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The World Anaesthesia Society (WAS) was formed in 1985 with the aim of supporting anaesthetists in developing countries. It aimed to do this by providing them with an add-on textbook, “Update” that would be sent to them, free of charge. It also aimed to provide a network for communication between interested anaesthetists in the developed world and those in the developing countries. The former would pay to join the Society and their contributions would fund the work of the Society.

Progress has been made, but at a cost. Thanks to dedicated anaesthetist/translators, Update is now available in five languages, English, French, Spanish, Russian and Mandarin. It is available on CD from TALC (www.talculk.org) and is accessible of the web (www.nda.ox.ac.uk/wfsa) for the English version. We have recently launched a web site, www.world-anaesthesia.org that is constantly being expanded and improved and have transferred our membership database from Exeter to the AAGBI office in Portland Place, London. This latter move is intended to improve our ability to contact our membership and to enable you to contact us at our new permanent postal and email addresses, was@aagbi.org.

Unfortunately, the WAS has recently had cash-flow problems (a euphemism for running out of money) and it has been necessary for us to increase our annual subscription. Our members in developing countries pay nothing to join our Society but approximately half of the WAS membership live in the affluent West and it has been necessary to ask them to increase their annual membership donation to £35 (or equivalent). Although this is a significant amount of money, it is probably no more than they would pay for a meal in a reasonable restaurant and we, therefore, hope that they will continue to support us.

As you will read in this issue, our President, Iain Wilson, is continuing to expand the work of the WAS. In his dual role as Chairman of the Publications Committee of the WFSA and President of the WAS, he is proposing the establishment of a book swap scheme and a web-based “Tutorial of the Week.” I am sure that you will support both.

I am always grateful for comments on how World Anaesthesia News might be improved and for articles that might be of interest to our growing readership. I hope to hear from you.

Happy New Year.

William F Casey

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Cover picture by kind permission of Dr Alex Bojarska
Anaesthesia for Ventricular Septal Defects (VSD)

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Introduction
The perioperative management of the child with congenital heart disease is a special challenge for the anaesthesiologist. More than half of the children undergoing cardiac procedures are less than one year of age and 25 percent are less than one month old. Their perioperative management will depend upon the current status of their cardiac disease, compensatory cardiovascular mechanisms and associated diseases. The anaesthesiologist must understand the child-specific intracardiac and extracardiac defects, the effects of haemodynamic changes on those defects, the sequelae of surgery or residual defects and the cardiovascular effects of the anaesthetics agents to be administered.1,2

Ventricular septal defects (VSD) are the most common isolated congenital heart defect, constituting 20 percent of all such defects. The classification is based on anatomic location. The four types of VSD are:

- **Supracristal.** Located above the crista supraventricularis just under the annulus of the aorta.
- **Infracristal.** Located lower in the membranous septum beneath the crista supraventricularis.
- **Canal type.** Equivalent to the VSD of the auriculo-ventricular canal.
- **Muscular.** Located anywhere in the muscular septum and may be multiple.

Children with small defects have few symptoms because there is little flow across the defect whilst the muscular type of defect may close spontaneously. With larger defects, heart failure appears at about one month of age when pulmonary vascular resistance and right ventricular pressure normally decrease.

The pathophysiological effects of VSD are left to right shunting, heart failure due to volume overload and pulmonary hypertension. Severely symptomatic patients require surgical treatment in infancy as closure of the VSD prevents progression of pulmonary vascular disease and shunt reversal.1,2

The operation is performed through the right atrium in most patients although supracristal defects may require a right ventricular approach. Infant mortality after operation ranges from 8 to 10 percent in our hospital.

Preoperative evaluation and preparation
Congestive heart failure occurs at an early age in most children with large defects. Treatment is with digitalis and diuretics although severe heart failure in small infants may need to be treated palliatively with a band placed on the pulmonary artery. Mortality is higher in the two stage approach (banding + late closure).

It is important to ask about the child’s general medical condition. Most children with VSD suffer from respiratory tract infections. Evidence of an acute upper or lower respiratory tract infection is a contraindication to elective procedures. Much information can be obtained from observing the general appearance of the child plus a careful appraisal of the investigations that have been carried out.

A pansystolic murmur is present at the left third or fourth intercostal space and the chest X-ray shows pulmonary artery enlargement, cardiomegaly and increased pulmonary vascularity. ECG, echocardiography and cardiac catheterization are needed for accurate diagnosis. Measurement of the pulmonary artery pressures and calculation of resistance are very important.

Anaesthetic management
Anaesthesiologist should always be prepared for the unexpected. Even children with asymptomatic defects have limited cardiac and pulmonary reserves when compared with others without cardiac defects.

Equipment and drugs should be always ready before the induction of anaesthesia. Vascular access can be difficult in small malnourished children with cardiac defects and a wide range of cannulae should be available.

Equipment and drugs for resuscitation such as adrenaline, calcium chloride, isoproterenol, atropine, lidocaine and sodium bicarbonate should be prepared before induction as well as muscle relaxants and narcotics (fentanyl).

Our anaesthetic technique for children with VSD without significant pulmonary hypertension is similar to that for patients with atrial septal defects (ASD).

The real challenge for us is the patient with a VSD and fixed pulmonary hypertension who may present with a sudden increase in pulmonary vascular resistance (PVR) and a rapid deterioration.1,2,3 Factors that may increase PVR in these patients include hypoxia, hypercapnia, acidosis, hyperthermia, hyperinflation of the lungs, atelectasis, sympathetic stimulation and polycythaemia.1,2

Solids are withheld for 6 hours before the induction of the anaesthesia but clear fluids are given (if needed) until 3 hours prior to induction. Patients who are receiving digitalis have their medication withheld the day before surgery.

Premedication is given with oral or intramuscular drugs in most patients.

Children should be well sedated without adversely affecting haemodynamic stability.1 Midazolam 0.5 mg/kg orally or 0.2 – 0.3 mg/kg intranasally is a useful agent although some anaesthesiologists prefer intramuscular premedication with narcotics (meperidine, morphine) 30 min to 1 hour before surgery.

Intramuscular ketamine, 3 to 5 mg/kg, can be very useful in the anxious child with difficult venous access. This agent preserves airway reflexes and ensures haemodynamic stability until a venous catheter can be inserted. Atropine 0.01 mg/kg should be given at the same time.

**Venous access**
After adequate premedication, an intravenous catheter should be placed before induction because rapid administration of parenteral cardiac drugs may be required.

Special care should be taken to avoid the introduction of air bubbles as in any patient with an abnormal communication between the right and
left heart; there is always a risk of an air embolus reaching the left heart and thus entering the systemic circulation and being carried to the brain.

