

Description of surgical and anaesthetic services provided at two district hospitals in KwaZulu-Natal in relation to the surgical norms and standards outlined in the Service Package for District Hospitals

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Abstract

Background: Provision of surgical services at district hospitals (DHS) is cost effective and important. The District Hospital Service Package for South Africa (package of services) specifies the services that a district hospital should provide. The aim of this study was to document the surgical services provided at two DHS in KwaZulu-Natal and to compare this with the recommendations in the package of services.

Methods: In a retrospective quantitative study, data from 2008 were collected from the theatre register at two DHS. Data were analysed and results compared with the norms and standards in the package of services. Results were presented to staff at the hospitals, who then commented on the challenges of providing surgical services at DHS.

Results: Only 60% and 30% respectively of procedures listed in the package of services were being carried out at the two hospitals. In total, 3 900 procedures were carried out over the year. Dundee Hospital offered a broader range of surgical procedures and anaesthetics than the Church of Scotland Hospital (COSH). COSH has a large obstetric burden, with 3 666 deliveries each year. A large number of procedures were being carried out by a single operator.

Conclusions: Many surgical procedures are being carried out even though neither hospital provides the full complement of surgical services as specified in the package of services. The wide variation between the surgical services offered reflects the surgical and anaesthetic skills at the respective hospitals. Potential medico-legal hazards that require urgent attention were identified. A review of the package of services is essential to identify core procedures that must be provided at DHS.

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Background

District hospitals (DH) are expected to provide level-one (generalist) services to in-patients and out-patients. Staff at these hospitals should ideally be able to manage all common surgical and obstetric procedures for a defined population. In addition to supporting clinical service delivery, DHS are important gateways to more specialist care provided at regional and tertiary hospitals.¹

In 2002 the National Department of Health (DoH) developed the District Hospital Service Package for South Africa – it is a set of norms and standards that specify the various services that DHS should be able to provide.¹ The package of services was seen as a reform tool to prioritise health care services within budgetary constraints, ensure the redistribution of health services and reduce inequalities around the country.² It also enables administrators to cost the services and budget accordingly, and communities

to hold the DoH accountable for service delivery against established and defined care targets.

Surgical conditions contribute significantly to the burden of disease in sub-Saharan Africa, with 38 disability-adjusted life years (DALY) per 1 000 population lost due to surgical conditions. Of these, 15/1 000 are due to trauma and 6/1 000 are due to obstetric complications.³ Many of these surgical conditions can be well managed at DH and the provision of a simple surgical service has been found to be almost as cost effective as the provision of basic services, such as immunisations (US\$11–33/DALY averted vs US\$5/DALY averted) and cheaper than the provision of antiretrovirals (US\$300–500/DALY averted).³ Despite this, apart from obstetric services, surgical services were not included in the Millennium Development Goals, and have been labelled the ‘neglected diseases’ in many parts of Africa,³ often because of the overwhelming burden of HIV and AIDS. Under the auspices of the World Health Organization (WHO), the

Table I: Hospital details

	Catchment population	Authorised beds	Bed occupancy (%)	Doctors	Professional nurses
Dundee Hospital	57 685	224	57–64	9	126
COSH	173 000	347	78	17	108

Table II: Total number of procedures carried out in 2008 at the two hospitals

	Total number	Major (none obstetric)	Minor	Trauma related	Deliveries	C/S	C/S rate	Surg refs
Dundee Hospital	2 306	62	661	878	2 474	367	15%	127
COSH	1 594	6	296	202	3 666	734	20%	195

C/S: Caesarean section; Surg refs: surgical referrals

Bellagio Essential Surgery Group suggested a list of high-priority surgical procedures, which include the management of trauma and obstetric procedures that could be carried out at DHS.⁴

Besides the study carried out by Reid in 1995,⁵ there is little information available in South Africa on the extent to which surgical services are being provided at DH. The aim of this study was to describe the surgical services being provided at two DHS in KwaZulu-Natal (KZN) and to compare this to the surgical norms and standards as outlined in the District Hospital Service Package of Services (hereafter referred to as the “package of services”). Based on the results, specific recommendations will be made to the hospital management and policy makers to address the issues identified.

