyelitis* and *clubfoot plasters*) were performed by only a few of the respondents.

Urethral catherisation is one of the **Urological Procedures** that was performed by most of the respondents. Although only a third of the respondents performed a *suprapubic catheter insertion* it is a very handy skill and an easy one to acquire. Half of the respondents performed *circumcisions*, but all the respondents indicated that it was multiple procedures. *Epididimal cyst or spermatocele repair* and *hydrocele repair* are currently not generally performed. *Testicular torsion (scrotal exploration)* is an emergency and a delay is associated with necrosis and loss of the testis in question. The majority of respondents did not perform or had to perform the procedure in the previous twelve months. *Vasectomy, orchidectomy* and *orchidopexy* were not generally performed. The *management of priapism* was done by a third of the repondents. As with a torsion of the testis, a time delay in these cases equates to a worse outcome and should rather be dealt with promptly.

It will be interesting to compare the current practice with the respondents' opinion of what they deem as essential surgical skills for rural South Africa as will be discussed in the next section.

4.4 OPINION REGARDING ESSENTIAL SURGICAL SKILLS NEEDED IN RURAL SOUTH AFRICA

In this part of the questionnaire the respondents were requested to indicate whether they thought that the procedure in question was essential, useful or not needed in their practice. The results were expressed in graph form and were grouped in the different surgical fields.

4.4.1 Ophthalmology Procedures

The respondents were asked to indicate their opinion regarding uncomplicated cataract surgery (n=101), incision and drainage of Meibomian cyst (n=102) and removal of foreign object, not in visual axis (n=102). A modified Likert scale was utilised (cf. Figure 4.21).

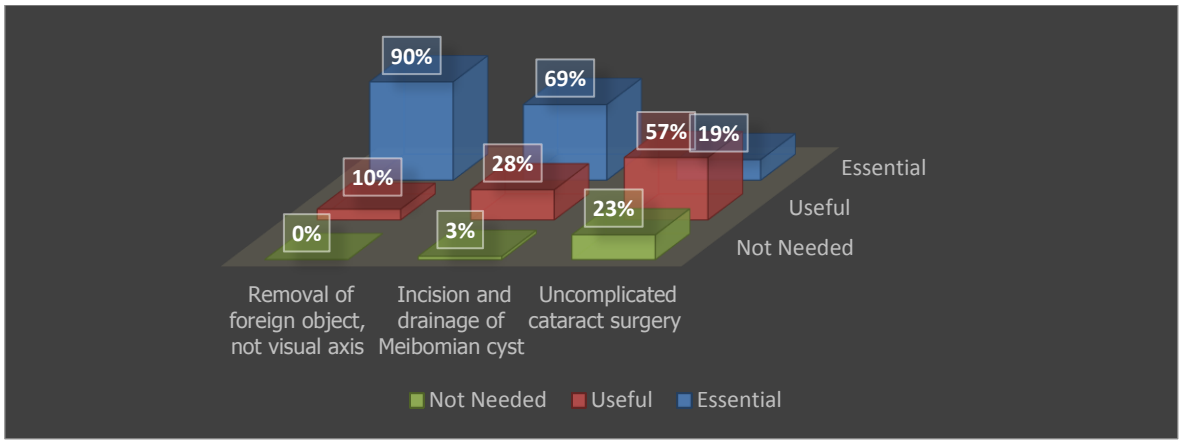

FIGURE 4.21: ESSENTIAL SURGICAL SKILLS – OPHTHALMOLOGY PROCEDURES (n=101)

More than 50% of respondents indicated that *Incision and drainage of Meibomian cyst* and *Removal of Foreign Object* are essential surgical skills. When participants were asked regarding their current (cf. 4.3.1) practice 2% and 10% indicated that they performed more than 20 of these procedures per year.

4.4.2 Ear, Nose and Throat Surgery

The participants had to indicate whether the specific Ear, Nose and Throat Surgery procedures is essential, useful or not useful. In current practice (cf. 4.3.2) the only procedures that were performed more than 20 times per year by some practitioners were Tonsillectomies and Foreign body removal. There were 101 respondents to this question that was answered on a modified Likert scale (cf. Figure 4.22).

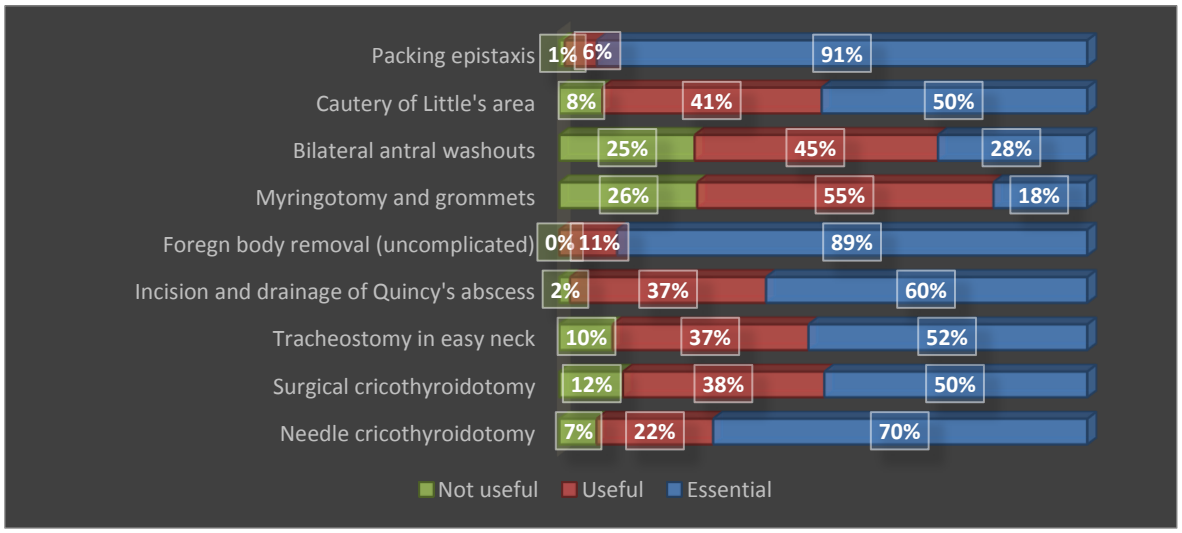

FIGURE 4.22: ESSENTIAL SURGICAL SKILLS – EAR, NOSE AND THROAT SURGERY (n=101)

4.4.3 Abdominal Surgery

General practitioners were asked which Abdominal Surgery procedures they considered to be essential, useful and not useful in rural South Africa on a Likert scale. Participants indicated that in their current practice (cf. 4.3.3) that they perform a variety of these procedures (cf. Figure 4.23).

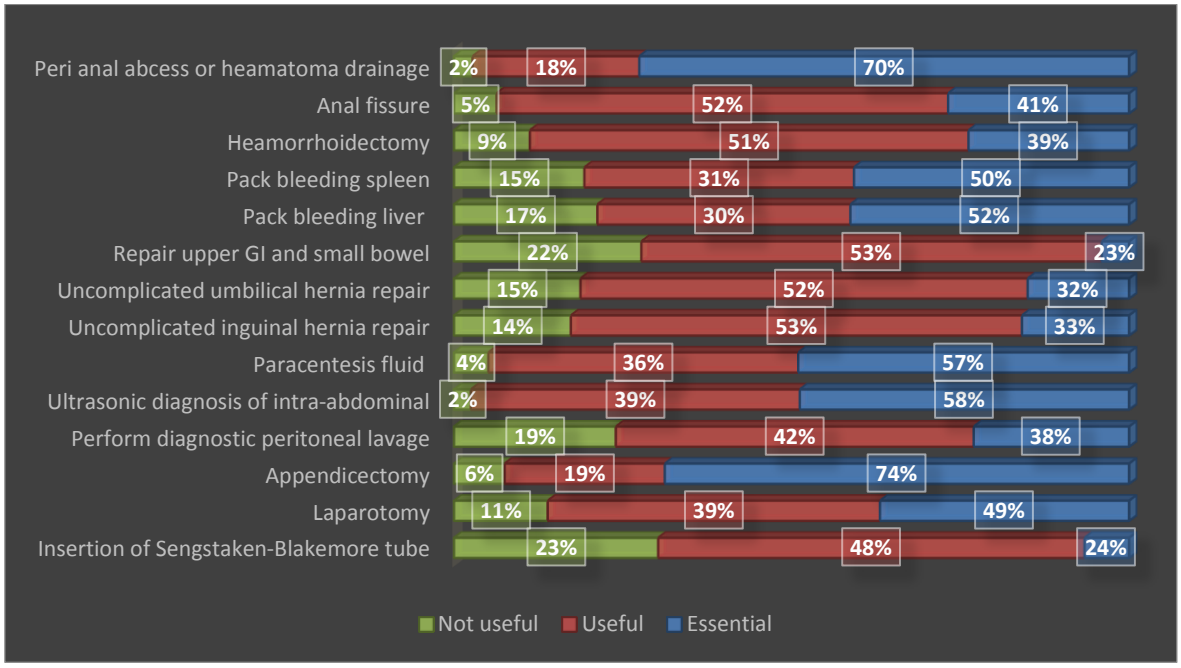

FIGURE 4.23: ESSENTIAL SURGICAL SKILLS – ABDOMINAL SURGERY (n=101)

4.4.4 Vascular Surgery

Vascular Surgery for limb salvage is not suitable for rural areas, but uncomplicated amputations and vascular cut downs are procedures that may be of value in rural South Africa. The participants were asked regarding these procedures. There was 101 responses and the results are reflected in Figure 4.24.

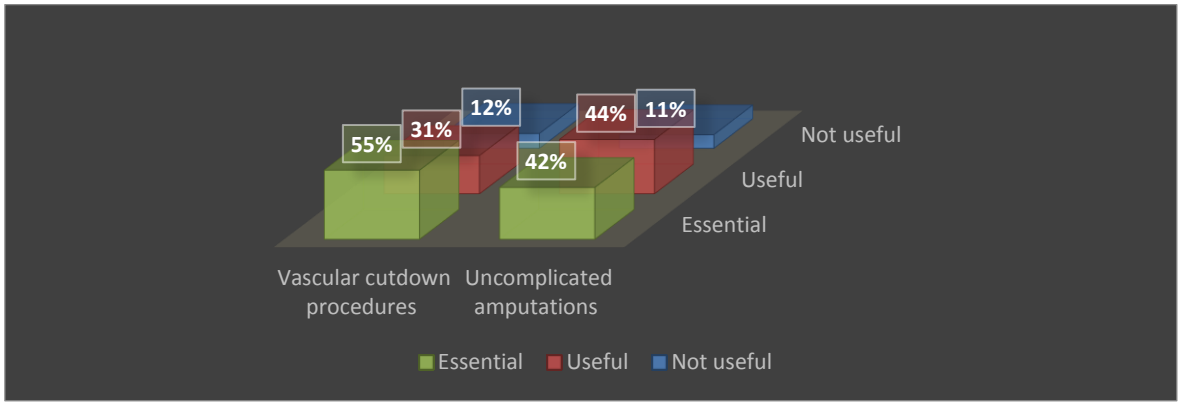

FIGURE 4.24: ESSENTIAL SURGICAL SKILLS – VASCULAR SURGERY

4.4.5 Skin and Soft Tissue Surgery

General practitioners were asked which Skin and Soft Tissue Surgery procedures they thought were essential, useful or not useful. The procedures in question were skin grafting, escharotomy of circumferential burns, debridement and suturing of lacerations, biopsy of lumps or other soft tissue masses and biopsy of skin lesions. The recorded responses (n=101) are represented in Figure 4.25.

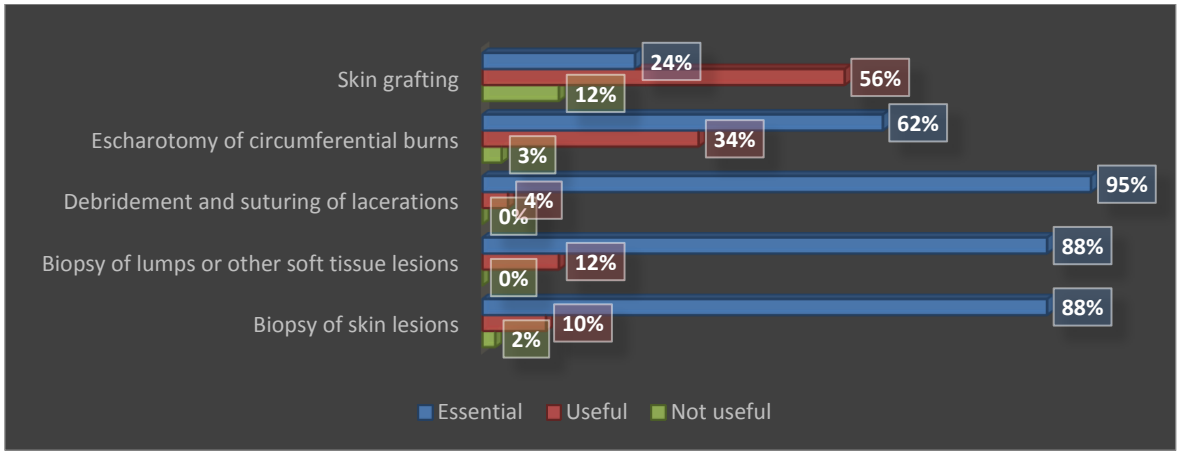

FIGURE 4.25: ESSENTIAL SURGICAL SKILLS – SKIN AND SOFT TISSUE SURGERY (n=101)

4.4.6 Orthopaedic Surgery

Participants were asked to indicate on a modified Likert scale whether clubfoot plasters, drainage of acute osteomyelitis and aspiration or infection of joints are considered essential, useful or not useful (cf. Figure 4.26).