Percutaneous central vein catheterisation through the internal jugular vein is achieved after induction. This site is ideal for monitoring the central venous pressure (CVP) and for the continuous infusion of vasovactive drugs.

**Monitoring**

Standard monitoring includes ECG, non-invasive blood pressure, pulse oximetry, capnography, temperature (central and peripheral) urine output and airway volume and pressure.

ECG leads are attached before induction to monitor the cardiac rhythm. A blood pressure cuff is placed on an extremity that is free of intravenous catheters and the pulse oximeter probe. An interval of 2 minutes is selected for the automatic, non-invasive monitoring of the blood pressure. Following intubation, carbon dioxide monitoring is initiated and an arterial catheter can be placed percutaneously in the radial or femoral artery. The cannula is connected to a pressure transducer and a constant infusion containing heparin 25 mg/1000 ml normal saline started. A three-way stopcock is attached to the cannula to facilitate arterial blood sampling.

Urinary output is a reliable index of renal perfusion and is thus a reflection of cardiac output. An adequate urine output is generally considered to be 1 ml/kg/hour.

Induction can be achieved safely with fentanyl 10-20 micrograms/kg or in children who are haemodynamically stable with thiopental 2-4 mg/kg followed by non-depolarizing muscle relaxants such as pancuronium or atracurium for neuromuscular blockade before intubation. In patients with pulmonary hypertension, fentanyl is the drug of choice. After the induction; inhalational agents such as isoflurane are added as indicated.

Maintenance is achieved mainly with narcotics. A traditional high dose narcotic technique (fentanyl 50-100 micrograms/kg) plus non-depolarizing muscle relaxants is best for most critically ill patients. Pulmonary and systemic haemodynamic changes following a bolus of 25 microgram/kg of fentanyl are insignificant in infants with congestive heart disease.

Used with 100% oxygen or air-oxygen, this high dose narcotic technique is safe even in children with low cardiac output syndrome.

Some studies of fentanyl anaesthesia in infants have suggested beneficial effects on the pulmonary circulation with blunting of the response of the pulmonary vascular bed to the stress of endotracheal suctioning. However, a more recent study by Gruber and colleagues concluded that fentanyl, with or without midazolam, does not prevent hormonal or metabolic stress responses in infants undergoing cardiac surgery. In neonates and small children these may be profound and are associated with increased morbidity and mortality.

Patients who are haemodynamically stable may receive small amounts of others agents such as isoflurane, midazolam, propofol etc or regional (caudal) anaesthesia in order to achieve a more complete suppression of the stress response.

To prevent coagulation during cardiopulmonary bypass, the patient must be adequately anticoagulated with heparin. Prior to insertion of arterial and venous cannulae for bypass, heparin 3-4 mg/kg is administered through the central catheter. The activated coagulation time (ACT) is used for monitoring heparin activity. An ACT of more than 300 seconds should be achieved 5 minutes after heparin administration and a minimum of 480 seconds (ideally more than 600 seconds) is needed during bypass.

During cardiopulmonary bypass, anaesthesia is maintained with intravenous narcotics, muscle relaxants and benzodiazepines.

Weaning from bypass is facilitated by judicious volume administration and inotropic support. Dopamine and dobutamine are commonly used and vasodilators are used to control pulmonary and systemic vascular resistance.

After successful weaning from bypass, we prefer to maintain anaesthesia with fentanyl and a small amount of isoflurane because of the minimal myocardial depression associated with these agents.

Complications after bypass include cardiac arrhythmias, low cardiac output syndrome and bleeding. Heart block may occur after injury to the conduction system. A transient block caused by oedema secondary to manipulation or suturing near the conduction system may appear after the VSD closure and temporary pacing electrodes should be placed routinely in all patients.

In patients who have undergone ventriculotomies or needed prolonged bypass, inotropic support may be needed.

In most children with uncomplicated ventricular septal defects, endotracheal extubation can be performed soon after surgery in the Intensive Care Unit. Those with more complicated VSDs or with pulmonary hypertension should not be extubated early but the hypertension controlled by drugs for 2-3 days.

**References:**

Intensive Care Unit admissions following anaesthesia-related complications in a Nigerian Teaching Hospital

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Summary
This is a retrospective, observational study of post-operative patients admitted to our general ICU because of anaesthesia-related complications over a two year period between 1st January 2002 and 31st December 2003. The clinical records (case notes and ICU records) of the patients were used to extract the relevant data.

During the study period, a total of two hundred and fifteen patients (215) were admitted to the ICU. Five (2.8%) of these patients were admitted because of anaesthesia-related complications following 3155 anaesthetics, giving an ICU admission rate of 1:607 anaesthetics. The average age of the patients admitted was 34 years. There were four males and one female who had presented for four elective and one emergency operation. There were 3 cases (60%) of failed intubation, one case (20%) of endotracheal tube dislodgment and another case (20%) of post-extubation hypoxia in a patient with a suspected malignant thyroid.

The average duration of stay in the ICU was 7.2 days. One patient (20%) received mechanical ventilation whilst the remaining four (80%) received oxygen via an intranasal catheter or variable performance facemask.

Four patients (80%) received pressor agents but none was transfused blood.

There were three deaths giving a 60% mortality rate or 1 death in 1052 anaesthetics. This mortality rate is higher than that in the studies reviewed. Morbidity and mortality were due to a combination of human, drug and equipment factors. Closer supervision of resident doctors and procurement of anaesthetic materials will help reverse this trend. Critical incident reporting will help heighten awareness.

Introduction
Mortality rates for healthy patients presenting for elective surgery are in the range of 1:50,000 to 1:150,000.

In 1:2000 cases, there may be anaesthesia-related factors associated with death. Anaesthetic mishaps are typically the result of a combination of errors: lapses in vigilance, environmental influences and equipment deficiencies, all of which can combine to delay the prompt detection and correction of a problem. Failed intubation and failure to ventilate occur in about 1 in 10,000 anaesthetics.

Patients die from failure to be given adequate oxygen rather than a failure to be intubated.

In the developed world, the ready availability of modern monitors and equipment has greatly reduced the mortality associated with anaesthesia. In the third world, where some of these monitors are not readily available, looking after a patient under anaesthesia is still an arduous task for the anaesthetist.

Whilst several papers in the Western world and Asia have researched this important topic, a review of literature (Medline based) did not reveal a similar study from our country or indeed the entire West African sub-region.

Methods and Material
The clinical records (ICU and case files) of all the patients admitted to our ICU following anaesthetic complications over a two year period (2002-2003) were retrospectively reviewed.

The patients' demographics, anaesthetic techniques/complications, type of surgery performed and duration of stay in the ICU were all noted. Also noted were the need for ventilatory support, pressor agents and blood transfusion. The number of deaths was also recorded.