Method

This was a descriptive, quantitative study carried out at two DH in KZN. The hospitals were chosen for convenience, but are representative of DH throughout KZN. Using a data collection sheet to record pertinent data, all theatre records from 1/1/2008–31/12/2008 were reviewed. The following data were collected: patient details, procedure, duration and anaesthetic given, and details of the anaesthetist, surgeon and assistant. Details of all surgical cases referred from these institutions were also collected from the base hospital and the referral hospitals. Data were analysed using the SPSS computer software programme and the results compared with the norms and standards as outlined in the package of services. Following an initial analysis, the results were discussed with medical staff and other senior staff members at each hospital. Comments on the data presented were recorded. Ethical permission for this study was obtained from the University of KZN Research and Ethics Committee and the Department of Health, KZN.

Results

Dundee Hospital is a 224 bed DH servicing a population of 57 685 people. It has a staff complement of nine doctors and 126 professional nurses. There are on average 200

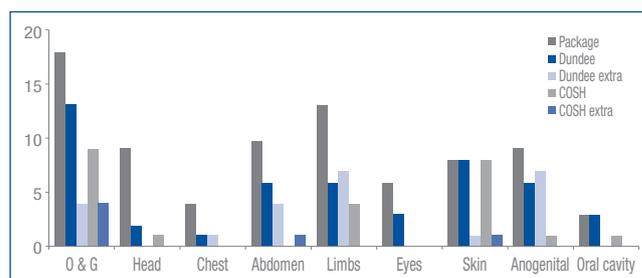


Figure 1: Summary of surgical services provided at the two hospitals compared with those included in the package of services

deliveries per month (range 175–232) and a bed occupancy rate of 57–64% (personal communications with the hospital manager). The Church of Scotland Hospital (COSH) is a 347 bed DH serving a population of 173 000 people. It has a staff complement of 17 doctors and 108 professional nurses (personal communications with the hospital manager). There are on average 306 deliveries per month (range 245–536) and a bed occupancy rate of 78%. See Table I.

Eighty surgical procedures and three anaesthetic procedures are listed in the package of services. Sixty per cent (48/80) of these procedures are being carried out at Dundee Hospital, in addition to a further 24 procedures. Only thirty per cent (24/80) of these procedures are being carried out at COSH. See Figure 1. Details pertaining to the number and range of surgical procedures being carried out at Dundee Hospital and COSH are summarised in Table II and listed in detail in Table III. Procedures recommended in the package of services but not carried out are not listed, and additional procedures performed are outlined at the end of the table. Obstetric procedures accounted for 16% of procedures at Dundee Hospital and 46% of procedures at COSH. Trauma accounted for 878/2306 (38%) of the work load at Dundee Hospital and 202/1594 (13%) at COSH. Sixty-two major surgical procedures were carried out at Dundee Hospital, while only six major procedures were carried out at COSH. Major procedures were defined as all abdominal procedures and above- and below-knee amputations. Six hundred and sixty-one minor surgical procedures were carried out at Dundee Hospital compared with 296 minor procedures at COSH.

Table III: Services provided at the two hospitals according to the package of services guidelines

Procedures as outlined in the package of services	Number of procedures carried out		Number of cases referred	
	Dundee Hospital	COSH	Dundee Hospital	COSH
Women's health				
Acute third-degree tear repair	1	3	0	2
Cervical cancer screening	32	6	4	0
Caesarean section (C/S)	367 (16%)	734 (46%)	28	92
Diagnostic dilatation and curettage	46	8	0	0
Evacuation of uterus	136 (6%)	257 (16%)	0	0
Laparotomy for ectopic pregnancy	10	5	0	3
Manual removal of placenta	5	8	0	0
Mini-laparotomy ligation	40	7	0	0
Tubal ligation (T/L) with C/S	0	83	0	0
Laparotomy for ovarian lesion, ruptured uterus	4	0	0	0
Sub-total hysterectomy	6	0	0	0
Pelvic abscess drainage	4	0	0	0
Breast cancer screening	17	0	1	1
Trauma/emergency/surgical				
Head				
Removal of foreign body in the ear	7	19	0	0
Reduction of dislocated or fractured jaw	1	0	0	0
Chest				
Intercostal drains	6	0	0	0
Abdomen				
Appendectomy	12	0	5	6
Acute abdomen	0	0	7	6
Laparotomy, for trauma	5	0	2	4
Paracentesis	1	0	0	0
Inguinal hernia repair	5	0	0	1
Umbilical hernia repair	6	0	0	0
Insertion of suprapubic catheter	0	4	0	1
Limbs				
Amputations	25	15	0	0
Joint dislocation: shoulder, elbow, finger, hip	8	6	1	0
Manipulation under anaesthesia, fractures and plaster of Paris	153	38	10	23
Tendon injuries	4	0	0	0
Aspiration of joints	13	0	0	0
Eyes				
Foreign body in eye	5	0	0	0
Cataract	138	0	1	0
Eye injuries	5	0	5	1
Skin				
Incision and drainage of abscesses	144	93	0	0
Skin grafts	9	18	0	0
Suturing	695 (30%)	139 (9%)	7	0
Secondary suturing	4	1	0	0