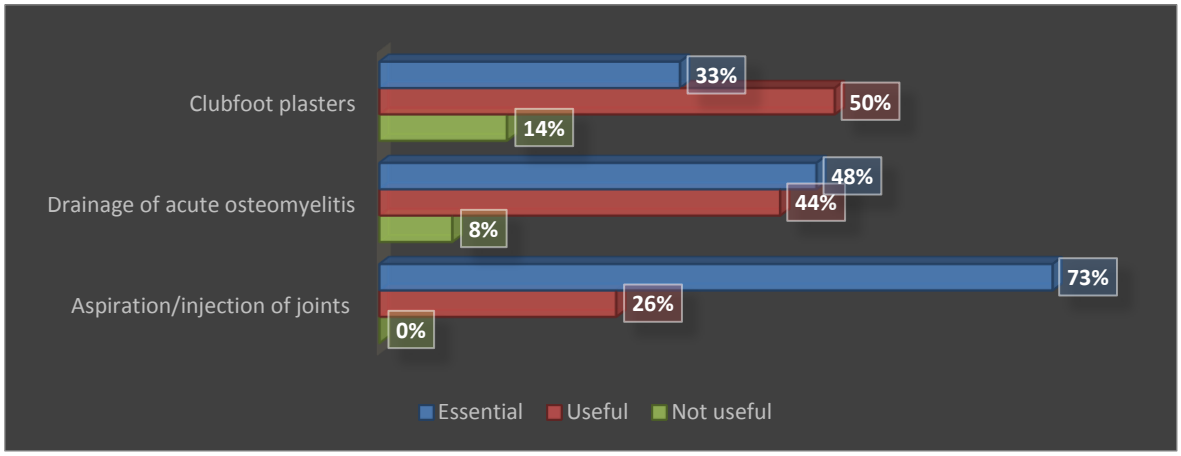

FIGURE 4.26: ESSENTIAL SURGICAL SKILLS – ORTHOPAEDIC SURGERY (n=101)

4.4.7 Urological Surgery

Participants' opinions regarding Urological procedures were gathered (cf. Figure 4.27). Also see 4.3.7 for current practice.

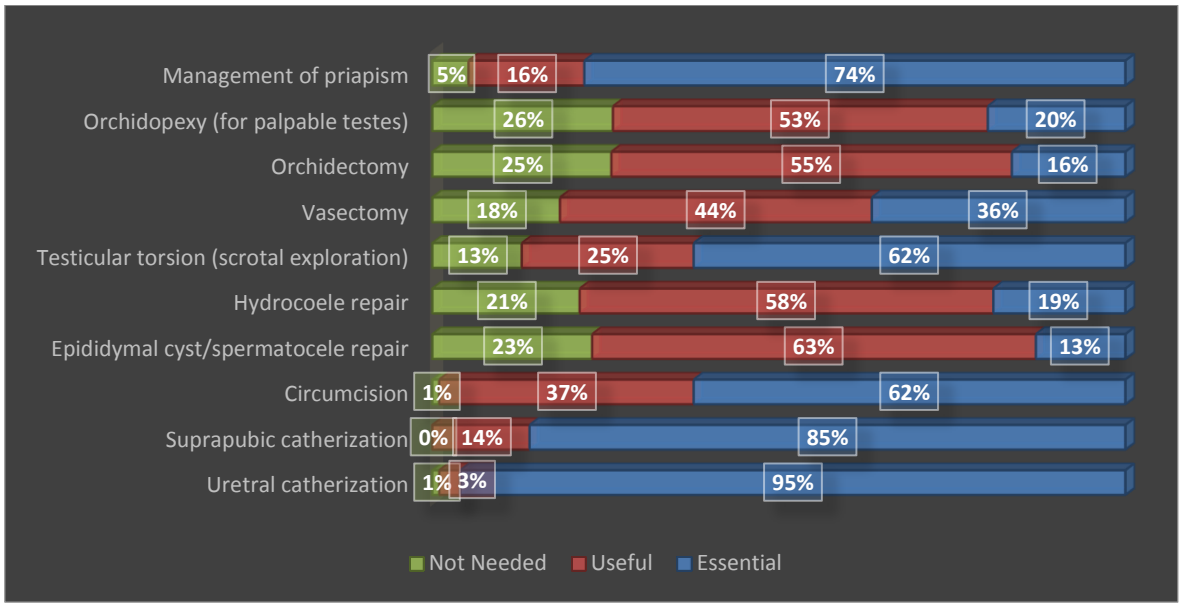

FIGURE 4.27: ESSENTIAL SURGICAL SKILLS – UROLOGICAL SURGERY (n=101)

4.4.8 Discussion of Essential Surgical Skills

Of the **Ophthalmology Procedures** *removal of superficial foreign body not in the visual axis* and *incision and drainage of Meibomian cyst* were deemed essential by more than 50% of respondents. These responses correlate well to the current practices (cf. 4.3.1). *Uncomplicated cataract surgery* was not deemed an essential surgical skill.

Although not generally performed (cf. 4.3.2), more than 50% of respondents indicated *tracheostomy in easy neck, surgical cricothyroidotomy* and *needle cricothyroidotomy* are essential surgical skills in rural South Africa. Dealing with nose bleeding is a common problem confirmed by current practice and the participant responses indicating the essential nature of *packing epistaxis* and *cautery of Little's area*. *Uncomplicated foreign body removal (ear and nose)* was commonly performed and deemed an essential surgical skill. The life-saving role and importance of *drainage of a Quincy abscess* was highlighted by 60% of respondents indicating that it is an essential surgical skill, but performed by less than 20% of the participants. *Bilateral antral washouts* and *myringotomies and grommets* are not part of the majority of the participants practice or deemed essential surgical skills by them.

The following **Abdominal Procedures** were identified as essential surgical skills:

- Appendectomy;
- Peri anal abscess or haematoma drainage;
- Pack bleeding spleen;
- Pack bleeding liver;
- Paracentesis fluid; and
- Ultrasonic diagnostic peritoneal lavage.

The first two procedures are very common conditions and the last four is emergency treatment and assessment of abdominal trauma that is a challenging problem in rural areas without all the necessary diagnostic modalities present in referral centres. There is a general trend away from elective non-emergency procedures like *uncomplicated umbilical and uncomplicated inguinal hernia repairs, anal fissure* and *haemorrhoidectomy.*

There was general consensus that the **Vascular Procedures** that included uncomplicated amputations and vascular cut downs were not essential rural surgical skills.
The only procedure that was evaluated under the **Skin and Soft Tissue Surgery** that was confirmed as essential was *skin grafting. Escharotomy of circumferential burns, debridement and suturing of lacerations, biopsy of lumps or other soft tissue lesions* and *biopsy of skin lesions* were all deemed essential surgical skills. The last three were also commonly performed procedures under current surgical practice (cf. 4.3.5).

Respondents indicated that aspiration and injection of joints was an essential surgical skill concerning **Orthopaedic Surgery** and *drainage of acute osteomyelitis* and *clubfoot plasters* were not reckoned as essential skills, although *drainage of acute osteomyelitis* was deemed by 48% of respondents to be so.

A similar trend was seen with **Urological Procedures** as with the abdominal procedure were seen were the respondents identified the emergency procedures as essential surgical skills, but tend to not perform and not deem the elective procedures as essential (cf. 4.3.7). The only exception to this trend was *circumcision*. The following procedures were indicated as essential surgical skills:

- Management of priapism;
- Testicular torsion (scrotal exploration);
- Circumcision;

- Suprapubic catherisation; and
- Uretral catherisation.

Orchidopexy, orchidectomy, vasectomy hydrocoele repair and *epididimal cyst or spermatocele repair* were identified as non-essential surgical skills. It is interesting to note that although the most practitioners did not perform suprapubic catherisation or testicular torsion procedures they still deemed it essentila due to the emergency nature of the conditions (cf. 4.3.7).

4.5 ESSENTIAL SURGICAL PROCEDURES NOT LISTED IN QUESTIONNAIRE SURVEY

This part of the questionnaire survey was designed to give respondents the opportunity to list procedures they believe is essential in rural surgery they perform, and that was not included in the survey. The questionnaire was designed after a literature study, including a documents analysis of the Department of Health (cf. 4.1.1). The pilot study did not identify any other procedures, but during the empirical research phase of the questionnaire survey some procedures not listed, were indicated as essential surgical skills by the respondents. These procedures may be considered as part of a follow up study.

4.5.1 Ophthalmology Procedures

A number of procedures were repeatedly mentioned by respondents. The drainage of a hordeolum or stye is the most prominent. Pterigium removal, treating corneal lacerations and measurement of ocular pressure also occurred repeatedly. This may be considered for evaluation in a further study. Although foreign body removal was included as part of the essential procedures in the questionnaire survey (cf. 4.4.1), this was repeatedly mentioned in this part of the survey, confirming the essential nature of the procedure (cf. Table 4.38).

TABLE 4.38: UNLISTED ESSENTIAL PROCEDURES DONE – OPHTHALMOLOGY
(Table continue on next page)

• Measuring of intraocular pressure
• Drainage of a stay
• Eye lacerations / fundoscopy
• Pterigium removal
• Cataract removal (Essential)
• PanRetinal photocoagulation , management of glaucoma Vitreous bleeding
• Excision of pterygium
• Basic visual acquity testing

• Corneal abrasions
• Excision of hordeolum internus
• Measure of intra-ocular pressure
• Drainage of stye or hordeolum
• Removal FB
• None. I refer immediately to opthalmologist
• Fluoroscein staining for foreign body,curettage of meibomian cysts
• Diagnose uveiitis
• Staining of eye, and removal of foreign bodies eg, wood chips
• Removal pterygium (if no ophthalmological surgeon is available).
• Management of traumatic injury of the eye or burns
• Stye

4.5.2 Ear, Nose and Throat Procedures

Participants' responses when asked what procedures they performed other than the listed ones in the questionnaire that are essential, listed mainly removal of a foreign object from the ear and tonsillectomies. Removal of foreign objects was part of the questionnaire and 91% of respondents indicated that it was an essential procedure (cf. 4.4.2). Tonsillectomies, intubation and treatment of nasal polyps was also indicated, this can be evaluated in a follow up study (cf. Table 4.39).

TABLE 4.39: UNLISTED ESSENTIAL PROCEDURES DONE – EAR, NOSE AND THROAT

• Adenotonsilectomies
• Tonsillectomy and adenoidectomy
• Removal of foreign body under anaesthesia
• Nasal polyps management
• Removal of foreign body training in ear
• Removal of foreign bodies
• Cerumen washout/ foreign body removal
• Intubation
• Listed ones that I have performed. I have indicated
• Removal of foreign body
• To clean external ear canal with suction
• Syringing of ears for wax impaction. removal of foreign bodies
• Removal of foreign body ear, nose and throat

4.5.3 Abdominal Surgery

In this section, as the previous section (cf. 4.5.2), participants were requested to list essential procedures that they perform and that was not listed in the questionnaire

(cf. 4.4.3). Most of the recorded responses were a repeat of the listed procedures in the questionnaire survey. The only new procedure that can be evaluated in a follow-up study, was diagnostic laparoscopy.

The problem that will confront general practitioners in rural areas with regards to laparoscopy, is the necessity for special and expensive equipment, and surgical expertise with laparoscopy. This, however, is a very handy tool in my opinion and the cost might be countered by the fact that expensive investigations like computer tomography (CT) and unnecessary transfers might be avoided. Studies (Liebert, Bachar, Perry, Dukhno, Mizrahi & Kirshtein 2013:1-8) comparing diagnostic laparoscopy to CT and ultrasound have proven the benefit of this modality in the diagnosis of early acute appendicitis.

