Building consensus on clinical procedural skills for South African family medicine training using the Delphi technique

Mash B, MBChB DCH DRCOG MRCGP PhD
Family Medicine and Primary Care, Stellenbosch University
Couper I, MBBCh MFamMed
Chair of Rural Health, Department of Family Medicine, University of the Witwatersrand
Hugo J, MBChB MFamMed
Associate Professor, Department of Family Medicine, University of Pretoria
and Facilitator of the FaMEC / ICHO Development of Family Medicine Training in South Africa

Correspondence to: Prof Bob Mash, e-mail: rm@sun.ac.za

Abstract

Background

The development of registrar training as part of the newly created speciality of family medicine in South Africa requires the development of a national consensus on the clinical procedural skills outcomes that should be expected of training programmes.

Methods

This study utilized a Delphi technique to establish a national consensus between 35 experts from training institutions, those already in family practice and managers who might be employing family physicians in both private and public sector contexts.

Results

Consensus was reached on 214 core skills at different levels of desired competency and 23 elective skills. The core skills were divided into 58 that should be taught by family physicians, 101 that should be performed independently and 55 that should be performed during training under supervision. The panel were unable to reach consensus on a further 21 skills.

Conclusion

This is the first study that has proposed a set of essential clinical procedural skills for the training of family physicians in South Africa. The findings will act as a benchmark for programmes in South Africa and through the new initiative of 'FaMEC in Africa' may influence curriculum development in other African countries. They may be used as a guide for curriculum planning, as a way of monitoring skills development and as an indication to registrars of the skills they need to achieve for assessment purposes. The findings may also inform the planning of training programmes for the proposed mid-level health worker (clinical associate) in South Africa as their skills will be a sub-set of these skills and will be taught by family physicians within district hospitals. Training programmes for undergraduates and interns in family medicine may also want to position themselves as stepping stones in line with these final outcomes of postgraduate training.

SA Fam Pract 2006;48(10):14

The full version of this article is available at: www.safpj.co.za **Ⓟ This article has been peer reviewed**

Introduction

The Health Professions Council of South Africa (HPCSA) recognised family medicine as a specialty at the end of 2003. As a result of this decision there was a need to reach agreement on national norms and standards for registrar training. The Family Medicine Education Consortium (FaMEC), which incorporates all the South African university departments of family medicine, is at the forefront of this process with a project sponsored by a grant from the Interuniversitair Centrum voor Huisartsopleiding (ICHO) and the Belgian Government. Flagship training sites for the first formal registrar posts in family medicine are being developed in each province.

Registrars in family medicine, as in other disciplines, will also be registered as M Med students at one of the universities in South Africa. Postgraduate programmes in family medicine have been perceived as relatively strong academically, but weak in the area of clinical skills training and supervised professional experience. Significant knowledge and skills gaps in medical officers at district hospitals have been identified.[1] As formal training sites and registrar posts are developed this relative weakness should be corrected and it will be necessary to reach a national consensus on what clinical skills are essential outcomes of such training. Any employer looking at a graduate with an M Med degree and certified registrar training should be confident that this family physician (FP) will be competent to perform certain nationally agreed clinical skills.

The job description of a FP in South Africa may vary widely depending on the context. For example a trained FP may work in a private practice in an urban area seeing mainly ambulatory office-based primary care, in a large community health centre in the public sector, in a managed care practice or in a rural or district hospital where more hospital-based surgical, obstetric and anaesthetic skills are required. Although FPs may be employed in diverse settings, FaMEC is clear that graduates must be competent to work in both the ambulatory primary care as well as the hospital-based generalist environment.

This study therefore aimed to establish a national consensus on the core clinical skill outcomes for training of registrars in family medicine in South Africa. A clinical skill was defined as a practical procedure that would be performed as part of clinical management of a patient. Management, research and teaching skills were excluded.