Procedures as outlined in the package of services	Number of procedures carried out		Number of cases referred	
	Dundee Hospital	COSH	Dundee Hospital	COSH
Biopsy of lumps, lesions	49	6	0	0
Cautery/cryotherapy of warts	9	24	0	1
Debridements	14	29	0	0
Excision of lumps	113	7	0	0
Anogenital				
Circumcision	41	11	0	0
Hydrocoelectomy	3	0	0	0
Orchidectomy	1	0	0	0
Reduction of paraphimosis	6	0	0	0
Proctoscopy	1	0	0	0
Vasectomy	8	0	0	0
Oral cavity				
Dental extraction	1	81	0	0
Tonsillectomy	17	0	2	0
Dental procedures	9	0	0	0

The following procedures, although stipulated in the package of services, were not provided at either hospital:

- **Maternal health:** uterine artery ligation, repair of cervical tear, cervical polypectomy, endometrial biopsy, colposcopy, postpartum/laparoscopic sterilisation
- **Head:** removal of foreign bodies from the nose, incision and drainage of Ludwig angina, removal of inhaled or swallowed foreign body, repair of lacerations of the tongue, surgical cricothyroidotomy, tracheostomy, repair of trauma to the teeth
- **Chest:** pericardiocentesis, pleural biopsy, thoracotomy for stabbed heart
- **Abdomen:** repair of pelvic, perianal, rectal, bladder and urethral injuries; peritoneal lavage; liver biopsy
- **Limbs:** injection of joints, repair of nerve injuries, debridement of compound fractures, drainage of acute osteomyelitis, fasciotomy for compartment syndrome, skeletal traction, Steinmann pin insertion
- **Eyes:** incision and drainage of Meibomian cyst, removal of foreign body from conjunctiva or cornea
- **Ano-genital:** management of torsion testes, sclerotherapy for hydrocele, anal stretch
- The following procedures, over and above those stipulated in the package of services, were provided in theatre:
 - **Dundee Hospital:**
 - **Maternal health:** Shirodkar suture (1), episiotomy (1), vaginal tear repair (1), examination under anaesthetic (3)
 - **Chest:** pleural aspiration (5)
 - **Abdominal:** incisional hernia repair (2), strangulated hernia repair (2), cholecystectomy (5), colostomy (1)
 - **Limb:** removal of foreign bodies: foot, leg (4), open

reduction and internal fixation (2), bursectomy of knee (1), carpal tunnel release (1), removal of ingrowing toenail (4), removal of extra digit (3), hip disarticulation (1)

- **Skin:** sloughectomy (13)
- **Anogenital:** urethral dilatation (7), excision of thrombosed piles (1), haemorrhoidectomy (6), orchidopexy (1), fistulectomy (2), aspiration of hydrocele (12), examination under anaesthesia (3)

Church of Scotland Hospital:

Skin: sloughectomy (13)

There were 195 surgically related referrals from COSH, 98 (50%) of which were obstetric-related, 23 (12%) were orthopaedic and 61 (31%) were broadly surgical. There were 127 referrals from Dundee Hospital, 31 (24%) of which were obstetric, 13 (10%) were orthopaedic and 71 (56%) were surgical. The reasons for obstetric referrals are shown in Figure 2.