O'Malley, Boyle, O'Callaghan, Coffey and Walsh (2013:113-122) is of the opinion that laparoscopy may have an important role in a selected subgroup of patients with penetrating abdominal trauma. Their study shows the roles of laparoscopy in screening, diagnostic and therapeutic, particularly where diaphragm injury is suspected. It is extremely sensitive in determining need for laparotomy but detects hollow visceral injuries less reliably, with surgeon expertise also an important factor in this regard.

They concluded that the development of specific guidelines or protocols may increase the value of laparoscopy in trauma but this would require more evidence of a higher quality. Uranues, Popa, Diaconescu and Schrittwieser (2015:1381-1388) proved that laparoscopy is more cost effective than negative laparotomy, and that it can be performed safely and effectively on stable patients with penetrating abdominal trauma.

The most important advantages they alluded to are reduction of morbidity, accuracy in detecting diaphragmatic and intestinal injuries, and elimination of prolonged hospitalization for observation. They confirmed the importance of surgeon expertise.

My conclusion regarding diagnostic laparoscopies with current data are that it will be of little or no value in rural practice at this point in time, but that it might still develop to play an essential role in rural surgery in future (cf. Table 4.40).

TABLE 4.40: UNLISTED ESSENTIAL PROCEDURES DONE – ABDOMINAL SURGERY
(Table continue on next page)

• Do not perform any laparotomies at all.

• Laparotomy for blunt trauma. Stababdomen Bowl obstruction. Sigmoid volvulus. Primary anast. Colostomy. Perforated peptic ulcer gastroscope and colonoscopy.
• C section and ga and spinal anaesthesis
• Laparotomy for perforated peptic ulcer
• Perforated peptic ulcer management Resection due to abdominal stub or gunshot Intestinal obstruction (torsion, intussusception, etc.)
• McBurneys appendectomy diagnostic laparoscopy
• Do not perform any abdominal surgery
• Nail avulsion
• Subclavian push in
• Gastrostomy

4.5.4 Vascular Surgery

Vascular trauma and the surgical treatment on this was one of the themes when participants were asked as to what essential vascular surgery they perform, and that was not listed in the questionnaire (cf. 4.4.4). As a general surgeon, having dealt extensively with vascular trauma I know that experience is one of the most important predictors of successful surgery, combined with good post-operative care very often including blood transfusions and ventilation. Endovascular procedures have also changed the face of vascular surgery and these patients will have a better outcome in a bigger centre. Simmons, Gunther, Smieg, Manley, Rushton, Porter and Mitchell (2011:1521-1525) evaluated data from patients referred from a rural catchment area and showed that the mechanism of the injury was a bigger predictor of amputation than delay in referral.

Pericardiocentesis is definitely a procedure that needs to be evaluated in a follow-up study. Sonography for deep vein thrombosis sorts under radiology and the treatment for venous ulcers are medical and not surgical (cf. Table 4.41).

TABLE 4.41: UNLISTED ESSENTIAL PROCEDURES DONE – VASCULAR SURGERY

• Pericardiocinthesis
• Manage vascular trauma
• Suture wound in large artery
• Sonography / doppler for dvt
• Cardiothorapic surgery is not covered
• Cauterization of veins
• Do not perform these
• Treatment venous ulcers
• Neck laceration Foley Cathteteg refer vascular surgeon

4.5.5 Skin and Soft Tissue Procedures

Fine needle aspiration (FNA) and small skin flaps were not listed in the questionnaire. Both these procedures must definitely be investigated in a future study. The rest of the procedures listed work covered in the questionnaire survey in some other form (cf. 4.4.5) (cf. Table 4.42).

TABLE 4.42: UNLISTED ESSENTIAL PROCEDURES DONE – SKIN AND SOFT TISSUE

• Benign skin lesion excision and biopsy
• Excision of sibacious cysts, moles
• Swinging of skin flaps to reduce skin deficit (plastic surgery scope)
• Marsuialization of Batholian abscess
• Remorel of renal excision + incisional Biopsy FNA
• FNA
• Breast surgery - no section Mastectomy Biopsy open & closed Excision of gynaecomastia
• Warts and plantar wart cauterisation Implants
• Cauterisation
• Excision of bacal cell carcinoma
• Cautery
• Rehydration refer
• The simple ones that I perform I have indicated and I believe are essential
• Small skin flaps - not grafting
• Management of axillary abscess
• Biopsy and excision of lesion

4.5.6 Orthopaedic Procedures

The application of Plaster of Paris (POP) and the reduction of dislocated joints are practical skills, essential ones, but not a surgical skill and therefore not covered in the study. Consideration must be given to evaluate nerve blocks in another study, as this may assist not only in dealing with orthopaedic surgery, but will also be of value in dealing with skin and soft tissue surgery. Tendon repair and carpal tunnel repair has many pitfalls and must be performed by experienced surgeons. Many authors share this view, not only on the experience of the surgeon, but also on a good rehabilitation facility (Tiller, Bains, Nessa, Røttingen & Søderberg 2008:36-8; Sivaloganathan, Kenward, Sarraf & Jain 2011:34-38). Although Ashrafi, Boodhun, Rahman and Roberts-Thomson (2009:A66-9) had very good results performing carpal tunnel surgery in Tasmania over the period of three years audited, they were specialists trained during fellowship, and carpal tunnel surgery cannot generally

be advocated as an essential rural surgical skill. The unlisted essential procedures that were performed, is shown in Table 4.43.

TABLE 4.43: UNLISTED ESSENTIAL PROCEDURES DONE – ORTHOPAEDIC

• Tendon repair. relocate dislocated shoulders
• Reduction of fractures and application of pop. nerve blocks to accomplish these reductions
• Backslab. Pop.
• Simple reductions and simple cast
• Close reductions
• Applying plasters and reduction fractures amputation fingers and toes post-traumatic
• Suture of tendons
• Use of bier's block for closed colles' fractures
• Musculo skeletal sonography - torn muscles / joint pathology
• Carpal tunnel release basic orif skills for uncomplicated fractures proper techniques in intra articular joint injections
• Closed reduction & correct application of cast simple or-if (plates, k-wires, screws, etc.) tractions both skin and bone
• Joint relocations
• Manipulation of fractures management of compound fractures
• Reduction of fractures
• Reductions
• Hand injury repairs
• Not performing but placing of basic ex-fix is useful
• Pop application to uncomplicated fractures
• Manipulation of colles fracture using bier's block
• Intra-artricular cortisone administration
• Simple internal fixation of fractures
• Undisplaced fracture management
• Relocation of dislocations
• Reduction of dislocations e.g. shoulder
• Reduction of closed fractures, reduction of dislocations of various joints including tmj, shoulder, etc.
• Dislocations pop
• None. i refer timeously
• Carpal tunnel release trigger finger
• Applying p.o.p. casts for fractures
• Applying plaster of paris after x-ray confirming fracture of limbs
• Pops ,aspiration of joints effusion, etc.

4.5.7 Urology Procedures

All the unlisted essential Urology procedures listed in Table 4.44 was covered and evaluated in the questionnaire survey (cf. 4.4.7) with exception of prostate biopsies.

TABLE 4.44: UNLISTED ESSENTIAL PROCEDURES DONE – UROLOGY

• P/phimosis and dorsal slit. Ultra sound prostate bladder. Kidneys.
• Prostate biopsy
• Phimosis paraphimosis
• Aspiration of Hychocode
• Bladder washout
• Paraphymosis
• Hydrocoele aspiration
• Review suprapubic catheter
• Suprapubic catherization, prostate biopsy

4.5.8 Skills training in Rural Surgery

4.5.8.1 *Attending Surgical Skills Courses*

Participants had a very positive response when they were asked if there were willing to attend a surgical skills course. Ninety-nine respondents answered this question, and an overwhelming 92% indicated a "Yes" response (cf. Figure 4.28).

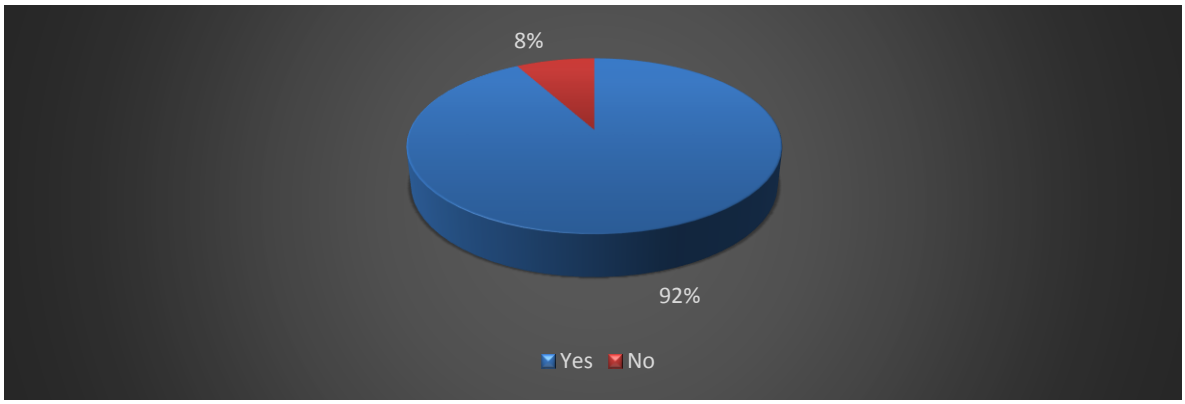

FIGURE 4.28: WILLING TO ATTEND SKILLS COURSES IN RURAL SURGERY (n=99)

This response points towards the need for skills course for rural surgery. The next section deals with the question whether or not general practitioners will perform more procedures if properly trained.

4.5.8.2 *Perform more procedures if trained in specific skills*

This question had a very similar response to the previous question (cf. 4.5.8.1) with 93% of respondents answering in the positive. Only 7% of participants indicated that training would not motivate them to perform more procedures (cf. Figure 4.29).

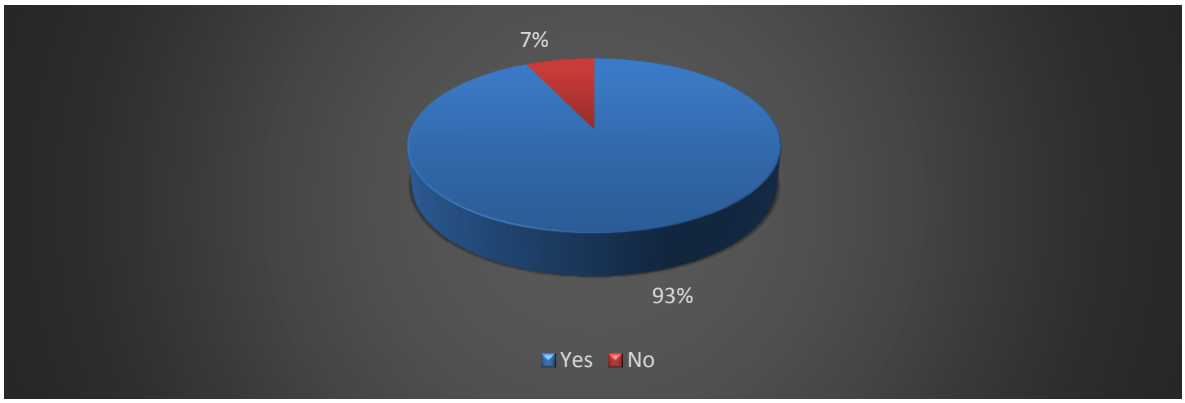

FIGURE 4.29: WILLING TO PERFORM PROCEDURES IF TRAINED IN SPECIFIC SKILLS (n=98)

4.5.9 Outcomes of CPD Programme for essential surgical services in rural hospitals

This was an open-ended question aimed at determining the outcomes of a short learning programme in rural surgical skills (cf. 2.8). A wide range of responses and opinions was lodged (n=68) leading to the development of various themes.

The most dominant theme was the development of **practical skills**. More than half of the respondents conveyed with remarks such as "*good practical skills" or "hands on training"* the emphasis that they place on skills training. In Chapter 2 (cf. 2.7.3) clinical skills centre training is discussed, and the value of this confirmed by the findings in this section of the questionnaire survey.

The second theme that emerged was developing **confidence** in treating and operating patients. *"Confidence in performing surgical operations"* and *"BE CAPABLE OF MANAGING ACUTE, LIFE THREATENING PROCEDURES CONFIDENTLY"* are some of the responses noted. Simulation-Based Medical Education (cf. 2.7.6) and peer assisted learning (cf. 2.7.5) is some learning strategies that will address this theme.

The need for a **short learning programme** (cf. 2.11.3) was tabled *("short course, 1-2 days).* A request that the course must be **inexpensive** was also aired. Distance learning (cf. 2.7.4) and E-learning (cf. 2.7.2) can be considered as strategies to assist in the control of expenses.

Another outcome was to provide more services in rural areas, subsequently relieving the pressure on referral hospitals and specialists.