Methodology

A modified Delphi method was used. This was chosen because it is a practical and well documented method for obtaining consensus at a distance.[2;3] It is a useful process for developing standards when there is insufficient existing evidence for decision-making.[4] The Delphi technique quantifies consensus among a panel of experts so that the opinions of the panel on the relative importance of specific issues are progressively refined by reviewing colleagues' input. Key features are anonymity of the panel members, iteration with controlled feedback from a series of questionnaires, quantitative analysis of the group response and the use of explicitly defined expert opinion.[2; 3]

Experts, defined as individuals believed by the researchers to have useful knowledge of the topic [5], were selected from three groups, viz.

1. Those currently responsible for training of family physicians in academic Departments of Family Medicine.
2. Family physicians working in typical public, private, rural, urban, primary and district hospital settings within all provinces of South Africa
3. Managers who employ family physicians within the district health system or within private sector organizations from all provinces of South Africa.

Members of these groups who might be willing to engage with the process were identified by the research team. Out of 48 such experts who were invited to participate, 35 agreed (12, 15 and 8 in each of the three categories respectively) and informed consent to participate was obtained.

The panel was asked to respond to a series of three questionnaires that were sent to them electronically over a 6 month period. Data was analysed in STATISTICA version 7. Consensus was defined as 70% or more of the group agreeing on the level for that skill; when this was obtained the item was removed from subsequent questionnaires. Each questionnaire provided space for panel members to clarify the meaning of any items, suggest new items that should be included or to give any other qualitative feedback on the contents of the questionnaire.

First questionnaire

The first questionnaire contained a list of 226 clinical skills. The list was drawn up from existing training programme curricula, the SA Family Practice Manual, [6] local research on skills required at district hospitals [1] and the experience of the authors who are all involved in postgraduate education. The initial definitions for level of expertise were adapted from the levels for skills described in the Blueprint 1994 for training of doctors in the Netherlands. [7] The questionnaire asked the respondents to select one of the options for each clinical skill:

Only Theory:
The doctor must have only theoretical knowledge regarding the skill's principles, indications, contraindications, performance and complications.
Seen or have had demonstrated:
The doctor must have the theoretical knowledge regarding the skill and have seen or observed the skill demonstrated
Apply/Perform:
The doctor must have the theoretical knowledge regarding the skill and have performed the skill in question under supervision, at least several times.
Routine:
The doctor must have the theoretical knowledge regarding the skill and have experience in using and performing the skill independently.
Teach
The doctor must have the theoretical knowledge regarding the skill, experience in using and performing the skill independently, and be able confidently to teach the skill to other health care workers.

Second questionnaire

In the second round, the last option for rating a skill ("teach") was amended in line with feedback from the panel, who had difficulty distinguishing between the "routine" and "teach" categories and expressed a desire to consider some items as "electives". Thus a new definition was added to this questionnaire, in place of the "teach" level, viz.

Elective
This is a skill that an individual Registrar elects to learn as opposed to a skill that all Registrars should learn. The skill should still be clearly relevant to Family Medicine as practiced in certain SA settings.

When analyzing the second questionnaire, if the combination of "seen or have demonstrated" and "elective" was more than 70% this was interpreted as mean-

ing the skill should have been observed and could be mastered fully as an elective skill. Where the combination of "apply/perform" and "routine" was more than 70% this was interpreted as meaning that there was at least consensus that registrars should achieve "apply/perform" as a skill level . The results of the first questionnaire were embedded in the second questionnaire as feedback to the panel.

Third questionnaire

The remaining skills, on which consensus had not been reached, were again presented to the panel and they were asked to decide between only two categories "apply/perform" and "elective". Two categories were used to help panel members resolve their ambivalence as to whether a skill should be part of the core curriculum or an elective option by requiring them to make a choice between the two. The following new definitions were thus given:

Apply/Perform:
The doctor must have the theoretical knowledge regarding the skill and have performed the skill in question under supervision, at least several times. They therefore will be familiar with the skill and could perform it if they had to.

Seen or have had demonstrated / Elective
The doctor must have the theoretical knowledge regarding the skill and have seen or observed the skill demonstrated. They therefore will be familiar with the skill and could easily explain it to a patient and if necessary would learn how to do it as an elective.