Results
A total of two hundred and fifteen patients (215) were admitted to our ICU between January 2002 and December 2003. Five (2.8%) of these patients were admitted to the ICU because of anaesthesia related complications following 3155 anaesthetics.

The average age of the patients was 34 years. There were four males and one female who had presented for four elective and one emergency operation. There were 3 cases (60%) of failed intubation, one case (20%) of endotracheal tube dislodgment and another case (20%) of post-extubation hypoxia.

<table>
<thead>
<tr>
<th>Types of surgery</th>
<th>Anaesthetic complication</th>
<th>Duration of admission (days)</th>
<th>Deaths (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thyroidectomy</td>
<td>Failed intubation</td>
<td>7</td>
<td>1 (33.3%)</td>
</tr>
<tr>
<td>Laparotomy for intestinal obstruction</td>
<td>Failed intubation</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>Open pericardiectomy and biopsy of pericardium</td>
<td>Failed intubation</td>
<td>5</td>
<td>--</td>
</tr>
<tr>
<td>Open reduction and immobilization of left mandibular fracture</td>
<td>Intra-operative endotracheal tube dislodgement</td>
<td>19</td>
<td>1 (33.3%)</td>
</tr>
<tr>
<td>Attempted thyroidectomy in a patient with suspected malignant thyroid</td>
<td>Post-extubation respiratory distress and hypoxia</td>
<td>4</td>
<td>1 (33.3%)</td>
</tr>
</tbody>
</table>
following attempted thyroidectomy in a patient with suspected malignant thyroid.

Table 1 shows the relationship between the type of surgery, anaesthetic complication, duration of stay in the ICU and mortality.

The average duration of stay in the ICU was 7.2 days. One patient (20%) received mechanical ventilation, while four patients (80%) received oxygen via an intranasal catheter or variable performance facemask. Four patients (80%) received pressor agents for organ support but none received a blood transfusion.

The mortality rate was 60% with three deaths: two deaths were due to anoxic encephalopathy following failed intubation (66.6%) and one death (33.4%) was due to post extubation hypoxia in the patient with suspected malignant thyroid.

A total of 3,155 anaesthetics were given during the review period giving an ICU admission rate of 1:631 anaesthetics and a mortality rate of 1:1052 anaesthetics. The three deaths represented 11.3% of all ICU deaths during the study period.

**Discussion**

Anaesthesia related complications, however undesirable, do occur because as Short has stated “all doctors, however experienced, make mistakes.” Nevertheless, our aim should be to prevent mistakes as much as possible.

In this study, the ICU admission rate for anaesthesia related complications was 1 in 631 anaesthetics. There is higher than two reports from Britain that gave ICU admission rates of 1 in 1543 and 1 in 2371 anaesthetics respectively. 8,9 In a six month, prospective study of unplanned admissions to their post-anaesthetic intensive care unit in Thailand, Toomtong et al. reported that anaesthesia-related intensive care unit admissions in a tertiary hospital in a developing country.

The mortality rate in this study was 1 death in 1052 anaesthetics or a 60% mortality rate amongst the patients admitted to the ICU for anaesthesia related complications. Cooper et al. and Leigh et al. reported mortality rates of 17% and 15.2% in their respective studies in the U.K.8,9 Imarengiaye et al reported a 27.3% mortality rate in their study.12

The high mortality rate in this study was due to a combination of human, drugs and equipment factors. Significantly, all the patients in this study were managed by junior resident doctors. Following these incidents; more anaesthetic materials have been acquired, the need for more consultant supervision emphasised and human errors strongly condemned.

Critical incident reporting enables potentially dangerous situations to be identified and, hopefully, allows preventive measures to be introduced before disasters occur.14-16

**Acknowledgement**

Our sincere thanks go to the staff of the records and ICU departments of the University of Nigeria Teaching Hospital (UNTH), Enugu, Nigeria for their cooperation during this study. We also thank Miss Mary Nwodo, who graciously typed this manuscript.

**References**


Haydn Perndt - a portrait

Steve Kinnear
Kinn12345@ozemail.com.au

If you are even an occasional reader of this Journal, you will almost certainly have already come across the name Haydn Perndt. The surprising thing is that you may not be aware of the great variety of ways that Haydn has been involved with, and contributed to, the activities of the WFSA and of anaesthetists throughout the developing world.

Haydn started his medical career at Sydney University. However even at that early stage it was clear that Haydn’s path would be the one less travelled. During his medical degree he took a year off and travelled through India and Nepal, mostly by himself. In 5th Year he went to Africa for several months, and then after completing his degree, he went to Canberra to work as a Resident Medical Officer for 2 years. Shortly after that time he returned to Nepal, and then traveled on to Greece where he met his wife-to-be, Di. He continued on to the UK where he undertook anaesthetic training at St Thomas’ Hospital in London, in Professor Churchill-Davidson’s department. He completed his training and then, in 1984, he and his wife Di went to Canada, where Di’s family were, and he worked in Montreal for 18 months at the Hospital for Sick Children.

It was from this eclectic background that Haydn really started to fly. His next job was working in Vanuatu for two years. Here he was able to combine his considerable anaesthetic skills, with the insight and empathy for his fellow man that are hallmarks of his character. After this he took up a position as Staff Specialist at the Royal Hobart Hospital, in Hobart, Tasmania - a position that he has used as a base for applying his enormous energies over the subsequent 15 years.

In the late 80’s Haydn, along with a few other anaesthetists from Australia and New Zealand (Kester Brown, Mike Tinson, Anthea Hatfield and Hugh Spencer) were responsible for setting up and running refresher courses for the few hard-pressed anaesthetists of the Pacific region. These week-long courses have continued annually ever since - 14 years so far - and have expanded from Polynesia to Micronesia. Haydn has been a lecturer for at least 8 of them. They have provided a great teaching and fellowship focus for Pacific anaesthetists, and were the springboard for the development of the Pacific Anaesthetic Training Programme, which commenced in 1995 in Suva, Fiji. This training programme is now well established, and trains Pacific Island doctors to Diplomate and Masters Level in Anaesthesia. Haydn has also been an active supporter of this training programme. In its early days he was known to just hop on a plane and spend a week in Suva, for no other reason than to provide moral support, advice and friendship to the then newly-appointed and somewhat apprehensive tutor of the struggling programme.

Alongside these activities, Haydn became actively involved in the World Federation of Societies of Anesthesiologists in 1992, joining the Education Committee. In this capacity, he traveled to many countries in Africa, Asia, and the Pacific, assisting anaesthetists in those countries to establish better teaching programmes, doing some teaching himself, and improving communication between isolated groups of anaesthetists and the WFSA. In 1996 he became Chairman of this committee, and was largely responsible for greatly increasing the attendance and participation of anaesthetists from the third world at the 1996 World Congress of Anaesthetists in Sydney, Australia. He remained on this committee as Chairman until 2000. Since then he has also worked for the International Committee of the Red Cross for considerable periods of time in Malawi, Somalia, and on the Thai-Cambodian border.