4.5.10 Other areas of essential surgical skills not identified

The participants were asked to identify surgical skills that were not discussed in the questionnaire (cf. 2.4, 4.4 & 4.5). Forty-four responses (n=44) were recorded and the majority of procedures listed were already discussed. There were a few themes that emerged and that will be discussed shortly.

Bur holes for drainage of life threatening intracranial bleeds was named. This can be a lifesaving procedure, especially in cases of large extra-dural bleedings, but there are some obvious concerns in performing these in a rural setting. The most important concern would be the lack of surgical instrumentation needed to perform this procedure as a hand held cranial drill is not part of standard surgical packs. The question of diagnosis and post-surgical care is also of major concern.

The treatment of **arterial injuries**, although a prominent theme, was dealt with in Section 4.5.4. Major arterial trauma needs referral to referral centres with the expertise in dealing with this, whereas injuries to smaller distal arteries in limbs can be dealt with by applying pressure or even tying it off if adequate collateral arterial supply is present. This can be part of debridement and suturing of lacerations (cf. 4.4.5).

Ultrasound training falls outside the scope of this study, there is however existing short courses available if the need exists to develop this area of skill (Impilo Medical Systems:online).

Obstetrics and gynaecology was not part of this study, but is well looked after by the Department of Health (cf. 1.2.3). There are also very successful models elsewhere in Africa that can be looked at from this perspective (cf. 1.2.2).

Wound management and the **treatment of burns** is definitely an issue of concern for general practitioners in rural areas, and although skin grafting is a surgical modality for the treatment of certain burns and wounds, it is only a fraction of wounds that need this. I have personally attended numerous symposiums and training courses held by industry for management of burns and wound that is well suited to provide for this requirement. The performing of a skin graft is definitely a skill that needs evaluation in a future study.

4.5.11 Attitude towards surgery

4.5.11.1 *Risk of HIV*

General practitioners were asked if the risk that HIV poses had changed their attitude towards performing surgery in any way. The overwhelming response was **NO.** The participants are **aware of risk** of HIV, not only to themselves as potential **surgeons**, but also to the **patient** undergoing surgery. A theme that emerged was **selection of patients** for surgery with CD4 counts as an indicator whether to perform emergency only or elective surgery as well.

In Chapter 1 (cf. 1.2) the difference in attitudes of surgeons in the Western world (Leow *et al*. 2012:397-401) towards HIV compared to South African practitioners (Gwala-Ngozo *et al.* 2010:11-16) was alluded to showing a general **positive attitude** by most general practitioners. This study once again confirmed this positive attitude, phrases like "treated as those without HIV" and "people should not be denied procedures due to status".

Participants did also indicate that they would be **more cautious** and take **better precautions** such as wearing protective eye gear and wearing double gloves. A small group of participants felt more reluctant to perform surgery and indicated that they **performed less procedures** due to the HIV risk to them and their patients. This was especially applicable to elective surgery. "*It creates reluctance towards any non-emergency surgery"* is just one of the examples. Not one of the participants stopped all surgery because of HIV.

Three groups namely no or little change, more cautious and increased precautions and less surgery performed was established from the response noted (cf. Figure 4.30).

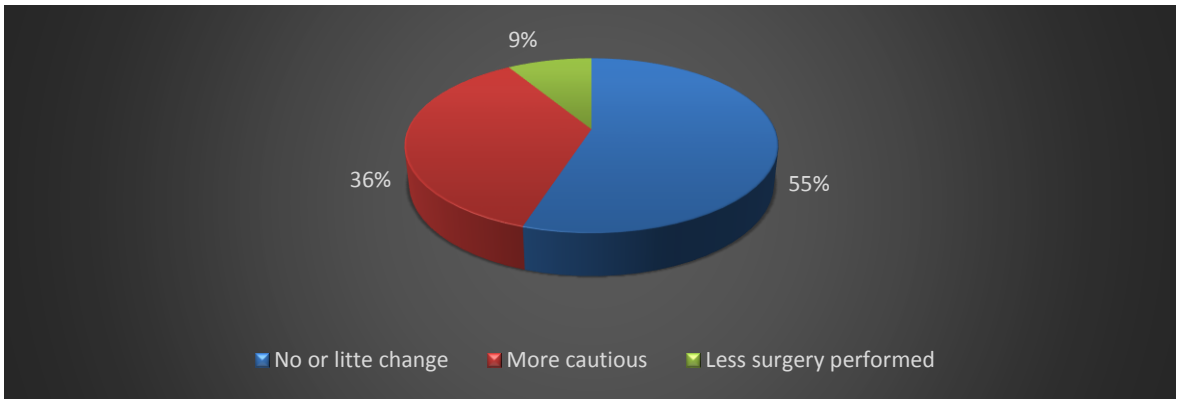

FIGURE 4.30: HIV INFLUENCE ON ATTITUDE TOWARDS SURGERY (n=72)

4.5.11.2 *Medico-Legal risk*

Eley *et al.* (2007:12-20) and Glazebrook *et al.* (2006:502) refers to various factors that influences surgery in rural areas including the lack of professional support, medico-legal risk and family obstacles (cf. 1.2). In this section the participants where asked what their opinions were in regarding the influence that medico-legal risk plays in their attitude towards surgery. Two opposing groups were identified, namely a small group (n=8) indicating that it did **not play any role** in their decision making, and a majority group (n=69) indicating that they were very aware of the risks, and that it **deterred them from performing surgery**. This second group also indicated that they **increased their referrals** due to the medico-legal risk posed by performing surgery.

There was various sub-groups in the second group, the three themes that emerged was that the medico-legal risk influenced the **type of surgery** that they performed, that **indemnity insurance** is a prerequisite for surgery and that they required **adequate training** before performing surgery (cf. Figure 4.31).

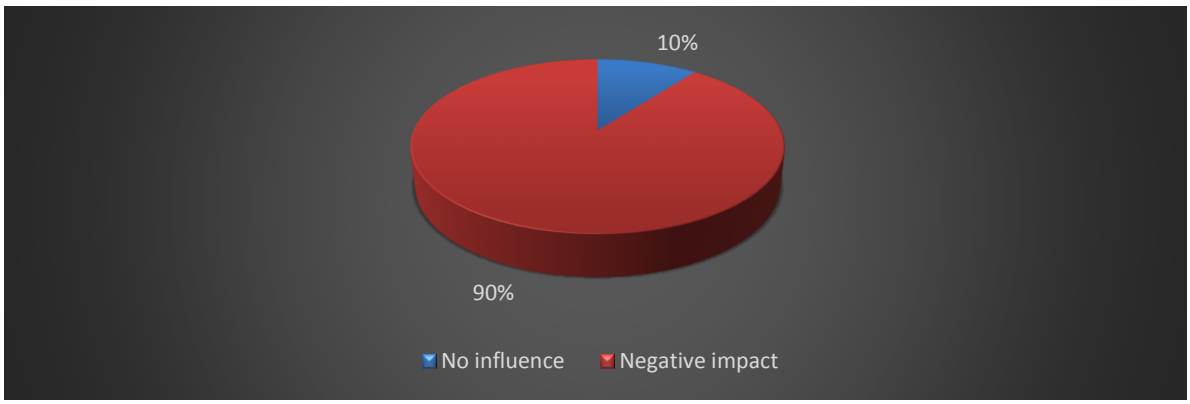

FIGURE 4.31: THE IMPACT OF MEDICO-LEGAL RISK ON ATTITUDE TO SURGERY

4.6 CONCLUSION

In Chapter 4, the results from the questionnaire survey were discussed. Certain procedures were identified by participants as essential skill needed for surgery in rural South Africa. These results will be used in Chapter 5 named ***Description of outcomes and essential content and design for a short learning programme in essential surgical skills*** to propose the content for a short leaning programme in essential surgical skills.

CHAPTER 5

DESCRIPTION OF OUTCOMES AND ESSENTIAL CONTENT AND DESIGN FOR A SHORT LEARNING PROGRAMME IN ESSENTIAL SURGICAL SKILLS

5.1 INTRODUCTION

In Chapter 4 the quantitative results obtained from the modified Likert type questionnaire survey were presented in line with the aim (cf. 1.4.2) and objectives (cf. 1.4.3) stated in Chapter 1 using graphs followed by a discussion regarding the data. The results of the open-ended questions (qualitative data) included for certain questions in the questionnaire were also discussed. Dent and Harden (2013:31-43) described ten steps to designing a medical curriculum (cf. 2.3). In this chapter, the description of outcomes and essential content derived from the research study is presented in the background the following ten steps:

- Identify the Need;
- Establish the learning outcomes;
- Agreeing the content;
- Organising the Content;
- Deciding the educational strategy;
- Deciding the teaching methods;
- Preparing the assessment;
- Communication about the curriculum;
- Promoting an appropriate educational environment; and
- Managing the curriculum.

The environment of South Africa's health and education systems are undergoing major changes. Despite democracy, the infra-structure and financial challenges remain and are getter bigger as the population growth continues. Medical services in especially the rural parts of South Africa poses the biggest challenges. The government is attempting to address and remedy some of these problems (cf. 1.2.3) with National Health Insurance. Unfortunately despite the fact that surgical conditions contribute a major part of the disease burden (cf. 1.2), surgery was not addressed in the composition of the District Health Team (cf. 1.2.3). The importance of, and challenges in rural surgery is a wider problem, not only in Africa (cf. 1.2.2), but also in the rest of the world (cf. 1.2.1).

The HPCSA document titled "*Education and Training of Doctors in SA"* states that the faculties of health sciences need to educate competent, knowledgeable, skilful and caring health care professionals conforming to modern medical standards who can adapt to change and will have lifelong learning attitudes (HPCSA 1991:1-9). The rolling out of the CPD programme (cf. 1.2.4 & 2.6) was a result of this document.

These challenges and facts provided a rationale or **identified need** that prompted this study to determine the outcomes and essential content for a *Essential Surgical Skills for Rural Hospitals in South Africa: A CPD Programme.* It is apparent that education and training just for general practitioners in rural South Africa should be adapted to fulfil the needs of society.

The purpose of the study has been a formal attempt to scientifically describe the outcomes and essential contents of *Essential Surgical Skills for Rural Hospitals in South Africa: A CPD Programme* so as to add value to the profession and produce general practitioners who are able to address and overcome the challenges they face in surgery in rural South Africa.

It will also articulate well with existing programmes like ATLS (Advanced trauma life support) and Basic Surgical Skills. ATLS provides system for resuscitation and evaluation of trauma patients and the Basic Surgical Skills course trains participants suturing skills. The *Essential Surgical Skills for Rural Hospitals in South Africa: A CPD Programme* develops procedure specific skills that can be applied practice e.g. packing of spleen as part of lifesaving procedure after initial resuscitation and evaluation according to ATLS guidelines (Trauma Society of South Africa:online).

5.2 SHORT LEARNING PROGRAMME (SLP) IN ESSENTIAL SURGICAL SKILLS IN RURAL SOUTH AFRICA IN THE CONTEXT OT THE NESTED APPROACH

5.2.1 NQF level, designator, qualifiers and credits

According to the Higher Education Qualifications Sub Framework (cf. 2.12),

"The HEQSF incorporates a nested approach to qualifications design. Within a nested approach to standards development, qualification specification requires a movement from generic to specific outcomes. The most generic standards are found in the level descriptors. The most specific standards are found in the programmes that lead to qualifications.

Specific standards always meet the requirements of the generic standards within which they are nested or framed. Within this broader context, the focus of the HEQSF is on qualification type descriptors - the second layer of a nested approach. Within the nested approach, the outer layer provides the context for qualification specification. The National Qualifications Framework (NQF) level and its level descriptor form the outer and most generic layer in terms of the knowledge and skills that learners are required to acquire, integrate and demonstrate (applied competence) at each level of cognitive complexity on the HEQSF (HEQSF 2013:13)*".*

It further states,

"Level descriptors and qualification descriptors are expressed in terms of learning outcomes. The design of programmes makes assumptions about the volume of learning that is likely to be necessary to achieve the intended outcomes" (CHE 2013:15).

The level descriptors are the outermost layer of qualification specification. At each level they describe the generic nature of learning achievements and their complexity. Level descriptors are thus broad qualitative statements against which more specific learning outcomes can be compared and located" (CHE 2013:18).

The *Short Learning Programme in Essential Surgical Skills for Rural South Africa* is an attendance based course and do not carry any credits unto any further qualification. The programme is at NQF Level 8 (Postgraduate Diploma/Bachelors Honours Degree level). Attendees will however qualify for CPD points (cf. 2.6) that equates to one point for every hour that the participants are attending the programme.

5.2.2 Minimum admission requirements

The minimum admission requirement is an appropriate Bachelor's Degree in the form of a M.B.,Ch.B. or equivalent degree (HEQSF 2013:30).