Again the results of the second questionnaire were embedded as feedback to the panel.

The goal throughout was to identify the core skills for the training curriculum and adjustments in definitions were made in order to clarify that and to require respondents to make clear choices. The panel members did not know each others identity and feedback of data to them was anonymous. All data was collated by a research assistant and provided anonymously to the researchers to prevent any prejudice in its interpretation. Ethical approval was obtained from the Research and Ethics Committee of Stellenbosch University.

Results

Response rates obtained to the 3 questionnaires from the 35 panel members were, in sequential order, 83%, 66% and 69%. There were no significant differences in response rate between the groups.

The skills for which consensus was obtained at different levels of competency are shown in Tables 1, 2, 3 and 4. The skills for which no consensus was obtained are shown in Table 5. The skills are presented in categories for ease of reference. Note that the consensus of the panel did not select option 1 "Theory only" for any of the suggested skills.

Discussion

This is the first study that has proposed a set of essential clinical procedural skills for the training of family physicians in South Africa. The findings will act as a benchmark for programmes in South Africa and through the new initiative of 'FaMEC in Africa' may influence curriculum development in other African countries. They may be used as a guide for curriculum planning, as a way of monitoring skills development and as an indication to registrars of the skills they need to achieve for assessment purposes. The findings may also inform the planning of training programmes for the proposed mid-level health worker (clinical associate) in South Africa as their skills will be a sub-set of these skills and will be taught by family physicians within district hospitals. Training programmes for undergraduates and interns in family medicine may also want to position themselves as stepping stones in line with these final outcomes of postgraduate training.

A similar study performed in Canada identified 65 core skills and 15 elective skills for family medicine training.[8] The smaller number of skills identified in this study reflects the broader scope of practice expected of South Africa family physicians as well as differences in the methodology. For example examination skills and interpretive skills were excluded and consensus in round one was set at 80%.

Tables 1-3 list 214 core skills, at different levels of competency, which should be included in all curricula. The difference in competence required to perform a skill routinely and to teach it was unclear to the panel. The different consensus obtained however may reflect ideas about what skills should be taught primarily by family medicine or reveal different levels of confidence in not only performing, but also demonstrating a skill to a future student. Combining the two provides a useful list of core skills as a basis for the training and assessment of family medicine specialists.

Although Table 4 defines the 23 elective skills, this list should not be considered definitive as, individual registrars in particular settings may elect to learn skills that are not listed here. For practical purposes the skills in Table 5 can also be considered as elective options in curriculum planning. The qualitative comments from the panel members showed that in some skills, such as 'cervical cerclage', they were ambivalent because of uncertainty regarding the latest evidence on the effectiveness of the procedure. In other skills, such as 'thin and thick smears for malaria', the relevance of the skill in different settings hindered the panel from coming to a consensus. Although the questionnaire clearly stated that FaMEC intended to train FPs to work in both district hospital and primary care settings, the panel members struggled at times with the different needs of rural and urban areas. This is not surprising, because it is recognised internationally that the range of skills requiring to be performed by generalists in rural practice is much wider than that expected of any individual practitioner in an urban context, generalist or specialist.[9-11]

The decision to take 70% as a cut-off for consensus was arbitrary. The literature offers little guidance on the level of agreement required as a cut-off for consensus in a Delphi study.[12] Powell describes a range of definitions from published studies, including qualitative terms such as 'most participants' agree and agreement being 'implied by the results', or specific quantitative definitions varying from 55% or 100%, with other studies leaving the interpretation of consensus open to the readers.[13] McKenna suggested a baseline of 51%.[14] The researchers were not comfortable to consider a lower level for consensus than 70%. Importantly, however, the level for consensus was defined prior to commencing data collection, which has been a failure in many studies using the Delphi technique.[2]

The number of panellists used also varies widely among studies, ranging from as low as 15 participants to over 60.[15] The relatively large size of this panel, combined with its representation of critical stakeholders in the training process together with a range of interest groups and provinces, offered the chance of greater acceptance for the