Haydn has also been a great motivator for anaesthetists within his own country to become more outward- looking and aware of the needs of the peoples of the countries that surround us. In 1999 he and a colleague, George Merridew, set up a one week training course for anaesthetists to learn and practice draw-over anaesthesia, and hear about various aspects of working in developing countries and difficult situations. Since then there have been 14 such courses held in several locations around Australia. The latest one was in Darwin, in July 2004. All have been over-subscribed, and most anaesthetists who attend go on to work overseas in some capacity, usually voluntary.

Recently Haydn took time out from clinical anaesthesia to broaden his own outlook even further, and has spent the last year studying for a Masters Degree in Public Health. He has almost completed this.

Haydn has been an integral part of the Overseas Aid Subcommittee of the Australian Society for over a decade, and has been a prime-mover of several of the major activities this committee through that time. Most recently, this has involved assisting the newly independent East Timor to establish its own Nurse Anaesthetist training programme. He has been to Dili several times to help with this.

Apart from all this, Haydn is a devoted family man, and spends as much time as he can with Di and his three children, Nic, Alex and Katrina.
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Dr Henry Bukwirwa was born on 16 November 1954 in Kihanda in the Rukungiri District of South-Western Uganda. He was educated in Kigezi and at King’s College, Budo before graduating in medicine from Makerere University in 1980 with the degrees MB ChB. After five years in general hospital practice, he began training in anaesthesia and was awarded the degree, Master of Medicine in Anaesthesia by the University of Nairobi in 1989.

After surviving the privations of the brutal regimes of Idi Amin and Milton Obote, when Patricia Coyle was the only physician anaesthetist in the country, Dr Bukwirwa became senior lecturer and Head of Anaesthesia, Department of Makerere University Medical School at Mulago Hospital in Uganda, a position he held for 14 years. During that time, he was responsible for training 60 anaesthetic officers, 28 nurse anaesthetists and supervised 17 doctors during their post-graduate training for the degree M.Med.Anaesthesia. Since June 2004, he has been the Head of Anaesthesia and Intensive Care Services at the Central University Teaching Hospital Kigali in Rwanda.

Henry has long been interested in medical education and, in particular, the training of anaesthetists. Despite his very heavy clinical workload, he is frequently invited to participate in anaesthesia training programmes either as an external examiner or as a visiting lecturer in East and Central Africa and beyond. He has also been actively involved in national, regional and international Continuing Medical Education activities and has published extensively in national and international anaesthetic journals.

Dr Bukwirwa is an active member of numerous professional bodies. He was involved in the formation of the Uganda Society of Anaesthesia in 1990, then served on its Executive for many years and was President between 1991-1996. He subsequently became the Chairman of the Society of Anaesthesiologists of East Africa from 1997 to 1998.

Recently he has been one of the founder members of the Association Rwandaise des Anaesthesistes and the driving force behind the 1st Rwandese Congress of Anaesthesia held in 2004. During the World Congress of Anaesthesia held in Sydney in April 1996, he was nominated to serve for a second term on the Publications Committee of the World Federation of Societies of Anaesthesiologists (WFSA). At the same Congress, he was nominated by the African delegates to the post of Secretary of the Steering Committee for the formation of the African Regional Section of WFSA and was subsequently deeply involved in writing its Constitution. During the Montreal World Congress of Anaesthesia in 2000, he was elected to the WFSA Education Committee with particular responsibility for training programmes on the African continent.

He has published and read scientific papers on a wide range of Anaesthesia topics. He has been an active member of the editorial board of Update in Anaesthesia. One of his most original contributions to anaesthesia has been the establishment of the anaesthesia equipment maintenance training programme for users and technicians that is supported mainly by the WFSA Foundation.

Dr Bukwirwa is a member of various non-medical professional bodies. He was a member of Kampala North Rotary Club which, in conjunction with Rotary International, has extended substantial assistance to the Makerere University Anaesthesia Department.

Henry is married and blessed with three daughters and now lives in Kigali, Rwanda. Many who are practicing anaesthesia in Africa today have reason to be grateful for his boundless energy, infectious enthusiasm and dogged determination to raise the profile of anaesthesia throughout the continent.

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Obstetric anaesthesia in Kenya
a survey of 39 patients undergoing Caesarean section

Objective:
To examine aspects of the case-mix, anaesthetic practice and outcome that differ from UK practice.

Introduction:
Mutomo hospital is a district mission hospital administered by the Catholic Sisters of Mercy. It is situated 70km south of Kitui in Ukambani, Kenya and serves a large and widely-dispersed mainly rural population of perhaps 150,000 people.

In 2002, there were 685 in-hospital deliveries, of which 155 were by Caesarean section (22.6%) and 21 by vacuum extractor (3.3%). There were 8 maternal deaths in the group as well as 34 stillbirths and 38 neonatal deaths. In the months January-December 2003, 151 /584 deliveries (25.8%) were by Caesarean Section (CS) and 40 by vacuum extractor (6.8%) with 5 maternal deaths, 27 stillbirths and 33 neonatal deaths.

Materials and methods
A partial prospective survey was carried out over a three month period. Cases anaesthetised by the author were examined prospectively; information on the other cases was derived from the patient notes and in some cases from interviewing the patients after Caesarean Section. The first 17 cases were consecutive. Information was gathered where possible on the variables listed below.

Results:
In all, 39 patients underwent Caesarean section during the 3 month period of the survey.

Anaesthetic technique
General anaesthesia was the method of choice for bleeding emergencies and for ruptured uterus: other cases had spinal anaesthesia. One CS was performed under local anaesthesia: a primip who had had an eclamptic seizure and was post-ictal with hypotension due to magnesium sulphate. She was fully dilated and had a failed vacuum delivery.

Spinal:
The gauge of needle used was 20g (23 pts), 22 (2pts), 24g (3 pts) and 25g (3 pts)

Table 1: Indications for Caesarean section were classified as:

<table>
<thead>
<tr>
<th>Emergency (Mother’s life in danger)</th>
<th>Urgent</th>
<th>Scheduled</th>
<th>Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 (21%)</td>
<td>20 (51%)</td>
<td>7 (18%)</td>
<td>4 (10%)</td>
</tr>
</tbody>
</table>

Table 2: Indications for Caesarean section

<table>
<thead>
<tr>
<th></th>
<th>Emergency</th>
<th>Urgent</th>
<th>Scheduled</th>
<th>Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obstructed lab.</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure to progress +/other</td>
<td>4</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foetal distress</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ante-partum haemorrhage</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous scar +/- other</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uterine rupture confirmed</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uterine rupture suspected</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eclampsia/failed vacuum</td>
<td>1</td>
<td></td>
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</tr>
<tr>
<td>Malpresentation, incl. breech</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Method of anaesthesia employed.