5.3 OUTCOMES OF ESSENTIAL SURGICAL SKILLS FOR RURAL HOSPITALS IN SOUTH AFRICA: A CPD PROGRAMME

This section is focused on **establishing the learning outcomes**. Before giving the specific outcomes of the *Essential Surgical Skills for Rural Hospitals in South Africa: A CPD*

Programme it would be more appropriate to indicate the critical cross-field outcomes and learning outcomes.

5.3.1 Exit level learning outcomes of SLP in Essential Surgical Skills

i. Perform and monitor safety, health, environmental and quality assurance procedures in the clinical environment to ensure professional service and safety of all.
ii. Apply scientific and technological knowledge for the management of the patient during surgical procedures.
iii. Perform therapeutic, corrective procedures and organ system support on patients using specialized health technology to facilitate the management of the patient.
iv. Apply management principles and concepts in the health establishment to ensure professional, legal and ethical service delivery.
v. Demonstrate communication and interpersonal skills in a clinical environment.
vi. Plan, design, and conduct research in a specific clinical science specialisation relating to a particular context of practice and application to the benefit of the patient.
vii. Apply business performance management practices.
viii. Design and implement experiential learning in the workplace.

(HPCSA 2013:online)

5.3.2 Critical Cross-Field Outcomes of SLP in Essential Surgical Skills

- Identify and solve problems in the field of essential rural surgery in which responses display that responsible decisions using critical and creative thinking have been made.
- Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation.
- Contribute to the full personal development of each learner:
  - Reflect on and explore a variety of strategies to learn more effectively.
  - Participate as a responsible citizen in the life of local, national and global communities.
  - Be culturally and aesthetically sensitive across arrange of social contexts.
  - Explore education and career opportunities.
- Organise and manage oneself and one's activities responsibly and effectively.
- Collect, analyse organize and critically evaluate information in Rural Surgery on a regional, national and international level.

- Communicate effectively in the learning and health care environment by using technology and associated accessories for transfer and sharing of information among healthcare workers and other stakeholders so as to deliver quality patient care and facilitate management processes.
- Demonstrate an understanding of clinical therapy principles by recognizing that problem solving contexts do not exist in isolation.
- Work effectively in collaboration with other health care professionals as members of a team.

(HPCSA 2013:online)

5.3.3 Level descriptors at exit level 08

Scope of knowledge

A learner is able to demonstrate:

- Knowledge of and engagement in an area at the forefront of essential rural surgery.
- An understanding of the theories, research methodologies, methods and techniques relevant to essential rural surgery and an understanding of how to apply this knowledge in a particular context.

Knowledge literacy

An ability to interrogate multiple sources of knowledge in an area of specialisation, and to evaluate knowledge and processes of knowledge production.

Method and Procedure

- An understanding of the complexities and uncertainties of selecting, applying or transferring appropriate standard procedures, processes or techniques to unfamiliar problems in rural surgery.

Problem solving

- An ability to use a range of specialised skills to identify, analyse and address complex and/or abstract problems drawing systematically on the body of knowledge and methods appropriate to essential rural surgical skills.

Ethics and professional practice

- An ability to identify and address ethical issues based on critical reflection on the suitability of different ethical value systems to specific contexts.

Accessing, processing and managing information

- An ability to critically review information gathering, evaluation and management processes in specialised contexts in order to develop creative responses to problems and issues.

Producing and communicating information

- An ability to present and communicate academic, professional or occupational ideas and texts effectively to a range of audiences, offering creative insights, rigorous interpretations and solutions to problems and issues appropriate to the context.

Context and systems

- An ability to operate effectively within a system, or manage the system based on an understanding of the roles and relationships between elements within the system.

Management of learning

- An ability to apply in a self-critical manner learning strategies that effectively address own and others' professional and on-going learning needs.

Accountability

- An ability to take full responsibility for own work, decision making and use of resources, and full accountability for the decisions and actions of others where appropriate (SAQA 2013:4-6).

5.3.4 Specific outcomes of a SLP in Essential Surgical Skills

Participants were questioned on their opinion regarding specific outcomes for the *Essential Surgical Skills for Rural Hospitals in South Africa: A CPD Programme.* There were five main themes that emanated from the responses:

- Better practical skills in rural surgery in terms of surgical technique;

- Increased confidence when dealing with rural surgery concerning diagnosis, selection and operating on patients;
- Leading to more performed procedure and subsequent decrease in referrals and burdening of specialists;
- The course also has to be short; and
- Inexpensive.

Attention to dealing with HIV and current medico-legal risk was also important outcomes (cf. Table 5.1).

TABLE 5.1: ESSENTIAL OUTCOMES FOR A SLP IN ESSENTIAL SURGICAL SKILLS IN RURAL SOUTH AFRICA

Outcomes	Improved Practical Skills	Increased Confidence
1. Surgical Procedures		
1.1 Ophthalmology Procedures - selecting patients and performing procedures	X	X
1.2 Ear, Nose and Throat Surgery – selecting patients and performing procedures	X	X
1.3 Abdominal Surgery – selecting patients and performing procedures	X	X
1.4 Vascular Surgery – selecting patients and performing procedures	X	X
1.5 Skin and Soft Tissue Surgery – selecting patients and performing procedures	X	X
1.6 Orthopaedic Surgery – selecting patients and performing procedures	X	X
1.7 Urological Procedures – selecting patients and performing procedures	X	X
2. Clinical Skills		
2.1 Selection of HIV patients for surgery	X	X
2.2 Selection of procedures for HIV patient		X
2.3 Taking of informed consent	X	X
2.4 Management of Medico-Legal risk	X	X
3. Short Learning Programme		
4. Inexpensive		
5. Increased service delivery with decreased referrals and specialist burden		

5.4 ESSENTIAL CONTENT FOR A SHORT LEARNING PROGRAMME IN ESSENTIAL SURGICAL SKILLS IN RURAL SOUTH AFRICA

The following table represents the **agreed contents** for *Essential Surgical Skills for Rural Hospitals in South Africa: A CPD Programme* on which consensus was achieved that it was essential and on which consensus was not achieved in the research study.

Consensus was deemed to have been achieved when at least 50% of the respondents indicated a procedure as essential upon a statement. The items on which consensus was

reached will be included as essential content in *Essential Surgical Skills for Rural Hospitals in South Africa: A CPD Programme*. Items on which no consensus has been reached will not be included in the programme but are mentioned for reference purposes (cf. Table 5.2).

TABLE 5.2: ESSENTIAL CONTENT FOR A SLP IN ESSENTIAL SURGICAL SKILLS IN RURAL SOUTH AFRICA
(Table continue on next page)

Contents	Consensus (Essential) Included in programme	No Consensus (Not Essential) Not included
1. Opthalmology		
1.1 Uncomplicated cataract surgery		X
1.2 Incision and drainage of Meibomian cyst	X	
1.3 Removal of foreign object, not in visual axis	X	
2. Ear, Nose and Throat Surgery		
2.1 Packing epistaxis	X	
2.2 Cautery of Little's area	X	
2.3 Bilateral antral washout		X
2.4 Myringotomy and grommets		X
2.5 Foreign body removal, uncomplicated	X	
2.6 Incision and drainage of Quincy abscess	X	
2.7 Tracheostomy in easy neck	X	
2.8 Surgical cricothyroidotomy	X	
2.9 Needle cricothyroidotomy	X	
3. Abdominal Surgery		
3.1 Peri anal abscess or haematoma drainage	X	
3.2 Anal fissure surgery		X
3.3 Haemorrhoidectomy		X
3.4 Pack bleeding spleen	X	
3.5 Pack bleeding liver	X	
3.6 Repair upper GI and small bowel injuries/perforations		X
3.7 Uncomplicated umbilical hernia repair		X
3.8 Uncomplicated inguinal hernia repair		X
3.9 Paracentesis of fluid	X	
3.10 Ultrasonic diagnosis of intra-abdominal fluid	X	
3.11 Perform diagnostic peritoneal lavage		X
3.12 Appendicectomy	X	
3.13 Laparotomy		X
3.14 Insertion of Sengstaken Blakemore tube		X
4 Vascular Surgery		
4.1 Uncomplicated amputations		X
4.2 Vascular cutdown procedures		X
5. Skin and Soft Tissue Surgery		
5.1 Skin grafting		X

5.2 Escharotomy of circumferential burns	X	
5.3 Debridement and suturing of lacerations	X	
5.4 Biopsy of lumps and other soft tissue lesions	X	
5.5 Biopsy of skin lesions	X	
6.Orthopeadic Surgery		
6.1 Clubfoot plasters		X
6.2 Drainage of acute osteomyelitis		X
6.3 Aspiration/injection of joints	X	
7. Urological Procedures		
7.1 Management of priapism	X	
7.2 Orchidopexy (for palpable testis)		X
7.3 Orchidectomy		X
7.4 Vasectomy		X
7.5 Testicular torsion (scrotal exploration)	X	
7.6 Hydrocoele repair		X
7.7 Epididimal cyst / spermatocele repair		X
7.8 Circumcision	X	

5.5 ORGANISING THE CONTENT, EDUCATIONAL STRATEGIES AND TEACHING METHODS FOR A SHORT LEARNING PROGRAMME IN ESSENTIAL SURGICAL SKILLS IN RURAL SOUTH AFRICA

5.5.1 Organising the Content

The contents should be organized in such a way that topics are revisited throughout the course, at different levels of difficulty, and that new learning should also be related to previous learning so that the competence of the student increases with each revisit the topic (cf. 2.3).

The essential content of was agreed upon (cf. 5.3). The content will be organized in two parts, relevant study material regarding the essential procedures and practical skills training.

5.5.2 Educational strategy

The SPICES model was discussed in Chapter 2 (cf. 2.3) as a guide to planning and evaluating a curriculum (Harden *et al.* 1984:284-297, Dent & Harden 2013:37). Figure 5.1 is a schematic representation of the SPICES model.

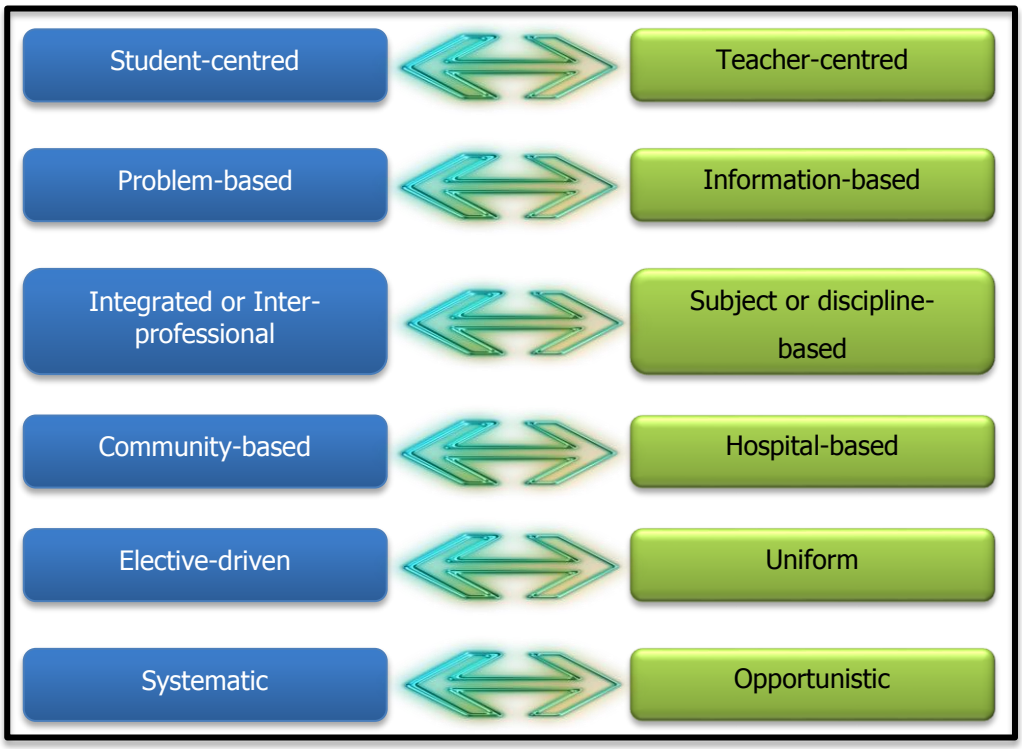

FIGURE 5.1: SPICES MODEL (HARDEN *et al.* 1984:284-297)

Each of the possible strategies is treated as a continuum, allowing for diversity and differences between institutions and learning programmes. If the SPICES model is applied in **deciding the educational strategies**, a *Short Learning Programme for Essential Surgical Skills in Rural South Africa* will be a student based, problem based that is discipline based for rural hospitals and community based practices. It will be a systematic uniform programme.