Table I: Skill that could be taught by a Family Physician

Teach (58 skills) The doctor must have the theoretical knowledge regarding the skill, experience in using and performing the skill independently, and be able confidently to teach the skill to other health care workers.	%
Examination	
Examine all body systems	100
Perform common side-room tests	
Measure capillary blood glucose	87
Measure haemoglobin	87
Perform pregnancy test	90
Perform urine dipsticks	93
Take intravenous blood sample	94
Adult health –general	
Femoral vein puncture	71
Lumbar puncture	90
Routine intravenous access	97
Adults- musculoskeletal	
Measure shortening of legs	74
Adults- abdomen	
Test stool for occult blood	74
Adults – chest	
Electrocardiogram – set-up, record and interpret	84
Interpret chest radiograph	81
Measure peak expiratory flow	83
Nebulise a patient	97
Pleural tap	71
Use inhalers and spacers	87
Adults- urology	
Penile block	71
Reduce a paraphimosis	84
Eyes	
Fundoscopy, visual fields and acuity	81
Instill drops or apply ointment	90
Remove a foreign body in the eye and evert eyelids	81
Ear, nose and throat	
Remove a foreign body from the ear	74
Remove a foreign body from the nose	74
Syringe and/or dry swab an ear	84
Take a throat swab	81
Skin	
Excise a sebaceous cyst (or similar nodules or cysts)	71
Consultation	
Assess and consult couples, families	71
Break bad news	84
Counselling for HIV, termination of pregnancy or sexual assault	84
Develop and use flowcharts for chronic care	75
Mini mental examination	74
Motivate behaviour change	84
Patient-centred consultation (all ages)	94
Shared consultation with clinical nurse practitioner	77
Use genogram and ecomap	81
Use problem-orientated medical record	90
Newborn	
Well newborn check	74
Pregnancy	
Antenatal growth chart	90
Assess foetal well being during labour	74
Episiotomy and suturing	71
Examine a pregnant woman	90
Examine progress during labour and use partogram	74
Normal vaginal delivery	84
Speculum examination	90
Women's health	
Insertion of intrauterine contraceptive device	71
Papanicolau smears	90
Emergency	
Calculate percentage burnt	71
Relieve choking	74
Give oxygen	77
Immobilise spine	74
Intubate and manage airway	71
Measure Glasgow Coma Scale	71
Anaesthetics	
Injections – intra-dermal, subcutaneous, intra-muscular, deep intra-muscular	77
Ring block	74
Child	
Assess growth and classify malnutrition	71
Administrative	
Complete a sick certificate	74
Complete a death certificate	71