<table>
<thead>
<tr>
<th>GA</th>
<th>Spinal</th>
<th>Spinal + ketamine supplementation</th>
<th>Local Anaesthesia alone</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>22</td>
<td>8</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 4: Drug and dosage employed for spinal anaesthesia.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5% Bupivacaine</td>
<td>1.5 mls (1)</td>
</tr>
<tr>
<td>5% Lidocaine</td>
<td>2 mls (28)</td>
</tr>
<tr>
<td></td>
<td>1.7 mls (1)</td>
</tr>
<tr>
<td></td>
<td>1.5 mls (1)</td>
</tr>
</tbody>
</table>

Table 5: Block heights.

<table>
<thead>
<tr>
<th>Neurological level</th>
<th>No. patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>T8</td>
<td>2</td>
</tr>
<tr>
<td>T7</td>
<td>4</td>
</tr>
<tr>
<td>T6</td>
<td>4</td>
</tr>
<tr>
<td>T5</td>
<td>2</td>
</tr>
<tr>
<td>T4</td>
<td>2</td>
</tr>
<tr>
<td>T3</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 6: Lowest recorded blood pressures

<table>
<thead>
<tr>
<th>Blood Pressure</th>
<th>Patient No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>1-10</td>
</tr>
<tr>
<td>60</td>
<td>11-20</td>
</tr>
<tr>
<td>80</td>
<td>21-30</td>
</tr>
<tr>
<td>100</td>
<td>31-40</td>
</tr>
<tr>
<td>120</td>
<td>41-50</td>
</tr>
<tr>
<td>140</td>
<td>51-60</td>
</tr>
</tbody>
</table>

Table 7: Complications after spinal anaesthesia

<table>
<thead>
<tr>
<th>Complication</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>5</td>
</tr>
<tr>
<td>PDPH likely</td>
<td>3</td>
</tr>
<tr>
<td>No headache</td>
<td>18</td>
</tr>
<tr>
<td>Transient Neurological complications</td>
<td>2</td>
</tr>
</tbody>
</table>
history and examination, post-dural headache (PDPH) was felt to be the cause. In all 3, the spinal needle used was a 20g with a cutting bevel. All headaches had resolved by the time of discharge.

Numbness and pain in the anterior thigh was present in 2/15 pts questioned. This was felt to be possibly in a femoral nerve distribution and it resolved by day 3 in both cases.

There were no complaints of persistent paraesthesia or numbness, although follow-up ended at the eighth post-operative day.

**General anaesthesia:**
The starvation time varied from 4 hrs to 2 days and cricoid pressure was not used routinely. All seven patients in the survey were grade 1 intubations and there was no evidence of regurgitation or aspiration at intubation although two patients regurgitated a small amount immediately prior to extubation.

The induction agent of choice was ketamine iv 2mg/kg in all cases, followed by suxamethonium 1-1.5 mg/kg and spontaneous ventilation with 50 % 02/N2O and 0.5% inspired halothane via a Magill circuit.

**Outcomes:**
There were 6 stillbirths following Caesarean section and 1 death two weeks after delivery of a 28 week gestation baby weighing 850g.

There was one maternal death during Caesarean section: the patient had been in obstructed labour for 3 days and presented with hypotension and poor peripheral perfusion. She was resuscitated with fluids and antibiotics. She suffered cardiac arrest during spinal anaesthesia and despite briefly regaining an output after fluids and adrenaline, sadly re-arrested shortly thereafter. The decision was made not to proceed with further resuscitation in view of the impossibility of prolonged ventilation and the likely poor outcome.

**Conclusions:**
In general, spinal anaesthesia is an effective and inexpensive means of providing anaesthesia for CS and the onset time with 5% hyperbaric lidocaine compares very favourably with GA, which is especially relevant if the anaesthetists are working alone. A dose of 2 mls 5% lidocaine might be considered generous and it may be significant that 12 patients required treatment for hypotension in the spinal group.

Intra-operative pain appeared to be predicted by block height below T6 on testing with a cold stimulus. PDPH, as expected, was associated with the use of 20g cutting bevel needles. No evidence of transient radiculopathy was uncovered in this survey, but this complication is in any case relatively infrequent.

GA appears safer if the mother is haemodynamically compromised or has severe sepsis. Regurgitation and aspiration appear to be rare in this population: this may be due to their low fat diet increasing the speed of gastric emptying, the relatively long starvation times and the small maternal and foetal sizes resulting in lower intra-gastric pressure than in their UK counterparts.

The role of cricoid pressure is unclear but it might be suggested that it should be applied in sick, unstarved mothers. Ketamine would appear to be a very reasonable choice of induction agent for the compromised mother.

**Editorial Note:**
I apologise to the author of this paper for losing their name and contact details. If he/she, or anyone who knows them, contacts me, I will acknowledge them in the next issue of WAN.
Smiles in Red Marrakech

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After spending time working in West Africa (Cameroon and Sierra Leone) last year I then moved to North Africa to join the Operation Smile team in Morocco. The few extremely intense days spent in Marrakech were packed with new experiences, not only clinical and logistical, but also visiting a fascinating fairy-tale city and meeting charming people.

Operation Smile (www.operationsmile.org) is a voluntary organisation based in the USA, that sends medical teams to perform reconstructive surgery (mainly head and neck) on children and young adults in developing countries. The most frequently performed operations are cleft lip and cleft palate repair.

Program
An advance team arrived mid-week to screen all the potential patients to be scheduled for surgery the following week. The main team arrived two days later and spent Saturday setting up the operating theatres. One day of enjoying Marrakech as tourists was followed by five days of hard work during which we operated on 156 patients, most of whom were children. I gave 20 anaesthetics in four days and spent one day helping other anaesthetists. We then packed up and left the following Saturday morning leaving behind a small follow-up team who stayed for another few days.

A typical day started at 5:30 am with the ‘wake up’ call. It was a normal time for my American colleagues but for me desperately close to the middle of the night! We were in the hospital usually by 7:15 am.

Logistical adventure
The experience of converting empty rooms into fully functional operating theatres was truly fascinating. As previously agreed between Operation Smile and the local hospital, a whole operating theatre suite was emptied except for operating tables, trolleys, drip stands, oxygen and power supply sockets in the wall. Operation Smile brought all necessary equipment from the USA. Every operating table had an assigned “trunk” containing an anaesthetic machine, monitoring, suction and Ambu bag. All disposables were brought in separate boxes.