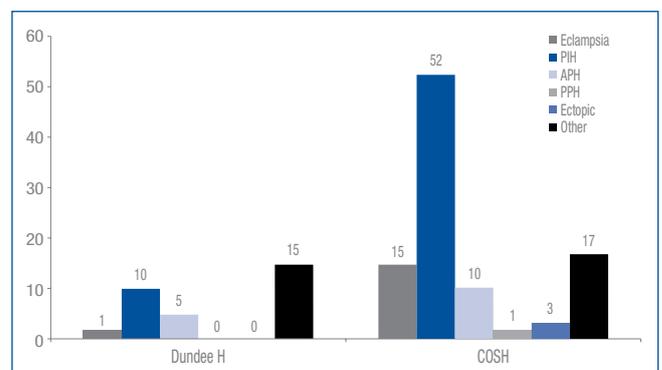


Figure 2: Obstetric referrals from Dundee Hospital and COSH (PIH = pregnancy-induced hypertension; APH = antepartum haemorrhage; PPH = postpartum haemorrhage)

Tables IV and V show the anaesthetics given. According to the records no general anaesthetics are being given at COSH for any procedures – not even for ectopic pregnancies, although five procedures were carried out for ectopic pregnancy. Spinal anaesthesia is the anaesthetic of choice for C/S although 29 general anaesthetics were given for C/S at Dundee Hospital. Sedation with pethidine and valium, and ketamine, is used extensively. Many procedures are being done at COSH with only one doctor in the theatre.

Table IV: Anaesthetics provided

Package of services:	Dundee Hospital	COSH
Anaesthetics given		
General anaesthesia	258	0
Ketamine	33	183
Spinal	401	754
Not included in the package of services		
Midazolam	1	0
Local anaesthesia	1213	223
Pethidine and diazepam	199	349

Discussion

Although only 60% and 30% of the surgical procedures outlined in the package of services are being carried out at Dundee Hospital and COSH, respectively, these figures are not an accurate reflection of the extent of the surgical services provided at these hospitals. With 3 900 procedures being carried out annually, surgical services are an important/critical part of the service offered in both hospitals. Many patients presenting to DH require surgery for trauma, obstetric and other emergencies. Many of these procedures cannot be safely postponed to allow for transfer to a regional hospital. Good primary management can prevent long-term morbidity and even mortality – for example, debridement of a compound fracture could prevent chronic osteitis. Despite the burden imposed by HIV, hospital management must ensure that adequate resources are allocated to the surgical services. Finding and retaining staff must be a priority, and ongoing training and support must be provided. Based on the findings of this study, there is a need to review the package of surgical services and to

Table V: Anaesthetics provided for the nine most common procedures carried out at the two hospitals

Procedure	Hosp	Tot	G/A	Spin	Pet/Val	Loc	Ket	Not recd.	No asst.	Singl op.
C/S	Dundee Hospital	367	29	320	3	0	0	16	233	1
	COSH	734	0	731	0	1	2	0	109	109
Suturing	Dundee Hospital	695	0	0	3	689	1	2	0	695
	COSH	139	0	0	4	100	7	28	0	139
Evacuation	Dundee Hospital	136	46	7	73	2	2	6	136	0
	COSH	257	0	2	234	0	8	13	0	205
I+D abscess	Dundee Hospital	144	0	0	37	97	4	8	0	144
	COSH	93	0	3	11	16	55	8	0	0
MUA fracture/POP	Dundee Hospital	153	0	0	14	45	23	71	0	153
	COSH	38	0	0	5	3	26	4	0	38
Cataract	Dundee Hospital	138	0	0	0	119	0	19	0	138
	COSH	0	0	0	0	0	0	0	0	0
Excision/biopsy of lumps	Dundee Hospital	162	9	10	7	128	1	8	0	136
	COSH	13	0	0	2	8	0	3		6
Tubal ligation	Dundee Hospital	40	34	4	0	0	0	2	38	0
	COSH	90	0	89	0	0	0	1	0	6
Circumcision	Dundee Hospital	41	4	0	4	30	1	2	5	36
	COSH	13	0	0	3	8	0	2	0	11

Hosp: Hospital; Tot: Total; G/A: General anaesthetic; Spin: Spinal; Pet/Val: Pethidine/Valium; Loc: Local; Ket: Ketamine; Not recd: Not recorded; No asst: No assistant; Singl op: Single operator; c/s: caesarean section; I+D: Incision and drainage; MUA: manipulation under anaesthesia; POP: plaster of Paris.

decide on priority procedures and anaesthetics that must be provided at all DHS.

Trauma accounts for a large number of procedures being carried out. In Dundee Hospital 38% of surgical cases were trauma-related (this increases to 42% if all the obstetric procedures are removed), while at COSH only 12% of the total number of surgical cases were trauma-related. This reflects the violent nature of the society in which we live in South Africa. The small number of trauma cases recorded at COSH may, however, be a reflection of the way in which procedures are recorded, with only those patients formally going to theatre being recorded in the theatre records.