5.5.3 Teaching methods

The oldest method of learning in medicine is lectures. The learners specific profile, background, challenges and needs (cf. 2.7) must be part of the decision making process when **deciding the teaching methods.**

For the purpose of this study, the learners are general practitioners that are working in rural areas or working in a district hospital (cf. 1.1). They are adult learners (cf. 2.9) that are well motivated as proven by the fact that 45,9% of the participants has some form of a post graduate qualification. A further indication of the level of self-motivation is shown by the fact that 92% of participants in the study indicated that they are willing to attend a short learning programme (cf. 4.5.8.1), and 93% indicated that they would perform more

surgery with adequate training. Distance learning will be the preferred method of teaching (cf. 2.7.4). A further consideration was that the group was not uniform in age (ages ranging from 24-70yrs) (cf. 4.2.1). The group are all professionals and their time is limited, and also expensive if they have to take off work for extended periods of time attend courses. The course must be designed in such a manner that it as short and inexpensive as possible (cf. 4.5.9).

Ellaway and Masters (2008:455-473) point to the necessity to make use of a range of methods to facilitate the students' learning (cf. 2.7). They acknowledge that new learning technologies such as simulation training (cf. 2.7.6) and e-learning (cf. 2.7.2) can contribute significantly to teaching. In case of the *Essential Surgical Skills for Rural Hospitals in South Africa: A CPD Programme* it is important to realize that the group is heterogenous in term of age and that not every one of the potential learners are equally technologically skilled.

The contents will be organized in two parts (cf. 5.4.1) of which the first part is the relevant study material regarding the essential surgical skills. This will be material for self-study before the surgical skills training. My aim is to make it available to learners as a hardcopy, on a CD (that also contains a soundtrack) and as a podcast. Due to the remoteness of some of the areas a web-based programme might not be accessible to some of the learners. The reasoning behind the podcasts (cf. 2.7.2) and CD soundtrack is to allow the learners to listen to the relevant information on their phones and in their vehicles commuting or between patient appointments. This will also aid in limiting time away from their practices and families. As this is self-study it does not carry any value in terms of CPD credits.

The second part of the content of the programme is surgical skills training. This part of the *Essential Surgical Skills for Rural Hospitals in South Africa: A CPD Programme* qualifies for CPD points. This will take place in a clinical skills centre (cf. 2.7.3). The programme will be initially rolled out at the Faculty of Health Sciences at the University of the Free State's clinical skills centre. The training will consist of various simulation-based (cf. 2.7.6) skills stations covering the various procedures identified as essential content for the programme. This will ensure that all the students will have training in all the various procedural skills. This will also take place in a peer assisted learning (cf. 2.7.5) manner that afford the student the opportunity to share past experiences, advice and knowledge, and also possible problems and challenges that needs attention.

The programme will run over a three-day period, from Friday to Sunday, keeping it short and limiting time away from the general practitioners' practices.

TABLE 5.3: TEACHING METHODS

Contact Y/N	Distance Y/N	Teaching Methods	% Learning time
YES	NO	Lectures (face to face, limited interaction or technologically mediated)	10%
YES	NO	Clinical skills and virtual reality centre training	20%
NO	YES	Independent self-study of specially prepared materials (case studies, multi-media, etc.)	60%
YES	NO	Assessment	10%

5.5.4 Assessment

Two strengths are involved in the act of remembering: storage strength induced by study sessions and retrieval strength induced by testing (Wheeler, Ewers & Buonanno 2003:571-580).

Assessment of students is a key component of any curriculum or programme (cf. 2.10). This leads to a number of questions some of which: what are the aims of the assessment process, what methods should be used and when should the students be assessed? (Dent *et al*. 2013:484-496).

5.5.4.1 *Principles of assessment*

Methods of Assessment

- Appropriate: The method of assessment is suited to the outcome being assessed i.e. is capable of gathering evidence in relation to the intended outcome, and not something else.
- Fair: The method of assessment does not present any barriers to achievements, which are not related to the achievement of the outcome at hand.
- Manageable: The methods used make for easily arranged, cost-effective assessments that do not unduly interfere with learning.
- Integrated into work or learning: Evidence collection is integrated into the work or learning process where this is appropriate and feasible. (Often referred to as naturally occurring evidence).

Evidence

- Valid: The evidence focuses on the requirements laid down in the relevant standard and matches the evidence requirements of the outcome/s at hand under conditions that mirror the conditions of actual performance as closely as possible.
- Current: The evidence is sufficient proof that the candidate is able to perform the assessment outcomes at the time the assessor declares the candidate competent.
- Authentic: The assessor is satisfied that the evidence is attributable to the person being assessed.
- Sufficient: The evidence collected establishes that all criteria have been met and that performance to the required standard can be repeated consistently in the future i.e. the performance to standard is not a "once-off".

Overall Assessment Process

- Systematic: The overall process ensures assessment is fair, effective, repeatable and manageable.
- Open: The process is transparent i.e. assessment candidates understand the assessment process and the criteria that apply and can contribute to the planning and accumulation of evidence.
- Reliable/Consistent: The same assessor would make the same judgement again in similar circumstances and judgements match judgements made on similar evidence.

(SAQA:2013)

5.5.4.2 *Aims of assessment*

Although this topic was covered in Chapter 2, a few points are worth pointing out: These also serve as the aim of assessment:

- Assessment enhances and drives learning;
- Assessment changes students learning strategies;
- Assessment improves retention of studied material; and
- Assessment improves learning outcomes for procedural skills.

These advantages of assessment are due to extrinsic and intrinsic effects of assessment. Van der Vleuten (1996:41-67) and McLachlan (2006:716-717) states that through its format, content and programming assessment motivates students to learn Schoonheim-

Klein *et al.* (2006:226-235) believes that assessment influences and changes students learning strategies.

Karpicke and Roediger (2007:151-162) in a review of studies provided evidence that testing in addition to these extrinsic effects testing also had an intrinsic effect on students resulting in improved retention of that material compared with spending an equivalent amount of time restudying the material. This has been demonstrated to be a robust and independent phenomenon that applies to a variety of test formats and levels of knowledge learning (Roediger & Karpicke 2007:151-162).

Consequently, including assessment as part of a course is an efficient strategy to improve learning outcome.

5.5.4.3 *Methods of assessment*

When deciding on the methods of assessment all the various methods (cf. 2.7) were taken into consideration. For this *Essential Surgical Skills for Rural Hospitals in South Africa: A CPD Programme* the most suitable methods are Multiple Choice Questions (cf. 2.10.4.2) and Objectively Structured Clinical Examination (cf. 2.10.4.4).

Multiple Choice Questions (MCQ's) have advantages that make it a good option for this programme:

- Measurement at all the levels of the cognitive domain is possible, e.g. factual knowledge, insight and understanding, analysis and synthesis, problem-solving and evaluation.
- The results are highly reliable.
- A large amount of learning content and outcomes can be tested in a relatively short time.
- Guessing is limited (in comparison with true/false items).

Assessments that incorporate feedback, for example, an Objective Structured Clinical Examination (OSCE) may induce learning (Brazeau, Boyd & Crosson 2002:932-936). The Objective Structured Clinical Examination (OSCE) is used widely in medical training. The advantages that make it an applicable choice is listed below.

- The OSCE is reliable, valid, feasible, objective and acceptable to students.
- It is an extensive and standardized method of assessment.
- It tests a wide range of clinical skills.
- It can measure outcomes at all the cognitive levels.
- It can be readily repeated.
- The assessment can be standardized by means of checklists.
- Assessments are the same for all candidates.
- It is easily adaptable depending on the circumstances, resources (e.g. patients available), number of stations, discipline, etc.
- Standard criteria can be easily determined.
- Examiners can give feedback promptly.
- It is a learning opportunity.

5.5.4.4 Timing of assessment

The assessment, as the contents of the *Essential Surgical Skills for Rural Hospitals in South Africa: A CPD Programme* will be in two parts. The first assessment will evaluate the students on the study material that was learned through self-study at the start of the three-day practical skills training. The second part will be in the form of an OSCE at the end of the practical skills training. This will take place during the following course weekend on the Friday in the clinical skills lab when the new student group is having the Day 1 lecture session. The will be an opportunity to rewrite the MCQ test on the start of Day 2. The OSCE can be repeated on the next course's Day 1.

5.5.5 Communication regarding programme

Dent *et al*. (2013:31-43) points out that failure in communication is a common problem in medical teaching. The student must a clear understanding of the learning outcomes, the access to learning experiences, how to match the available learning experiences with their own needs, and to give them guidelines to decide whether they mastered the topic. An overview of the outcomes will be provided in the study guide and the specific outcomes of each surgical skill station during the simulation-based clinical skills centre training will be communicated at the start of each session.

5.5.6 Educational environment

Promoting an appropriate educational environment (cf. 2.3) that is collaborative rather than a competitive environment is ideal for medical teaching (Dent *et al*. 2013:31-43). This will be promoted in *Essential Surgical Skills for Rural Hospitals in South Africa: A CPD Programme* providing the students with a clear framework of the expected outcomes. The programme design will accommodate distance learning (cf. 2.7.4). The use of a variety of educational tools such as e-learning (cf. 2.7.2), simulation-based education (cf. 2.7.6) and the use of peer assisted learning (cf. 2.7.5) in the backdrop of clinical skills centre training (cf. 2.7.3) will also contribute to the educational environment

5.5.7 Programme management

Attention needs to be given to the financial burden, time constraints and staff development to assure academic standards and quality (Dent *et al*. 2013:31-43). The program is a systematic uniform discipline-based programme that consists of two components, study material for self-study and simulation based clinical skills centre training for procedural training over a three day period. This will not cause extreme demands on finances or time.

5.6 SCHEMATIC OVERVIEW OF THE COURSE

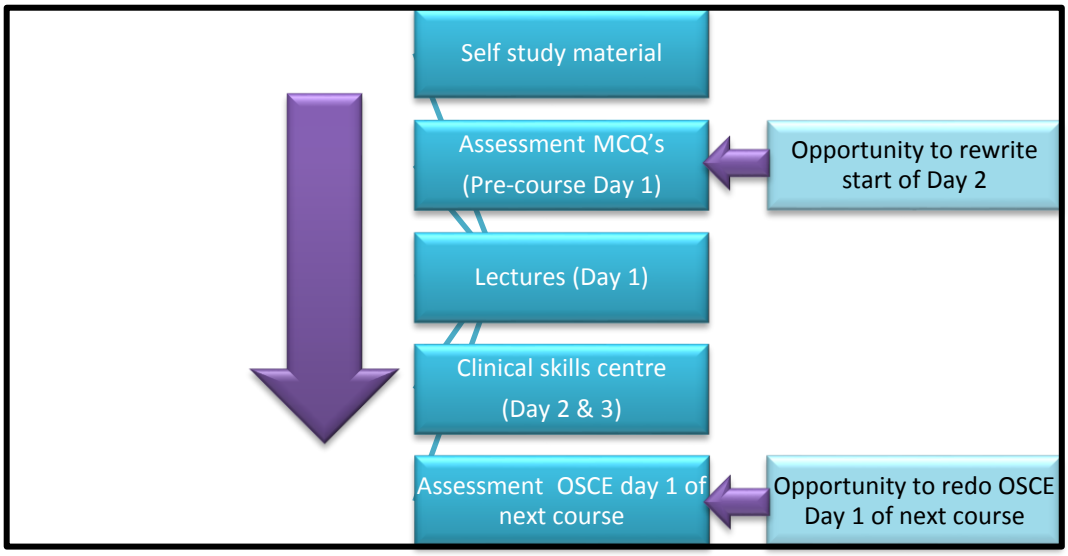

FIGURE 5.2: SCHEMATIC OVERVIEW OF THE COURSE

5.7 CONCLUSION

In this chapter an explanation of the critical cross field outcomes of *Essential Surgical Skills for Rural Hospitals in South Africa: A CPD Programme* and the level descriptors of a programme at exit level 08 within the nested approach was presented followed by the specific outcomes and essential content for a *Essential Surgical Skills for Rural Hospitals in South Africa: A CPD Programme* in a tabular format as derived from the study. Educational strategies and teaching tools for the programme were also discussed.

The next chapter, Chapter 6, ***Conclusions and recommendations,*** will state the conclusion of the thesis and make recommendations for future study.

CHAPTER 6

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

An in depth study was done by the researcher with the aim of determining the outcomes and potential contents of a short learning programme *Essential Surgical Skills in Rural Hospitals in South Africa: A CPD Programme.* The purpose of this programme is to develop and improve the surgical skills of general practitioners in rural South Africa. This programme is aimed at doctors in the public sector and private practice in rural South Africa.