Table II: Skills that should be performed independently at the end of training

Routine (101 skills) The doctor must have the theoretical knowledge regarding the skill and have experience in using and performing the skill independently	%
Adult health- general	
Arterial sampling via radial artery	77
Blood culture technique	84
Adults- musculoskeletal	
Aspirate and inject the knee	77
Inject tennis elbow / golfers elbow	70
Interpret radiographs of joints	91
Adults – abdomen	
Incision and drainage of perianal haematoma	84
Interpret the abdominal radiograph	94
Perform proctoscopy	84
Adults-urology	
Perform circumcision	80
Drain a hydrocele	74
Insert a transurethral urinary catheter	80
Insert a suprapubic urinary catheter	70
Eyes	
Incision and drainage of Meibomian cyst	77
Suture an eyelid	74
Test for squint	74
Washout an eye after chemical injury	83
Ear, nose and throat	
Manage epistaxis (cautery, nasal packing)	94
Rinne and Weber tests	81
Suture an pinna and / or earlobe	90
Skin	
Apply a 4-layer compression bandage for venous ulceration	74
Cryotherapy or cauterisation	74
Skin biopsy (punch and fusiform), skin scraping	84
Wide needle aspiration biopsy of lymph node	77
Consultation	
Conduct a family conference	83
Cope with language barriers	94
Perform a holistic 3-stage assessment and management plan	91
Take a sexual history and counsel	74
Newborn	
Assess gestational age	90
Provide Kangaroo mother care	81
Resuscitate a newborn	100
Perform umbilical vein catheterization	70
Pregnancy	
Apply and interpret a cardiotocograph	74
Assess foetal movement and wellbeing	100
Assist vaginal delivery with vacuum extraction or forceps	74
Perform Caesarean section	77
Evacuation of uterus	77
Manual removal of placenta	86
Repair third-degree tear	71
Women's health	
Perform dilatation and curettage	77
Drain a Bartholin's abscess or cyst	70
Perform endometrial biopsy or sampling	70
Perform fine needle aspiration of biopsy of breast lump	80
Perform tubal ligation	74
Emergency	
Administer rabies prophylaxis	73
Perform advanced cardio-pulmonary resuscitation in adult	90
Perform advanced cardio-pulmonary resuscitation in child	86
Debride wounds or burns	81
Perform gastric lavage	77
Give a blood transfusion	84
Incise and drain an abscess	91
Insert a chest drain	91
Insert a naso-gastric tube	84
Interpret radiographs in trauma	80
Perform an intravenous cut down	81
Manage snake bites	81
Perform a primary survey	90
Relieve tension pneumothorax	83
Remove a splinter or fish-hook	87
Perform a secondary survey	78
Select emergency equipment for the doctor's bag or emergency tray	83
Suture lacerations	94
Transport the critically ill	74
Orthopaedics	
Apply finger and hand splints	90
Apply plaster of paris (upper and lower limbs)	97

Table II continues on page 14d

Closed reductions (hand, forearm, tibia and fibula)	71
Set up traction (skeletal and skin)	80
Anaesthetics	
Administer oxygen	90
Check Boyle's machine	83
Control airways – mask	74
Give a general anaesthetic	83
Inhalation induction	71
Intravenous induction	83
Intubate and ventilate a patient	77
Perform ketamine anaesthesia	74
Monitor patient during anaesthetic	77
Recover patients in recovery room	74
Reverse muscle relaxation (mix drugs)	71
Set airflows – Magill, Circle, T-piece	83
Give spinal anaesthetic	70
Sterilize equipment	70
Ventilate patient – mask and bag	74
Child	
Assess child abuse (sexual/nonsexual)	90
Capillary blood sampling – finger and heel	87
Interpret a chest radiograph	81
Perform developmental assessment	90
Perform and interpret Tine or Mantoux tests	87
Establish an intraosseous line	74
Obtain intravenous access	77
Perform lumbar puncture	81
Use the integrated management for childhood illness approach	87
Perform suprapubic bladder puncture	74
Take venous blood sample – upper limb, external jugular vein	77
Administrative	
Certify a patient under the mental health care act	91
Complete a J88 form	100
Make appropriate referrals with a letter	96
Manage a clinic for chronic care (i.e. HIV and antiretrovirals)	87
Perform work assessment and complete disability grant forms	94
Forensic	
Assess, manage and document drunken driving	90
Assess, manage and document intimate partner violence	90
Assess, manage and document sexual assault	90
Palliative care	
Counsel a dying patient	91