If trauma and obstetrics are excluded from the statistics, then only 31% of true 'surgical cases' are seen at Dundee Hospital (62 major and 661 minor) and 19% (6 major and 296 minor) at COSH. This probably reflects a high unmet surgical demand.

In 2002 Nordberg et al suggested that the basic need for surgical services in sub-Saharan Africa was in the order of 1 000 major operations/100 000/year.⁶ In this study the number of surgical cases involving children younger than 15 years is small; only a few debridements and skin grafts were carried out. Children are very susceptible to trauma and burns. In a study carried out in Gambia it was estimated that 85% of children would need some sort of surgical procedure before they reached the age of 15 years.⁷ In 2001, Lopez et al estimated that in African children under the age of five years, injuries claim more lives than HIV, TB and malaria combined.⁸ The lack of surgical care provided to children in this district probably reflects a large unmet surgical need in these communities.

This study demonstrated that a much wider range of surgical procedures was being carried out, and anaesthetics administered, at Dundee Hospital than at COSH. The staff at Dundee Hospital indicated that the surgical service was dependent upon the surgical expertise of one long-term doctor with an interest in surgical care and on the availability of a doctor with additional anaesthetic expertise. This highlights the fragile nature of the surgical services provided in many DH.

COSH has a large obstetric burden: there were 3 666 deliveries, and almost 2 C/S daily. The C/S rates of 15% at Dundee Hospital and 20% at COSH are both on the high side of the WHO estimation of 5–15% of deliveries that should end in C/S.⁹ It is interesting to note the differences in C/S numbers between the two similar DH. COSH is in a very traditional area and it is possible that the use of *isihlambezo* (a traditional medication given to induce labour and ensure the wellbeing of the child) is causing

foetal distress, necessitating a greater need for emergency C/S. This requires further study. At Dundee Hospital there were no tubal ligations recorded at the time of C/S. This also requires further study. It is encouraging to note that only 1.25% (31/2 474) of deliveries at Dundee Hospital and 2.7% (98/3 666) of deliveries at COSH needed referral, which reflects the high level of competency in dealing with obstetric complications. However, both the moderately high C/S rate and the low referral rate need interpretation in the light of perinatal mortality and morbidity.

It was noted that a large number of C/S are handled by a single operator at COSH. The Health Professions Council of South Africa (HPCSA) has stipulated that abdominal procedures should be carried out with an anaesthetist, a surgeon and an assistant present.¹⁰ In the face of current staff constraints, professional nurses have been used as scrub sisters and assistants in many DH, and the medical officer has taken responsibility for the anaesthetic, the procedure and any resuscitation needed. In many circumstances this is done because of pressing needs and dire staff shortages. However, it puts these doctors at great risk for medico-legal negligence claims should anything go wrong with the procedure or the anaesthetic, and such action would be impossible to defend in court. Medical managers need to ensure that sufficient staff are available so that (at minimum) there are always at least two doctors available for every C/S. This issue was also highlighted in 1999 by Reid, who made recommendations about the need for appropriately trained generalists at rural hospitals able to give anaesthetics.⁵

The number of circumcisions carried out is low, considering that circumcision has been shown to reduce the incidence of HIV by 60% in a high prevalence HIV area.¹¹ In 2009 the USAID Health Policy initiative estimated the cost and impact of circumcising 80% of South Africa men by 2015.¹² If such targets were to be set in the COSH area, where few men are currently circumcised, this would translate into 1 000 circumcisions/month, or 50 circumcisions/day. To achieve this there would need to be a massive public awareness campaign as well as a commitment from DoH and local management to recruit additional medical and nursing staff to meet the additional demand.

Major differences in anaesthetics given between the two hospitals were noted. Most C/S at both hospitals are done under spinal anaesthesia, which is considered best practice, even in tertiary hospitals.¹³ However 29 C/S were done under general anaesthetic at Dundee Hospital. This requires further investigation. The fact that no general anaesthetics are being given at COSH is a cause for concern. Five ectopics were recorded as being treated under spinal anaesthesia and three ectopics were referred from COSH. A ruptured

ectopic pregnancy is an absolute contraindication to spinal anaesthesia as the blood pressure may drop precipitously once the spinal has been given.

