

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

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## 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.

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## 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.<sup>1</sup> 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.<sup>2,3</sup> It is a useful process for developing standards when there is insufficient existing evidence for decision-making.<sup>4</sup> 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.<sup>2,3</sup>

Experts, defined as individuals believed by the researchers to have useful knowledge of the topic<sup>5</sup>, 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,

<sup>6</sup> local research on skills required at district hospitals<sup>1</sup> and the experience of the authors who are all involved in post-graduate 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.<sup>7</sup> 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.<sup>8</sup> 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.<sup>9-11</sup>

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.<sup>12</sup> 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.<sup>13</sup> McKenna suggested a baseline of 51%.<sup>14</sup> 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.<sup>2</sup>

The number of panellists used also varies widely among studies, ranging from as low as 15 participants to over 60.<sup>15</sup> 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

| <b>Teach (58 skills)</b><br>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. | %   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Examination</b>                                                                                                                                                                                                                   |     |
| Examine all body systems                                                                                                                                                                                                             | 100 |
| <b>Perform common side-room tests</b>                                                                                                                                                                                                |     |
| Measure capillary blood glucose                                                                                                                                                                                                      | 87  |
| Measure haemoglobin                                                                                                                                                                                                                  | 87  |
| Perform pregnancy test                                                                                                                                                                                                               | 90  |
| Perform urine dipsticks                                                                                                                                                                                                              | 93  |
| Take intravenous blood sample                                                                                                                                                                                                        | 94  |
| <b>Adult health – general</b>                                                                                                                                                                                                        |     |
| Femoral vein puncture                                                                                                                                                                                                                | 71  |
| Lumbar puncture                                                                                                                                                                                                                      | 90  |
| Routine intravenous access                                                                                                                                                                                                           | 97  |
| <b>Adults- musculoskeletal</b>                                                                                                                                                                                                       |     |
| Measure shortening of legs                                                                                                                                                                                                           | 74  |
| <b>Adults- abdomen</b>                                                                                                                                                                                                               |     |
| Test stool for occult blood                                                                                                                                                                                                          | 74  |
| <b>Adults – chest</b>                                                                                                                                                                                                                |     |
| 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  |
| <b>Adults- urology</b>                                                                                                                                                                                                               |     |
| Penile block                                                                                                                                                                                                                         | 71  |
| Reduce a paraphimosis                                                                                                                                                                                                                | 84  |
| <b>Eyes</b>                                                                                                                                                                                                                          |     |
| Fundoscopy, visual fields and acuity                                                                                                                                                                                                 | 81  |
| Instill drops or apply ointment                                                                                                                                                                                                      | 90  |
| Remove a foreign body in the eye and evert eyelids                                                                                                                                                                                   | 81  |
| <b>Ear, nose and throat</b>                                                                                                                                                                                                          |     |
| 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  |
| <b>Skin</b>                                                                                                                                                                                                                          |     |
| Excise a sebaceous cyst (or similar nodules or cysts)                                                                                                                                                                                | 71  |
| <b>Consultation</b>                                                                                                                                                                                                                  |     |
| 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  |
| <b>Newborn</b>                                                                                                                                                                                                                       |     |
| Well newborn check                                                                                                                                                                                                                   | 74  |
| <b>Pregnancy</b>                                                                                                                                                                                                                     |     |
| 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  |
| <b>Women's health</b>                                                                                                                                                                                                                |     |
| Insertion of intrauterine contraceptive device                                                                                                                                                                                       | 71  |
| Papanicolaou smears                                                                                                                                                                                                                  | 90  |
| <b>Emergency</b>                                                                                                                                                                                                                     |     |
| Calculate percentage burnt                                                                                                                                                                                                           | 71  |
| Relieve choking                                                                                                                                                                                                                      | 74  |
| Give oxygen                                                                                                                                                                                                                          | 77  |
| Immobilise spine                                                                                                                                                                                                                     | 74  |
| Intubate and manage airway                                                                                                                                                                                                           | 71  |
| Measure Glasgow Coma Scale                                                                                                                                                                                                           | 71  |
| <b>Anaesthetics</b>                                                                                                                                                                                                                  |     |
| Injections – intra-dermal, subcutaneous, intra-muscular, deep intra-muscular                                                                                                                                                         | 77  |
| Ring block                                                                                                                                                                                                                           | 74  |
| <b>Child</b>                                                                                                                                                                                                                         |     |
| Assess growth and classify malnutrition                                                                                                                                                                                              | 71  |
| <b>Administrative</b>                                                                                                                                                                                                                |     |
| Complete a sick certificate                                                                                                                                                                                                          | 74  |
| Complete a death certificate                                                                                                                                                                                                         | 71  |