Anaesthesia
We used 7 operating tables in 4 reasonably spacious theatres. One table was reserved for local anaesthetics only and six were used for general anaesthesia. Each anaesthetist organised his/her own anaesthetic trolley. By the end of the first day we were very proud of our personally designed anaesthetic stations which we later constantly improved. My anaesthetic trolley was surely ‘state of art’ by the end of the week with lots of functional pockets and containers to store vital disposables like needles, syringes, suction catheters, cannulas, masks, tubes, airways etc. The most useful material was the Duck tape which bound everything together. Lesson number one for me: do not ever travel on a voluntary anaesthetic mission without Duck tape.

The anaesthetic machines were Hawks (Anmedic) that were compact (30cm tall), portable and robust. It was an American design with the oxygen flowmeter on the right hand side, marked green. We used 100% oxygen from the pipeline as pressurised air and nitrous oxide were not available. Each machine was fitted with a sevoflurane vaporiser and only manual ventilation was available. Disposable Mapleson D circuits were used with
different sizes of rebreathing bags. The monitors provided non-invasive blood pressure measurement, oxygen saturation, ECG and capnography.

The anaesthetic service was organised along American guidelines with minimal anaesthetic involvement in the patients’ pre- and post-operative care. The first time I met my patients was when I went to the reception play area to bring them to the theatre. They had previously been assessed by a surgeon during screening and by a paediatrician on the day of admission. Another paediatrician was in charge of the Recovery Room and dealt with post-operative pain control. Most of patients were ASA 1 so this arrangement seemed to work quite well although initially I felt slightly uncomfortable with it.

The standard paediatric anaesthetic consisted of: inhalational induction with sevoflurane in oxygen, intravenous cannula inserted by the anaesthetist or the surgeon (!), intubation, tylenol (paracetamol) suppository 30-40mg/kg, maintenance of anaesthesia with sevoflurane, spontaneous ventilation and local anaesthetic given by the surgeon or the anaesthetist. We were able to modify this basic anaesthetic but the general policy of Operation Smile is to avoid opioids and compromise on patient comfort rather than on safety. Fentanyl was available but we were advised to use it sparingly. By the middle of the week, I developed my own technique of supplementing sevoflurane with a small dose of fentanyl and/or ketamine (0.25 - 0.3 mg/kg). This regime made children calmer in the Recovery Room and decreased my use of sevoflurane. There was no scavenging system and pointing the expiratory limb of the breathing system in the direction of the surgeon was not always effective! We used dexamethasone both as an antiemetic and also to decrease any upper airway oedema. In keeping with the policy of Operation Smile we extubated all patients awake.

Induction of anaesthesia for adult patients was usually with intravenous propofol, a small dose of fentanyl and suxamethonium if the patient needed to be intubated. For plastic surgery not involving the airway, we used LMAs brought by two American colleagues as for some reason Operation Smile does not provide them. Here was ‘lesson number two’:

The team consisted of eight charming anaesthetists mainly from the USA, six of whom gave the anaesthetics and two were available to help at inductions and covering breaks.

The surgical team was more international: Brazilian, Italian, American and Moroccan. The surgeons were our friends. I am not joking, they were really wonderful!

The differences between American and British anaesthesia were the subject of very interesting discussions. Having two operating tables in one room seemed to enhance communication. As we were the members of one team working together for a good reason, all these discussions did not involve criticism of other’s practice but were a genuine exchange of ideas. For example we discussed simple things like the Venflon cannula with an injection port. It amazes me that this design has never managed to secure a foothold in the American market. The standard cannula used in the USA has no side port or cap for ‘needle-less’ injections and literally ‘forces’ an anaesthesiologist to use intravenous fluids for every patient.
Our working days were long, as we usually did not finish until about 8pm but it was good fun as the camaraderie was intense. The whole team was just a bunch of extremely nice people.

**Marrakech**

This is a city with irresistible charm, which has changed very little over a thousand years of history. The sultans obviously loved it and built splendidly decorated palaces and mosques. Marrakech is truly a royal city and capital of the South of Morocco.

By its geographical location it has always been the market place not only for the fertile plains around but for all the area between the Atlas mountains and the Sahara. Historically, it was the destination of many caravans coming from the oases of the South. It has now become a permanent fun fair with business and entertainment entwined. Marrakech certainly cast its spells on us. Unfortunately we only had a chance to touch its wonders for a short while.

The centre of city life is the Place Djema el F'na. It dramatically comes to life in the late afternoon, when it suddenly fills up with people and becomes a ‘circus of life’. A ring of spectators forms around every entertainer with each circle almost touching the other. The square would look like a honeycomb if viewed from above with fire-eaters, snake charmers, dancers, acrobats or storytellers in the centre of each ring. Later on, the square changes again into one great night-time, open-air eating place with endless rows of stalls selling food.

We immersed ourselves in the life of the souks (bazaars) where bargaining is a must. It was a feast for the senses - our eyes enjoyed the kaleidoscope of coloured carpets, china, shoes and leather. Our sense of smell delighted in the visit to the spice/chemist shop where there were remedies available for every possible ailment.

Marrakech is indeed “the red city” with all its walls, houses, fences, mosques painted brick-red colour. The old part is surrounded by an impressive 8-mile long rampart, pierced in several places by decorated gates. With the foothills of the High Atlas only forty miles away, the snow-cupped summits seem somehow unreal and created an amazing backdrop for the splendours of the city.

The spell has been cast - I must visit again.

**Acknowledgements**

I wish to thank my friend, Dr Keith Thompson for his encouragement and help in writing this and other articles.

**Post-script**

It is estimated that some 250,000 children are born each year with cleft lips or palates. Operation Smile, a US based charity, has been working for over twenty years to help such children and their families by providing free reconstructive facial surgery. If you would like to become involved, you can contact them at [www.operationsmile.org](http://www.operationsmile.org)
Kinyom Chea Krupeth Dak T’nam SondomÉ
(I am Doctor Who Give Medicine Sleep)

Matt Jarrett
mattjarrett67@hotmail.com

The final descent towards Phnom Penh revealed a broad, brown landscape of dry rice paddies and palm trees prior to arriving, with a jolt, on the outskirts of the 4 million strong capital of Cambodia. After deciding, whilst studying for my FRCA Finals, that I would take a period out, I finally arrived in Cambodia in February 2004 to start of a six month stint as a medical volunteer. With the help of Roger Eltringham at the WFSA (www.anæsthesiologists.org), I had organized a placement, practicing and teaching anaesthetics at a small charity hospital in the Cambodian capital. The "War on Terror" was represented by a long queue at Immigration, where policemen puzzled over a donated computer system. After a glutinously slow processing, I was met at Arrivals by Ruth Tootill, (Head of Surgery) and Chin Nareth (Physician Anaesthetist) and introduced to the mysteries of driving in the poorest country in SE Asia: a vehicular model of Brownian motion.