In South Africa, the internship training was extended from one year to two years so that young doctors would be adequately trained to work in DH. The anaesthetic training was extended from 40 anaesthetics given to a two-month block. However, junior staff cannot be expected to give general anaesthetics, even if appropriately trained, without the support of senior staff. The Saving Mothers report (1999–2001) highlights the importance of safe anaesthetics at DHS as an important component of any maternal care programme.¹⁴

Conclusions and recommendations

This study has highlighted the fact that many procedures are being carried out at DH. However, not all procedures stipulated in the package of services are being carried out, and a number of procedures not listed in the package of services are being carried out. There is also a wide variation between the surgical services offered at the two hospitals, which reflects the skill of the current staff at the hospital and the fragile nature of the surgical services provided.

If the package of services is to be used as a tool to monitor service delivery it needs to be modified to reflect current practice, and managers need to be held accountable for the services provided. Procedures such as endometrial biopsy, colposcopy, laparoscopic sterilisation, repair of nerve injuries and enucleation need to be removed from the list, and others such as sloughectomy should be added. There are a number of procedures that were being done in theatre which are usually done in the ward in other hospitals (e.g. pleural aspiration), and which should not really be listed under surgical procedures. A decision needs to be taken as to whether or not cataracts are a competence of a DH, particularly as this has funding implications for those DH trying to provide the service.

The importance of the surgical services at DH in the prevention of morbidity and mortality needs to be recognised. Managers need to strengthen the surgical services and ensure that health workers with surgical skills are employed as a priority. There is also a need for further studies to estimate the extent of the unmet surgical needs.

Declarations

Limitations of the study

This was a retrospective study carried out at only two hospitals in KZN and data may have been incomplete. Data, particularly from the emergency units, may not have been recorded. No outcomes are recorded. It is also possible that

there is no uniformity in the definitions used. Debridement may mean different things in different settings; it may mean cleaning of a compound fracture or a simple cleaning and suturing of a wound in theatre.

Conflict of interest

This study was carried out in partial fulfilment of the requirements for an MMed(FamMed).

References

1. Department of Health, A district hospital service package for South Africa – a set of norms and standards. Pretoria: South African Department of Health; 2002.
2. Taylor M. Prescribed minimum benefits–quagmire or foundation for social health reform. *S Afr Med J* 2007;97(6):446–50.
3. Ozgediz D, Riviello R. The “other” neglected diseases in global public health: surgical conditions in sub-saharan Africa. *PLoS Med* 2008 June;5(6):850–4.
4. Luboga S, Macfarlane SB, Von Schreeb J, et al. Increasing access to surgical services in sub-saharan Africa: priorities for national and international agencies recommended by the Bellagio Essential Surgery Group. *PLoS Med*. 2009 December 6(12):1–5.
5. Reid SJ. The procedural skills of rural hospital doctors. *S Afr Med J* 1999;89(7):769–73.
6. Nordberg E, Mwobobia I, Muniu E. Major and minor surgery output at district level in Kenya: a review and issues in need of further research. *Afr J Health Sci*. 2002;9:17–25.
7. Bickler SW, Telfer ML, Sanno-Duanda B. Need for paediatric surgery care in an urban area of The Gambia. *Trop Doct*. 2003 Apr;33(2):91–4.
8. Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJL. Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data. *Lancet* 2006;367:1747–57.
9. Galukande M, von Schreeb J, Wladis A, et al. Essential surgery at the district hospital: a retrospective descriptive analysis in three African countries. *PLoS Med*. 2010;7(3):e1000243.
10. The South African Medical and Dental Policy on Assistance at Operations. *South African Theatre Sister* 2009; 34(4):8–13.
11. Auvert B, Taljaard D, Lagarde E, Sobngwi-Tambekou J, Sitta R, Puren A. Randomized, controlled intervention trial of male circumcision for reduction of HIV infection risk: the ANRS 1265 Trial. *PLoS Med* 2005;2(11):1112–22.
12. USAID. The potential cost and impact of expanding male circumcision in South Africa. Washington DC; 2009.
13. Moya F, Smith BE. Spinal anesthesia for cesarean section. *Int Anesthesiol Clin*. 1998;36(4):53–60.
14. Moodley J. Saving mothers: 1999–2001. *S Afr Med J* 2003;93(5):364–6.