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

| <b>Routine (101 skills)</b><br>The doctor must have the theoretical knowledge regarding the skill and have experience in using and performing the skill independently | %   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Adult health- general</b>                                                                                                                                          |     |
| Arterial sampling via radial artery                                                                                                                                   | 77  |
| Blood culture technique                                                                                                                                               | 84  |
| <b>Adults- musculoskeletal</b>                                                                                                                                        |     |
| Aspirate and inject the knee                                                                                                                                          | 77  |
| Inject tennis elbow / golfers elbow                                                                                                                                   | 70  |
| Interpret radiographs of joints                                                                                                                                       | 91  |
| <b>Adults – abdomen</b>                                                                                                                                               |     |
| Incision and drainage of perianal haematoma                                                                                                                           | 84  |
| Interpret the abdominal radiograph                                                                                                                                    | 94  |
| Perform proctoscopy                                                                                                                                                   | 84  |
| <b>Adults-urology</b>                                                                                                                                                 |     |
| Perform circumcision                                                                                                                                                  | 80  |
| Drain a hydrocele                                                                                                                                                     | 74  |
| Insert a transurethral urinary catheter                                                                                                                               | 80  |
| Insert a suprapubic urinary catheter                                                                                                                                  | 70  |
| <b>Eyes</b>                                                                                                                                                           |     |
| Incision and drainage of Meibomian cyst                                                                                                                               | 77  |
| Suture an eyelid                                                                                                                                                      | 74  |
| Test for squint                                                                                                                                                       | 74  |
| Washout an eye after chemical injury                                                                                                                                  | 83  |
| <b>Ear, nose and throat</b>                                                                                                                                           |     |
| Manage epistaxis (cautery, nasal packing)                                                                                                                             | 94  |
| Rinne and Weber tests                                                                                                                                                 | 81  |
| Suture an pinna and / or earlobe                                                                                                                                      | 90  |
| <b>Skin</b>                                                                                                                                                           |     |
| 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  |
| <b>Consultation</b>                                                                                                                                                   |     |
| 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  |
| <b>Newborn</b>                                                                                                                                                        |     |
| Assess gestational age                                                                                                                                                | 90  |
| Provide Kangaroo mother care                                                                                                                                          | 81  |
| Resuscitate a newborn                                                                                                                                                 | 100 |
| Perform umbilical vein catheterization                                                                                                                                | 70  |
| <b>Pregnancy</b>                                                                                                                                                      |     |
| 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  |
| <b>Women's health</b>                                                                                                                                                 |     |
| 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  |
| <b>Emergency</b>                                                                                                                                                      |     |
| 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  |
| <b>Orthopaedics</b>                                                                                                                                                   |     |
| 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  |
| <b>Anaesthetics</b>                                             |     |
| 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  |
| <b>Child</b>                                                    |     |
| 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  |
| <b>Administrative</b>                                           |     |
| 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  |
| <b>Forensic</b>                                                 |     |
| Assess, manage and document drunken driving                     | 90  |
| Assess, manage and document intimate partner violence           | 90  |
| Assess, manage and document sexual assault                      | 90  |
| <b>Palliative care</b>                                          |     |
| Counsel a dying patient                                         | 91  |