In this chapter, the conclusions of the thesis, recommendations and limitations for the study are presented. The overview of the study is given first followed by the conclusions drawn from the study, a brief discussion of the limitations of the study, the contribution to knowledge and the study's significance. Lastly the recommendations for future study and concluding remarks are made.

6.2 OVERVIEW OF THE STUDY

Providing surgical services in rural areas remains a challenge globally (cf. 1.2.1). This is a difficult challenge in developed and developing countries alike.

In the United States of America they are actively recruiting general surgeons and changing the surgical training programs to draw surgeons to rural hospitals (cf. 1.2.1). Australia's efforts are focussed at training general surgeons specifically for rural practice in combination with general practitioners that are also trained for rural practice (cf. 1.2.1). In Canada general practitioners provide rural surgical care, but the pool of skilled practitioners is getting smaller and is difficult to replenish and maintain (cf. 1.2.1). The most successful programme in Canada for training GP's in surgical skills according to Hindle (2006:185) has only produced 16 trained doctors over a period of 12 years.

The attempts at meeting the demands for rural surgical services in developing countries take different forms. In Pakistan (cf. 1.2.1), Nigeria and Sudan (cf. 1.2.2) service delivery in rural areas are in the form a mobile surgery clinics, addressing the need for elective surgery, but not emergency services. Other countries opt for training of general

practitioners like in Niger (cf. 1.2.2). Tanzania and Mozambique are examples of countries where assistant medical officers are trained only to deal with obstetrics, and with great competency, providing proof the expertise in a limited scope of practice can be obtained over a relative short time-span (cf. 1.2.2).

As in the rest of the world, it is also a challenge in South Africa to provide adequate and high quality surgical care in rural areas (cf. 1.1). Traditionally the responsibility for these services was left to general practitioners. With this background and statistics reporting surgical diseases between 11 and 15% of the global disease burden it is a surprise that very little is currently known about surgical service delivery in rural areas in South Africa (cf. 1.1). We are currently in a process of change and improvement in our healthcare system with the planning and development of National Health Insurance. As NHI is currently standing no provision for surgical service has been made (cf. 1.2.3). These facts and the Continued Professional Development as set out by the HPCSA (cf. 2.6.1) and my personal experiences as a general surgeon servicing a rural community stimulated my interest in this study to attain the the outcomes and essential content of *Essential Surgical Skills in Rural Hospitals in South Africa: A CPD Programme.*

The demarcated field and scope of the study lies in the domain of programme development, in reaching interdisciplinary between the fields of Health Professional Education and Surgery (cf. 1.5).

In Chapter 1, the orientation to the study was set out, a brief background to the research problem and the research question was stated. The aims, objectives, and methods employed to achieve them were discussed briefly. The demarcation of the field and the scope of the study, its value and significance, and the implementation of the findings were also explained.

In Chapter 2, the theoretical perspectives of the study were provided. Curriculum design, South African and international rural surgery perspectives were analysed and discussed. Continued professional development, educational approaches and learning tools were explained before assessment and South African Qualifications Authority perspectives were discussed.

In Chapter 3, the description of the design of the study and the methods implemented to collect data for the empirical part of the study were explained.

In Chapter 4, the results of the questionnaire survey were presented and analysed and the interpretation of the findings were explained.

In Chapter 5, the critical cross field outcomes of *Essential Surgical Skills in Rural Hospitals in South Africa: A CPD Programme* and the level descriptors of a programme at NQF Exit Level 08 within the nested approach was presented followed by the specific outcomes and essential content for *Essential Surgical Skills in Rural Hospitals in South Africa: A CPD Programme* in a tabular format as derived from the study. This was presented against a background of curriculum design. Educational strategies and teaching tools for the programme were also discussed.

This chapter concludes this dissertation.

In Chapter 1 (cf. 1.3) the reasons that led to the formulation of the research question and the outline of the research question were presented.

The overall goal of this study was to conduct a critical analysis of the surgical skills required by general practitioners in rural South Africa, with the final product of providing a curriculum for an accredited CPD learning programme addressing these specific needs. This may be used to train GPs in the required surgical skills, ultimately improving healthcare in rural areas in South Africa.

Four main objectives were pursued in order to obtain answers to the research question and achieve the aims of the study. In Section 6.2.1 the research question is reviewed together with the four objectives and the findings of the research study.

6.2.1 Research questions and objectives

The research question (cf. 1.3) was - ***What should the contents of a CPD programme be in addressing essential surgical skills in South African rural areas for general practitioners be?***

Sub-questions that emanated from the main research question were:

i. What is the current level of surgical skills of GPs in rural areas?

ii. What are the essential surgical procedures skills set that are needed by GP's in rural areas?

The following four objectives were pursued to answer the research question (cf. 1.4.3):

a) *Conceptualising and contextualising the development of a CPD programme to address surgical skills as required by GP's in rural areas*.

This was done via a literature study of related South African and international literature and an analysis of related national documents. Chapter 2 gives an overview of the literature review and document analysis performed. The use of recent literature published over the past ten years, but also including renowned authors before 2007 ensured the validity of this data. The external validity was guaranteed and enhanced with the inclusion of international literature (cf. 3.4.2).

b) Determining the current surgical skills of GP's in rural areas in South Africa.

This objective was achieved through a literature review and document analysis of relevant national and international articles and documents as discussed in Chapter 2 and a Likert type questionnaire that was send out to general practitioners in rural South Africa. This instrument was tested with a pilot study to ensure that reliability of the results was beyond doubt. The reliability and generalisability were enhanced with the selection of the specific target population, the use of literature and a document analysis to design and plan the questionnaire. The research methodology was discussed in Chapter 3 and the results and analysis of the results from the questionnaire presented in Chapter 4 (cf. 4.3).

c) Gained a thorough insight into the challenges faced and needs in terms of essential surgical skills for GPs in rural South Africa.

The questionnaire survey served as the method to gain this objective (cf. 6.2.1-b). A discussion of the results was performed in Chapter 4 (cf. 4.4 & 4.5).

d) Determined and proposed the contents of a CPD programme for addressing the identified shortcomings in required surgical skills in rural South Africa.

This objective was achieved by the use of the questionnaires and analyses of documents. The results for the questionnaire survey were discussed in Chapter 4. The contents for a CPD programme was tabulated and discussed in Chapter 5.

6.3 CONCLUSION

In this research project, an in-depth study was done by the researcher with a view to develop and improve surgical skills of general practitioners in rural South Africa.

The researcher investigated the current situation faced by general practitioners in rural areas in South Africa when dealing with surgical procedures. Internationally there is widespread concern that GP's do not have the required essential surgical skills as required in delivering a professional service in a rural setting (Halaas, Zink, Finstad, Bolin & Center 2008:345-352). The research showed that GP's in rural areas still perform a variety of procedures (cf. 4.3), but there were procedures that were deemed essential that were not commonly performed (cf. 4.4).

It is important to understand that training for rural practice differs dramatically from training at tertiary hospitals (Van Schalkwyk, Bezuidenhout, Conradie, Fish, Kok, Van Heerden & De Villiers 2014:1-9). This shortcoming necessitated the description of outcomes and essential content for a CPD accredited short learning programme in essential surgical skills in rural South Africa, which was the aim of the research.

A modified Likert-type questionnaire was used to generate and analyse quantitative data, enhanced with qualitative open-ended questions using the EvaSys survey-management system. The results were interpreted and presented in Chapter 4.

A set of empirical data was generated from the questionnaire survey- the purpose of which is explained in Section 6.2.1 and in Chapter 4. The results revealed that the level of surgical skills and the amount of surgical procedure performed vary greatly between general practitioners.

The participants were also asked to indicate what procedures they deemed essential skills for rural surgery. The participants were asked to indicate whether in their opinion the procedures were essential, useful or not useful. Consensus was deemed if more than 50% of participants were of the view that the procedure was essential. Twenty-three of 41

procedures in the questionnaire were deemed essential. This is discussed and tabulated in Chapters 4 and 5.

Outcomes for *Essential Surgical Skills in Rural Hospitals in South Africa: A CPD Programme* was also pinned at NQF level 08 and matched with the outcomes identified by participants in the questionnaire (cf. Chapters 4 & 5).

Important challenges and views of general practitioners were gathered regarding other procedures that might be deemed essential in future. The views and beliefs in terms of their attitude towards HIV and surgery was a valuable contribution. The impact that the Medico-Legal risk has on the way general practitioners (that took part in the research) practice were insightful. These results are presented in Chapter 4.

6.4 LIMITATIONS OF THE STUDY

The following limitations were recognised by the researcher in the study:

i. Non-adherence to time limit set for the questionnaire. Although participants were informed before and during the distribution of the questionnaire about the time limits within which responses should be given, participants did not respond within the time limits stipulated. This forced the researcher to extend the time limits until adequate responses had been received or no more responses were expected. The heavy workload in clinical fields may have contributed to respondents' delay in responding.
ii. Delays at EvaSys administrator. The EvaSys survey management system at the UFS. According to their terms and conditions they would convert my Excel based to their Evasys format as soon as they received a 50% deposit on the total quotation. The proof of payment had to be e-mailed to them. The administrator changed and despite an e-mailed confirmation of payment there was quite a delay before I received the first draft of the questionnaire. There was also delays due to the administrator being on leave during the actual survey.
iii. During the course of the research the researcher accepted an offer to move his practice from Uitenhage to Port Elizabeth. Consequently, much of his time was absorbed by relocation to another town and getting acquainted with a new workplace. This was a very difficult time in terms of time management as the researcher has four children and a wife that also relocated with him and needed assistance in settling down in their new environment with extra demands on time.

iv. Lower than expected response rates. The response rates for the questionnaire survey was lower than expected. The researcher knows that participants were very busy with various commitments. Numerous notifications using were used to remind participants to complete the questionnaire survey. The researcher also supplied hard copies to participants that paper instead of e-mailed questionnaires. The researcher believes that travelling to the refresher courses where that general practitioners attended in Family medicine and personally encouraging them to complete the questionnaire survey would have increased response rates and made it possible to obtain responses within the stipulated timeframe, but due to financial and time constraints and vast distances, the researcher was not able to travel to respondents.

6.5 CONTRIBUTION TO KNOWLEDGE

The researcher is of the opinion that the research made a contribution to new knowledge by describing outcomes and essential content that are either not or inadequately described in the current literature. The programme presented in Chapter 5 will be rolled out at the University of the Free State, but is standardized and can be presented at any institutions with an adequately equipped clinical skill centre for the necessary simulation-based training. The programme outcomes and content described through this research can be applicable internationally as well.

In addition to the above, the research also provided:

- A clear understanding of the current practice in rural surgery performed by general practitioners in South Africa;
- A better and clear description of attitudes among general practitioners regarding surgery in HIV patients; and
- An understanding of the negative impact the medico-legal risks currently have on surgery performed by general practitioners.

6.6 RECOMMENDATIONS

Through this study the outcomes and essential content of *Essential Surgical Skills in Rural Hospitals in South Africa: A CPD Programme* have been described. The research proved that many outcomes that are not described by the current undergraduate medical curricula or postgraduate short learning programmes and content that is not part of the current

curricula or programmes are essential. Furthermore, the research indicated a need for a short learning programme in South Africa. The way forward is to approach the various University of the Free State and present to them the programme that has been formulated, and request them to adopt it as a short learning programme. My recommendation is that the programme is rolled out in the second semester of 2017 at the UFS before approaching other universities with the programme. The clinical skill centre at the UFS provides adequately in all the requirements for presenting *Essential Surgical Skills for Rural Hospitals in South Africa: A CPD Programme*.

This research was by no means a complete study of all aspects of training general practitioners in essential surgical skills. Investigations into the different training institutions, their clinical skills centre, new developments and products for skill centre training, virtual reality simulators and training and number of students needed to justify capital investment need to be made to present a short learning programme at an adequate level. Once this has been ascertained, investigations into development and standardisation of training programmes can be carried out through further research. The description of outcomes and essential content is only the first step in developing a short learning programme that can be rolled out at national and international level.

The role of the level of training received is as important as the outcomes and contents. In fact, the training will determine whether the outcomes are met by students. It is important that the study guide and assessment guide gives clear standardised guidance to students and assessors. Haphazard training and assessment will not achieve competence. After implementing the programme comprising the outcomes and essential content, further research can be undertaken to determine the success or failure of the programme.

It is also my recommendation that the essential outcomes and contents are re-evaluated every five years to accommodate change in the requirements of rural surgical practice and advancements in clinical skills centre and virtual reality training. The content and treatment guidelines must also be review to keep the programme evidence based and current.

Although current under graduate training does not make provision for surgical skills training, I hope that the essential contents and outcomes in this study will be included in the curriculum to provide the academic background to medical students to develop the surgical skills later.