Table III: Skills that should be performed under supervision during training

Apply / perform (55 skills) The doctor must have the theoretical knowledge regarding the skill and have performed the skill in question under supervision, at least several times.	**%**
Perform common side-room tests	
Microscopy of urine	87
Microscopy of vaginal discharge	78
Adult health – general	
Perform a lymph node excision biopsy	87
Perform an on-site HIV test	73
Adults- musculoskeletal	
Inject carpal tunnel syndrome	78
Inject de Quervain's tenosynovitis	70
Inject the shoulder and subacromial bursa	87
Inject trochanteric bursa	82
Adults- abdomen	
Perform anal dilatation	83
Perform an appendicectomy	74
Interpret barium swallow	74
Adults- chest	
Perform an electrocardiographic exercise stress test	83
Perform office spirometry	86
Perform pleural biopsy	74
Adults- urology	
Perform a hydrocolectomy	71
Interpret an intravenous pyelogram	70
Perform a vasectomy	71
Eyes	
Perform a subconjunctival injection	70
Use a Schiotz tonometer	83
Ear, nose and throat	
Assess hearing loss and interpret an audiogram	70
Drain a peritonsillar abscess	83
Perform indirect laryngoscopy	87
Reduce a fractured nose	70
Skin	
Inject a keloid scar	83
Perform phenol ablation of an ingrowing toenail	83
Perform a skin graft	78
Pregnancy	
Perform amniocentesis	83
Perform clinical pelvimetry	83
Perform external cephalic version	74
Perform obstetric ultrasound	83
Perform pelvic ultrasound	75
Women's health	
Perform culdocentesis	83
Implant hormones	83
Perform a laparotomy for ectopic pregnancy	83
Perform a termination of pregnancy	90
Emergency	
Perform a cricothyroidotomy	96
Insert a central venous line	91
Relieve cardiac tamponade	87
Perform peritoneal lavage	70
Suture a lip with tissue loss from a human bite	78
Perform a tracheostomy	70
Orthopaedics	
Perform amputation of a digit	87
Apply Plaster of Paris to a club foot	74
Debride an open tibia-fibular fracture	70
Excise a ganglion	78
Perform a fasciotomy	78
Reduce an elbow dislocation	87
Reduce a hip dislocation	78
Reduce a radial head dislocation	78
Reduce a shoulder dislocation	91
Anaesthetics	
Perform a Bier's block	87
Perform a brachial block	79
Perform an epidural	79
Palliative care	

Table IV: Elective skills

Seen or have had demonstrated / Elective (23 skills) The doctor must have the theoretical knowledge regarding the skill and have seen or observed the skill demonstrated. They may decide to master the skill electively.	**%**
Adults- general	
Perform Doppler ultrasound (for peripheral vascular disease)	70
Adults- abdomen	
Perform abdominal ultrasound	71
Perform anal sphincterotomy	79
Perform gastroscopy	79
Perform H. Pylori testing	79
Perform peritoneal dialysis	82
Repair a hernia	79
Adults- chest	
Perform an echocardiogram	70
Adults- urology	
Perform bilateral subcapsular orchidectomy	92
Perform cystoscopy	79
Perform El Ghorap shunt for priapism	78
Perform prostate biopsy	83
Perform a varicolectomy	73
Eyes	
Perform a cataract removal	83
Eviscerate an eye	78
Women's health	
Perform a cervical cone biopsy	70
Perform hysterectomy	74
Perform a large loop excision of the cervical transitional zone	79
Emergency	
Drill burr holes	87
Perform a laparotomy for bowel obstruction	92
Orthopaedics	
Perform an open reduction with pins and screws	96
Repair tendons or nerves	70
Dental	
Wire teeth for a mandibular fracture	87

Table V: Skills for which no consensus could be reached

Clinical skills without any consensus (21 skills)	Apply/ Perform %	See/ Elective %
Adults - general		
Perform a bone marrow biopsy	33	67
Microscopy of cerebrospinal fluid	33	67
Make thick and thin blood smears for malaria	54	46
Adults- abdomen		
Inject haemorrhoids	46	54
Perform a liver biopsy	63	37
Rubber band haemorrhoids	42	58
Perform sigmoidoscopy	58	42
Adults- urology		
Perform orchidectomy and anchoring of testes	67	33
Eyes		
Perform a slit-lamp examination	35	65
Dispense stock glasses after subjective refraction	58	42
Ear, nose and throat		
Perform tonsillectomy / adenoidectomy	50	50
Skin		
Perform skin patch testing	63	37
Newborn		
Perform exchange transfusion	50	50
Pregnancy		
Perform cervical cerclage	42	58
Women's health		
Remove cervical poly	54	46
Perform colposcopy	33	67
Emergencies		
Perform a laparotomy for stabbed abdomen	54	46
Child		
Perform extradural tap	58	42

consensus reached. We believe the final list will thus be well accepted by FaMEC.