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

| <b>Apply / perform (55 skills)</b><br>The doctor must have the theoretical knowledge regarding the skill and have performed the skill in question under supervision, at least several times. | %  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Perform common side-room tests</b>                                                                                                                                                        |    |
| Microscopy of urine                                                                                                                                                                          | 87 |
| Microscopy of vaginal discharge                                                                                                                                                              | 78 |
| <b>Adult health – general</b>                                                                                                                                                                |    |
| Perform a lymph node excision biopsy                                                                                                                                                         | 87 |
| Perform an on-site HIV test                                                                                                                                                                  | 73 |
| <b>Adults- musculoskeletal</b>                                                                                                                                                               |    |
| Inject carpal tunnel syndrome                                                                                                                                                                | 78 |
| Inject de Quervain's tenosynovitis                                                                                                                                                           | 70 |
| Inject the shoulder and subacromial bursa                                                                                                                                                    | 87 |
| Inject trochanteric bursa                                                                                                                                                                    | 82 |
| <b>Adults- abdomen</b>                                                                                                                                                                       |    |
| Perform anal dilatation                                                                                                                                                                      | 83 |
| Perform an appendicectomy                                                                                                                                                                    | 74 |
| Interpret barium swallow                                                                                                                                                                     | 74 |
| <b>Adults- chest</b>                                                                                                                                                                         |    |
| Perform an electrocardiographic exercise stress test                                                                                                                                         | 83 |
| Perform office spirometry                                                                                                                                                                    | 86 |
| Perform pleural biopsy                                                                                                                                                                       | 74 |
| <b>Adults- urology</b>                                                                                                                                                                       |    |
| Perform a hydrocolectomy                                                                                                                                                                     | 71 |
| Interpret an intravenous pyelogram                                                                                                                                                           | 70 |
| Perform a vasectomy                                                                                                                                                                          | 71 |
| <b>Eyes</b>                                                                                                                                                                                  |    |
| Perform a subconjunctival injection                                                                                                                                                          | 70 |
| Use a Schiotz tonometer                                                                                                                                                                      | 83 |
| <b>Ear, nose and throat</b>                                                                                                                                                                  |    |
| Assess hearing loss and interpret an audiogram                                                                                                                                               | 70 |
| Drain a peritonsillar abscess                                                                                                                                                                | 83 |
| Perform indirect laryngoscopy                                                                                                                                                                | 87 |
| Reduce a fractured nose                                                                                                                                                                      | 70 |

|                                                 |    |
|-------------------------------------------------|----|
| <b>Skin</b>                                     |    |
| Inject a keloid scar                            | 83 |
| Perform phenol ablation of an ingrowing toenail | 83 |
| Perform a skin graft                            | 78 |
| <b>Pregnancy</b>                                |    |
| Perform amniocentesis                           | 83 |
| Perform clinical pelvimetry                     | 83 |
| Perform external cephalic version               | 74 |
| Perform obstetric ultrasound                    | 83 |
| Perform pelvic ultrasound                       | 75 |
| <b>Women's health</b>                           |    |
| Perform culdocentesis                           | 83 |
| Implant hormones                                | 83 |
| Perform a laparotomy for ectopic pregnancy      | 83 |
| Perform a termination of pregnancy              | 90 |
| <b>Emergency</b>                                |    |
| 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 |
| <b>Orthopaedics</b>                             |    |
| 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 |
| <b>Anaesthetics</b>                             |    |
| Perform a Bier's block                          | 87 |
| Perform a brachial block                        | 79 |
| Perform an epidural                             | 79 |
| <b>Palliative care</b>                          |    |