Medical facilities in Cambodia could be politely described as rudimentary. In the late 1970’s, the Khmer Rouge killed or drove into exile all but four doctors: Similarly, most nurses, dentists, teachers, engineers and other professionals were murdered. A generation later, the legacy of this is still keenly felt: under-equipped, badly paid and poorly trained medical personnel run a meagre network of rundown hospitals. Corruption is a way of life, and if you are too poor to supplement the hospital staff’s salary, you are even less likely to get timely or efficient treatment.

The road network is improving, but badly pot-holed roads remain a major obstacle to getting sick patients from the countryside to hospital. Some patients took 3 or 4 days to arrive at the hospital from the rural North-East and travel in the rainy season was more difficult still. Medical education is improving, however. The French, the ex-colonial power, are helping co-ordinate post-graduate education in Phnom Penh. Doctors rotate around the various government, international & NGO-run hospitals that are part of the training group.

Opened in 1997, Sihanouk Hospital Centre of HOPE (www.shosp.org) is a small 25 bed hospital in central Phnom Penh. The hospital runs extensive outpatient and outreach programmes and recently they have had their 500,000th patient consultation. Funded through international donations via the parent organization, HOPE International, the hospital has 13 surgical beds, 2 operating theatres and an annual budget in excess of $2,000,000, allowing it to be free at the point of use for Cambodians. Approximately 45 operations per month are performed under general or regional anaesthetic. They are mainly orthopaedic or general surgical procedures but occasional gynaecological, plastic or urological cases are performed as well.

Surgery was dictated not only by need, but by availability of expertise and equipment. Local surgeons were supplemented by expatriate consultants with sporadic visits from foreign volunteers, mainly orthopaedic and plastic surgeons during my time there. Anaesthesia was administered by four local anaesthetists (1 physician and 3 nurses) with occasional visiting anaesthetists such as me. Induction followed the US model, with anaesthesia being induced on the operating table in the OR. There were no large bore cannulae, ventilators or an ICU and blood transfusion were only possible if a relative or staff member donated blood: rural patients’ haemoglobin levels rarely reached double figures.

Such is the need for medical care, that there are inevitably many more potential patients than can be provided for. Every morning, all but the sickest patients entered a lottery system for an outpatient’s appointment. This took place outside the main entrance of the hospital and made uncomfortable viewing during surgical ward rounds.

After spending the first few days observing, I began to give anaesthetics, assisted by or assisting one of the staff anaesthetists, often with a physician anaesthetist trainee in attendance. Spinal anaesthetics were administered wherever possible, using plain bupivacaine (of which I had no previous experience).

General anaesthesia was carried out using two veteran Boyle’s machines and 100% industrial grade oxygen, thiopentone, halothane and vecuronium. There were very limited supplies of propofol, isoflurane and atracurium and they were used sparingly. Suxamethonium was available as were new ET tubes and time-expired LMA’s. Standard monitoring was available with pulse oximetry, ECG and NIBP. We also had a pneumatic heating blanket.

Thanks to Graeme Cameron and Braun, I took out a Stimuplex nerve stimulator and a selection of donated short bevel needles. These were washed out in Cidex and reused when ever possible. I attempted a variety of local anaesthetic blocks with varying success. Two blocks that I and my colleagues did find particularly useful were rectus sheath blocks for laparotomy and intrapleural catheters for biliary surgery. Due to the intestinal parasite load, cholangitis and cholecystitis were common conditions in young and old alike and open cholecystectomy was a depressingly common operation.
The value of coming from a system where Continued Medical Education (CME) is built into the culture became obvious when working in a system where education stops once a job has been obtained. In Cambodia, there is limited CME and support for practicing anaesthetists and the spirit of enquiry is often dormant, resulting in practitioners facing difficulties when trying to research a problem, even when good resources (library, CD-ROMs, Internet) were available. Other older, wiser visitors said this is a common problem wherever medical aid is donated, to the extent that parcels of donated books can sit in their wrappers in dusty libraries throughout the developing world. Anaesthetists in the developing world also face the problem of receiving conflicting advice given during brief visits by foreign anaesthetists.

I led regular teaching sessions for anaesthetists and surgeons, but it took several months before I felt that these were actually of benefit, as so much gets lost in both linguistic and cultural translation. True rapport took time to build, with both tutor and students having to adapt to each other: I soon discovered it was possible to give a lecture that no-one in the audience understood, despite, through politeness, having given every indication that every bullet point had been committed to memory.

While working at SHCH, I introduced a series of programs to help raise anaesthetic safety and promote CME. These were:

1. The establishment of protocols for various critical incidents, such as “Cannot Ventilate, Cannot Intubate.”
2. A critical incident reporting book with monthly anaesthetic meetings to discuss these.
3. An open forum, in which it was possible to discuss potential anaesthetic problems prior to starting the day’s list.
4. Self-led teaching sessions and a journal club once or twice a week.
5. A post-operative pain audit.
6. Teaching medical English to support staff twice a week.

Recommendations for anaesthetic volunteers:
- Find out in good time what is the most useful donated kit you can bring with you.
- Contact the airline beforehand, with documentary evidence, to get your free baggage allowance increased.
- Take good textbooks, such as the Oxford handbooks, Primary Anaesthesia (King, M.H., OUP, 1986), Care of the critically ill patient in the Tropics and Sub-tropics (Watters et al, Macmillan, 1991), and be prepared to donate them when you leave.
- Take a laryngoscope.
- HIV is rife. Consider taking your own gloves and eye protection.
- Be prepared to be lonely, at least initially.

Acknowledgements:
Many thanks to Dr Roger Eltringham for his support and advice in arranging my trip to HOPE hospital. I’d also like to thank Ruth, Ian, Cornelia, Gwen, Boyet, Nareth and Saoly plus all the other staff and expatriate visitors who made my stay so memorable. Aude: I couldn’t/wouldn’t have done it without you.

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Help for sustainable self-help: employment of a team of medical technicians in the Black Lion Hospital, Addis Ababa, Ethiopia, 10 - 24 October 2003 - Report and outlook for the future

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History

For more than 10 years close relations have existed between the Department of Anaesthesiology, Emergency and Intensive Care Medicine at the University of Gottingen, Germany, the Zentrum Anaesthesiologie, Rettungs- und Intensivmedizin (ZARI), and the Department of Anaesthesiology at the Black Lion Hospital, University of Addis Ababa, Ethiopia.