6.7 CONCLUDING REMARK

"Sometimes you find yourself in the middle of nowhere and sometimes in the middle of nowhere you find yourself"

(Anonymous)

South Africa has a large rural population that is serviced by general practitioners. This study gave me insight into the challenges faced by doctors in rural areas and the essential surgical skills that would equip them to deal with these challenges on a daily basis. In the words of John Woods *"Don't let what you can't do stop you from doing what you can do".*

This study was done with the purpose of identifying the essential contents and outcomes of *Essential Surgical Skills for Rural Hospitals in South Africa: A CPD Programme*. I truly hope the hard work will lead to better surgical care for patients in rural areas and district hospitals. *"The roots of education is bitter, but the fruit is sweet"* (Aristotle).

The programme that was put forward will create an environment for adult learners to gain essential skills if presented correctly. I hope that I can evaluate this in a postdoctoral study. The learning environment is as important as the contents to produce the expected outcomes in the study. *"I never teach my pupils, I only provide the conditions in which they can learn"* (Albert Einstein).

This study further confirmed my believes that South African general practitioners are a resilient and resourceful breed that understands the importance of improvising and continuous education. I have a positive outlook towards the future of medicine and in specific surgery in rural areas.

I conclude with the words of South Africa's most famous son:

"Education is the most powerful weapon we can use to change the world"

(Nelson Mandela)

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19. APPENDICES

APPENDIX A:

Abbreviated Curriculum Vitae of researcher

NAME: David Clement Porter
ID NUMBER: 7412145046082
STUDENT NUMBER: 1993023876 **HPCSA NUMBER:** MP0505668
PRACTICE NUMBER: 0172723
QUALIFICATIONS: M.B.Ch.B 1998 University of the Free State
F.C.S.(S.A.) 2004 CMSA, training at UFS

WORK EXPERIENCE:

- Surgeon in private practice at Cuyler Netcare Hospital in Uitenhage 1/1/2005 until present.
- Part-time consultant and HOD of Surgery Department at Uitenhage Provincial hospital 1/1/2005 until present.
- Monthly gastroscopy list in Cradock 2012 until present.

ACADEMIC MEETINGS:

- Involved in surgical lecture program at Uitenhage Provincial Hospital.
- Attend and present at quarterly Gastro-Intestinal Forum meeting in Port Elizabeth.
- Attend and present CPD lecture at Cuyler Netcare Hospital.
- Presented suturing workshop to GPs in Victoria Canada 2010.

CONGRESSES ATTENDED:

- SAGES and ISW 2005 in Durban, South Africa.
- SAGES 2006 in Port Elizabeth, South Africa.
- ISW 2007 in Montreal, Canada.
- ACS Annual Congress 2008 in San Francisco, USA.
- SAGES 2010 in Johannesburg, South Africa.
- Burns Symposium 2011 in Cape Town, South Africa.

COURSES ATTENDED:

- Advanced Laparoscopic Suturing Techniques 2005 in Port Elizabeth.
- Advanced Stapling Techniques 2005 in Cape Town.
- Laparoscopic Inguinal Repair 2007 in Cape Town.
- Laparoscopic colectomy 2008 in Johannesburg.
- Laparoscopic colorectal surgery course 2009 at MATTU, Guildford, UK.
- Workshop on Inflammatory Bowel Disease and Ileo-anal Pouches 2013 in Bologna, Italy.
- Masterclass in Bariatric Surgery 2015 Istanbul, Turkey.

APPENDIX B:

Letter of request for potential participants to complete questionnaire

APPENDIX B:

Letter of request for potential participants to complete questionnaire

Dear ..... (Name of potential participant)

Essential Surgical Skills in Rural Hospitals: A CPD Programme

I am extending a cordial invitation to participate in this research project where an in-depth study will be done by the researcher with a view to developing a CPD accredited short-learning course to upscale the surgical skill of general practitioners in rural South Africa. The research completion is for a Ph.D in Health Professions Education at the University of the Free State.

You have been chosen according to the selection criteria stipulated in the research protocol as you are in a position to provide valuable input in this regard. The research is in the form of a questionnaire and will be provided in electronic format on the Internet and will take approximately 15 minutes to complete. Your assistance will be sincerely appreciated.

The information provided will be treated with strict confidentiality and necessary professional discretion. To ensure this, number codes will be used and there will be no references to participant's names when the research results are reported. Participation is entirely voluntary and there will be no financial compensation for participants. You may withdraw from this study at any given moment during completion of the questionnaire.

The aim of this study is to determine what specific surgical procedures are relevant to general practitioners in rural South Africa and to determine the contents of a short-learning course to address this need.

This study deals with doctors in the public sector and private practice in rural South Africa that have HPCSA registration as general practitioners for independent practice. This group of doctors is expected to treat or refer patients for surgical diseases.

The 2011 Local Government Budgets and Expenditure review uses the Rural Development Framework (1997) definition defining rural areas as having the following characteristics:

- Sparsely populated areas in which people farm or depend on natural resources, including villages and small towns that are dispersed through these areas.
- Areas that include large settlements in former homelands, which depend on migratory labour and remittances as well as government social grants for their survival.

For the purpose of this study the definition of rural doctors is general practitioners that are working in rural areas as defined above or working in a district hospital.

This research project can serve as a directive for providing essential surgical services in rural hospitals by equipping doctors with a specific skill set. The goal is to determine the needs and to define the contents of a short-learning course to obtain the necessary skills.

The results of this study will be submitted for publication.

My supervisors are:
1. Prof R du Toit (Head of Surgery Department, Faculty of Health Sciences, UFS).
2. Dr J Bezuidenhout (Division of Health Sciences Education Development, Faculty of Health Sciences, UFS).

Should you have specific questions, please feel free to contact me.

Yours faithfully

Dr DC Porter
Telephone number: (W) 041 9227144
Cellular number: 0824560073
E-mail address: dporter@wol.co.za
PO box 1263
Uitenhage
6230
South Africa

APPENDIX C:

Letter of request for approval from the Dean of the UFS Faculty of Health Sciences to conduct the research study

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Letter of request for approval from the Dean of the UFS Faculty of Health Sciences to conduct the research study

May 2013

Prof GJ van Zyl
Dean of the Faculty of Health Sciences
University of the Free State
Bloemfontein

Dear Professor Van Zyl

Application for permission to perform a research study to determine the required surgical skills for general practitioners in rural South Africa with the view to developing a CPD accredited short-learning course

I have registered for a Ph.D. degree in Health Professions Education, for which I must conduct a study related to Health Professions Education. I am a surgeon working in Uitenhage, in the Eastern Cape. I have a part-time consultant post at the local district hospital and have over the past 8 years not only been involved in the training of the junior doctors, but also in the treatment of patients referred from general practitioners working in the surrounding rural areas. This experience has sparked a keen interest in me for the training of general practitioners in general surgery, but also made me aware of the unique challenges facing doctors in rural areas. I sincerely hope that my intended research will contribute in addressing some of the problems related to surgery in rural areas.

The title of my study is: **Essential Surgical Skills in Rural Hospitals: A CPD Programme**

My supervisors are:
1. Prof R du Toit (Head of Surgery Department, Faculty of Health Sciences, UFS).
2. Dr J Bezuidenhout (Division of Health Sciences Education Development, Faculty of Health Sciences, UFS).

The aim of this study is to determine what specific surgical procedures are relevant to general practitioners in rural South Africa and to determine the contents of a short-learning course to address this need.

This study deals with doctors in the public sector and private practice in rural South Africa that has HPCSA registration as general practitioners for independent practice. This group is expected to treat or refer patients for surgical diseases.

The 2011 Local Government Budgets and Expenditure review uses the Rural Development Framework (1997) definition defining rural areas as having the following characteristics:
- Sparsely populated areas in which people farm or depend on natural resources, including villages and small towns that are dispersed through these areas.
- Areas that include large settlements in former homelands, which depend on migratory labour and remittances as well as government social grants for their survival.

For the purpose of this study the definition of rural doctors is general practitioners that are working in rural areas as defined above or working in a district hospital. This is my target population and intended sample group.

This research project can serve as a directive for providing essential surgical services in rural hospitals by equipping doctors with a specific skill set. The goal is to determine the needs and to define the contents of a short-learning course to obtain the necessary skills.

The research is in the form of a questionnaire (quantitative with qualitative enhancement) and will be provided in electronic format on the internet and will take approximately 15 minutes to complete. I have attached a copy for your information. The information provided by the participants will be

treated with strict confidentiality and necessary professional discretion. To ensure this, number codes will be used and there will be no references to participants' names when the research results are reported. Participation is entirely voluntary and there will be no financial compensation for participants.

The results of this study will be submitted for publication.

I would sincerely appreciate your attention and consideration of this request.

Yours faithfully

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APPENDIX D:

Letter to inform the Vice-Rector of the UFS: Academic of the research study

APPENDIX D:

Letter to inform the Vice-Rector of the UFS: Academic of the research study

November 2013

Prof HR Hay
Vice-Rector: Academic
University of the Free State
Bloemfontein

Dear Professor Hay

Letter of information regarding a research study to determine the required surgical skills for general practitioners in rural South Africa with the view to developing a CPD accredited short-learning course.

I have registered for a Ph.D. in Health Professions Education, for which I must conduct a study related to Health Professions Education. I am a surgeon working in Uitenhage, in the Eastern Cape. I have a part- time consultant post at the local district hospital and have over the past 8 years not only been involved in the training of the junior doctors, but also in the treatment of patients referred from general practitioners working in the surrounding rural areas. This experience has sparked a keen interest in me for the training of general practitioners in general surgery, but also made me aware of the unique challenges facing doctors in rural areas. I sincerely hope that my intended research will contribute in addressing some of the problems related to surgery in rural areas.

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For the purpose of this study, the definition of *rural doctors* is general practitioners that are working in rural areas as defined above or working in a district hospital. This is my target population and intended sample group.

This research project can serve as a directive for providing essential surgical services in rural hospitals by equipping doctors with a specific skill set. The goal is to determine the needs and to define the contents of a short learning course to obtain the necessary skills.

The research is in the form of a questionnaire (quantitative with qualitative enhancement) and will be provided in electronic format on the Internet and will take approximately 15 minutes to complete. I have attached a copy for your information. The information provided by the participants will be

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The results of this study will be submitted for publication.

I would sincerely appreciate your attention and consideration of this request.

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APPENDIX E:

Letter of request for approval from the Director General, National Department of Health to conduct the research study

APPENDIX E:

Letter of request for approval from the Director General, National Department of Health to conduct the research study

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May 2013

Office of the Director General
National Department of Health
Private Bag X828
Pretoria
0001
E-mail: khanyv@health.gov.za

Dear Director General

Application for permission to perform a research study to determine the required surgical skills for general practitioners in rural South Africa with the view to developing a CPD accredited short-learning course.

I have registered for a Ph.D. in Health Professions Education, for which I must conduct a study related to Health Professions Education. I am a surgeon working in Uitenhage, in the Eastern Cape. I have a part -time consultant post at the local district hospital and have over the past 8 years not only been involved in the training of the junior doctors, but also in the treatment of patients referred from general practitioners working in the surrounding rural areas. This experience has sparked a keen interest in me for the training of general practitioners in general surgery, but also made me aware of the unique challenges facing doctors in rural areas. I sincerely hope that my intended research will contribute in addressing some of the problems related to surgery in rural areas.

The title of my study is: **Essential Surgical Skills in Rural Rospitals in South Africa: a CPD Programme**

My supervisors are:
1. Prof R du Toit (Head of Surgery Department, Faculty of Health Sciences, UFS).
2. Dr J Bezuidenhout (Division of Health Sciences Education Development, Faculty of Health Sciences, UFS).

The aim of this study is to determine what specific surgical procedures are relevant to general practitioners in rural South Africa and to determine the contents of a short-learning course to address this need.

This study deals with doctors in the public sector and private practice in rural South Africa that has HPCSA registration as general practitioners for independent practice. This group is expected to treat or refer patients for surgical diseases.

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- Areas that include large settlements in former homelands, which depend on migratory labour and remittances as well as government social grants for their survival.

For the purpose of this study, the definition of *rural doctors* is general practitioners (public and private sector) that are working in rural areas as defined above or working in a district hospital. This is my target population and intended sample group.

This research project can serve as a directive for providing essential surgical services in rural hospitals by equipping doctors with a specific skill set. The goal is to determine the needs and to define the contents of a short-learning course to obtain the necessary skills.

The research is in the form of a questionnaire (quantitative with qualitative enhancement) and will be provided in electronic format on the Internet and will take approximately 15 minutes to complete. I have attached a copy for your information. The information provided by the participants will be treated with strict confidentiality and necessary professional discretion. To ensure this, number codes will be used and there will be no references to participants' names when the research results are reported. Participation is entirely voluntary and there will be no financial compensation for participants.

The results of this study will be submitted for publication.

I would sincerely appreciate your attention and consideration of this request.

Yours faithfully

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