**Table IV:** Elective skills

| <b>Seen or have had demonstrated / Elective (23 skills)</b><br>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. | %  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Adults- general</b>                                                                                                                                                                                                              |    |
| Perform Doppler ultrasound (for peripheral vascular disease)                                                                                                                                                                        | 70 |
| <b>Adults- abdomen</b>                                                                                                                                                                                                              |    |
| Perform abdominal ultrasound                                                                                                                                                                                                        | 71 |
| Perform anal sphincterotomy                                                                                                                                                                                                         | 79 |
| Perform gastroscopy                                                                                                                                                                                                                 | 79 |
| Perform H. Pylori testing                                                                                                                                                                                                           | 79 |
| Perform peritoneal dialysis                                                                                                                                                                                                         | 82 |
| Repair a hernia                                                                                                                                                                                                                     | 79 |
| <b>Adults- chest</b>                                                                                                                                                                                                                |    |
| Perform an echocardiogram                                                                                                                                                                                                           | 70 |
| <b>Adults- urology</b>                                                                                                                                                                                                              |    |
| Perform bilateral subcapsular orchidectomy                                                                                                                                                                                          | 92 |
| Perform cystoscopy                                                                                                                                                                                                                  | 79 |
| Perform El Ghorap shunt for priapism                                                                                                                                                                                                | 78 |
| Perform prostate biopsy                                                                                                                                                                                                             | 83 |
| Perform a varicolectomy                                                                                                                                                                                                             | 73 |
| <b>Eyes</b>                                                                                                                                                                                                                         |    |
| Perform a cataract removal                                                                                                                                                                                                          | 83 |
| Eviscerate an eye                                                                                                                                                                                                                   | 78 |
| <b>Women's health</b>                                                                                                                                                                                                               |    |
| Perform a cervical cone biopsy                                                                                                                                                                                                      | 70 |
| Perform hysterectomy                                                                                                                                                                                                                | 74 |
| Perform a large loop excision of the cervical transitional zone                                                                                                                                                                     | 79 |
| <b>Emergency</b>                                                                                                                                                                                                                    |    |
| Drill burr holes                                                                                                                                                                                                                    | 87 |
| Perform a laparotomy for bowel obstruction                                                                                                                                                                                          | 92 |
| <b>Orthopaedics</b>                                                                                                                                                                                                                 |    |
| Perform an open reduction with pins and screws                                                                                                                                                                                      | 96 |
| Repair tendons or nerves                                                                                                                                                                                                            | 70 |
| <b>Dental</b>                                                                                                                                                                                                                       |    |
| 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/<br>Perform % | See/<br>Elective % |
|----------------------------------------------------|---------------------|--------------------|
| <b>Adults - general</b>                            |                     |                    |
| Perform a bone marrow biopsy                       | 33                  | 67                 |
| Microscopy of cerebrospinal fluid                  | 33                  | 67                 |
| Make thick and thin blood smears for malaria       | 54                  | 46                 |
| <b>Adults- abdomen</b>                             |                     |                    |
| Inject haemorrhoids                                | 46                  | 54                 |
| Perform a liver biopsy                             | 63                  | 37                 |
| Rubber band haemorrhoids                           | 42                  | 58                 |
| Perform sigmoidoscopy                              | 58                  | 42                 |
| <b>Adults- urology</b>                             |                     |                    |
| Perform orchidectomy and anchoring of testes       | 67                  | 33                 |
| <b>Eyes</b>                                        |                     |                    |
| Perform a slit-lamp examination                    | 35                  | 65                 |
| Dispense stock glasses after subjective refraction | 58                  | 42                 |
| <b>Ear, nose and throat</b>                        |                     |                    |
| Perform tonsillectomy / adenoidectomy              | 50                  | 50                 |
| <b>Skin</b>                                        |                     |                    |
| Perform skin patch testing                         | 63                  | 37                 |
| <b>Newborn</b>                                     |                     |                    |
| Perform exchange transfusion                       | 50                  | 50                 |
| <b>Pregnancy</b>                                   |                     |                    |
| Perform cervical cerclage                          | 42                  | 58                 |
| <b>Women's health</b>                              |                     |                    |
| Remove cervical polyp                              | 54                  | 46                 |
| Perform colposcopy                                 | 33                  | 67                 |
| <b>Emergencies</b>                                 |                     |                    |
| Perform a laparotomy for stabbed abdomen           | 54                  | 46                 |
| <b>Child</b>                                       |                     |                    |
| 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.<sup>2</sup> 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.<sup>14</sup> 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.<sup>5</sup>

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.

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