Out of the 35 potential respondents, 29 completed the first questionnaire and only 5 of these failed to complete the third questionnaire. This response rate compares favourably with other studies.[2] The overall attrition rate was lowest in the group of practising family physicians (3 out of 15 people), followed by managers (3 out of 8 people) and academic family physicians (5 out of 12 people). Consensus was reached on 135 skills (52% of skills) in round 1 with 83% of invited respondents, 73 skills (28%) in round 2 with 66% of the respondents and 29 skills (11%) in round 3 with 69% of the respondents. Consensus on the majority of skills was therefore obtained with the largest response rate in round 1. It is difficult to determine reasons for attrition but could be due to other work pressures, lower interest in the topic or even individual characteristics. While attrition raises the possibility of bias, an important advantage of using the Delphi technique is the process of engagement with experts who literally hold a stake in the outcome, which thus has a great acceptance.[14] We deliberately chose a heterogeneous panel from 3 different groups and from all provinces to balance any potential competing interests. Furthermore, using this technique allows participants to offer and respond to ideas unbiased by the identities and pressures of other panel members.[5]

There are many ways that have been used for defining lists of procedures, such as assessing common procedures used in practice, assessing international experiences, and assessing community needs. The Delphi technique offered a way of achieving consensus from a wide group of people relatively quickly and easily, thus providing a relevant and applicable list.

Acknowledgements

This study was supported by FaMEC ICHO VLIR Own Initiatives Project (ZEIN2003PR290): Optimisation of the vocational medical training in family medicine/primary health care in South-Africa: a contribution to the realisation of health for all. The questionnaires and data were administrated and collated by Ms R Louw at Stellenbosch University.

References

1. De Villiers, M. The development of content and methods for maintenance of competence of generalist medical practitioners delivering district hospital services. 2004. Stellenbosch University.
2. Williams P,.Webb C. The Delphi technique: a methodological discourse. Journal of Advanced Nursing 1993;19:180-6.
3. De Villiers M, De Villiers P, Kent A. The Delphi technique in health sciences education research. Medical Teacher 2005;27:639-43.
4. Holden J,.Wearne J. Membership by assessment of performance: developing a method for assessing established general practitioners. British Journal of General Practice 2000;50:231-5.
5. Goodman C. The Delphi technique: a critique. Journal of Advanced Nursing 1987;12:729-34.
6. Mash B, Blitz-Lindeque J. South African Family Practice Manual. Pretoria: Van Schaik, 2006.
7. Metz, J., Stoelinga, G., Kip, E., and van den Brand-Valkenburg, B. Blueprint 1994: training of doctors in The Netherlands. Objectives of undergraduate medical education. 1994. University of Nijmegen.
8. Wetmore S, Rivet C, Tepper J, Donoff M, Rainsberry P. Defining core procedure skills for Canadian family medicine training. Canadian Family Physician 2005;51:1364-5.
9. Wonca Working Party on Rural Practice. Policy on Rural Practice and Rural Health. 2001. Traralgon, School of Rural Health, Monash University.
10. Rosenthal D. Extended Clinical Care. In Wilkinson D, Hays R, Strasser R, Worley P, eds. The Handbook of Rural Medicine in Australia, pp 113-27. Melbourne: Oxford University Press, 2004.
11. Hays, R., Evans, R., and Veitch, C. The quality of procedural rural medical practice in Australia. Rural and Remote Health . 2005; Article number 474 accessible at http://rrh.deakin.edu.au
12. Kilner T. Desirable attributes of the ambulance technician, paramedic, and clinical supervisor: findings from a Delphi study. Emergency Medicine Journal 2004;21:374-8.
13. Powell C. The Delphi technique: myths and realities. Journal of Advanced Nursing 2003;41:376-82.
14. McKenna H. The Delphi technique: a worthwhile research approach for nursing? Journal of Advanced Nursing 1994;19:1221-5.
15. Hasson F, Keeney S, McKenna H. Research guidelines for the Delphi survey technique. Journal of Advanced Nursing 2000;32:1008-15.