These links were initiated by the anaesthesiologist Dr. Reintraut Burmeister-Rother, who was working in Addis at that time and who founded the School of Anaesthesiology to train nurse anaesthetists and established the 6 bed intensive care unit (ICU) at the Black Lion Hospital. In Germany Dr. Burmeister was and still is strongly supported by Professor Dr. Dietrich Kettler, acting director of ZARI. He and his colleague Professor Dr. Hans Sonntag not only went to Addis to supervise the final examinations of anaesthesiologists, but they also made it possible for two Ethiopian anaesthesiologists, Dr. Kinfu and Dr. Manikule, to complete their medical education in Gottingen.

In addition, links were developed in the field of anaesthesia engineering. Initially, in the years 1993 and 1995, Wilfried Fraatz, a senior medical technician at Gottingen, together with Dr. Rupert Poschl serviced and repaired ventilators, anaesthesia machines, monitors, defibrillators, infusion pumps and other devices. Starting in 1997, under the direction of Dr. Klaus Zuchner, Head of Anaesthesia Engineering at ZARI, a step-by-step improvement to the medical gas supply for the ICU at the Black Lion Hospital was initiated. In 1999 a team of medical technicians (Wilfried Fraatz, Wolfgang Wollner, Johann Moser) installed an oxygen concentrator as the source of oxygen, and finally in 2003, after installing a duplex compressor system, performed extensive repair and upgrading work. The same team (reinforced by Horst Pfitzner) completed their work on the gas supply for the ICU and turned over responsibility for maintaining it to the Black Lion Hospital and a local medical technical company, Pharma Share Co. This company is managed by a German-born Addis resident Mr. Karl Hildebrandt and now also by his son Markos.

All those medical technical activities have been financially supported by an association called “Anaesthesiology in Developing Countries” (Anaesthesie in Entwicklungsländern), founded and headed by Professor Kettler. Additional substantial support has come from the manufacturer of the oxygen concentrator, F. Stephan Medizintechnik GmbH (Gackenbach, Germany), Lufthansa Germany, Hope e.V., the German embassy in Ethiopia and countless private donations.

Today, it is our legitimate hope that the essential supply of oxygen for the ICU is sustainably ensured, that vitally important life-support machines are functioning reliably and that all necessary repair and maintenance work can be executed quickly by qualified technicians on site. Now is the time to reflect on the lessons gained with this project and to apply them elsewhere. Why is the oxygen supply so important?

Oxygen is required to maintain the metabolism of the organism — no life can exist without sufficient oxygen! Ambient air contains approximately 21% oxygen, the remainder consisting mainly of nitrogen (78%) and Argon (1%). For healthy people this is perfectly adequate for breathing; however, in many lung or circulatory diseases the concentration of oxygen must be increased.

Addis Ababa, the capital of Ethiopia, is located on a high plateau about 2500 m above sea level. This in itself causes a distinct reduction in the barometric pressure and as a consequence a direct reduction in oxygen availability. Thus, a reliable supply of oxygen for patient is even more important than at sea level.

There are many methods of producing, transporting and storing oxygen. Everyone is familiar with steel cylinders filled with oxygen under high pressure. They are prepared in dedicated factories under strict safety precautions and require special regulators and gauges for safe administration of the oxygen. These heavy cylinders must be transported carefully and secured safely and a sufficient supply must always be guaranteed.

The reality we observed was often very different. The cylinders could only be filled to a maximum of 150 bar. Fittings were often defective and the administration of oxygen was imprecise. They were sometimes positioned in the centre of the ICU and we heard reports of falling cylinders and the resultant injuries.

Summarizing the situation prior to our intervention was simple: there was no safe and reliable oxygen supply with patients and health care personnel endangered by defective equipment. Furthermore, this unsatisfying situation consumed a substantial proportion of the local health care budget that could have been better used for drugs or additional equipment.

Picture 1. Oxygen cylinder positioned next to the patient's bed (before 1997).
The step-by-step solution

The improvement was implemented in several steps. First, in 1997 the ICU was equipped with a safe and leak-proof distribution system for oxygen. Terminal outlets for compressed air and electricity for all ICU beds were concurrently installed. Two manifolds were wall-mounted on opposite sides of the room and equipped with all necessary outlets for three beds on each side. Initially this distribution system was supplied conventionally with oxygen from the neighboring room that had previously been used as a storeroom. A significant improvement was made in 1999 when a state-of-the-art oxygen concentrator system was installed in the storeroom, providing the distribution system with both compressed air and oxygen at a concentration of greater than 90%. This concentration is perfectly adequate for medical purposes: the patient’s individual oxygen requirements are then met by blending oxygen with room air.

The concentrator method

Producing oxygen from ambient air with a concentrator uses a simple but extremely effective principle, the so-called “molecular sieve”, a crystalline compound made of aluminium and silicon oxides. It acts like a sponge with precisely defined pores, i.e. nitrogen is retained in these pores at a defined pressure of air and is thus separated from the remaining oxygen and argon. The oxygen content is therefore “concentrated” to more than 90% with the residual mixture being predominantly argon and nitrogen. This oxygen enriched air or “concentrator oxygen” is fed into a buffer tank from which it can be distributed to the terminal units in the ICU as needed. Nitrogen is returned to the environment, which causes no problems if the room is sufficiently ventilated.

The specific advantage of the concentrator method is the ability to produce oxygen “on-site”, thus avoiding losses during transport or storage and producing oxygen only as and when required. If the device’s capacity is adequate, it provides a permanent and always available source of oxygen. Naturally, a reliable electricity supply is required to supply the compressor. Short-term power failures can be buffered by using tanks. Other requirements, that can be easily achieved, are drying and filtering the ambient air to remove particles that could potentially clog the molecular sieve’s pores. Apart from this, the molecular sieve will not be consumed or altered. Only the compressor requires regular service and maintenance.

Special problems involved in producing concentrator oxygen in a developing country

It soon became evident that the compressor is the crucial component in the process of producing concentrator oxygen. Unfortunately, due to limited financial resources, the initial installation in 1999 used only one compressor for both purposes, oxygen production and compressing the air supply. This resulted in a continuous work load and compressor failure at an early stage. This fault could not be fixed by simply sending a key component for its repair and therefore a complete new compressor was shipped to Addis. Even this only solved the problem for a limited period of time until a concentrator valve malfunction caused...
new problems. The lack of knowledge and information about how to repair and maintain the whole system on site was evident. It was therefore necessary to ensure that there was adequate maintenance expertise in Addis at the same time as integrating two compressors into a duplex system to share the work and provided back-up security.

Previous, unfavourable experiences with training of personnel in Gottingen were discouraging. Returning trainees found they could use their newly obtained skills more profitably elsewhere and were soon no longer available for work at the hospital. Therefore, an excellent solution was to contract the local Pharma Share Company established more than 40 years earlier in Addis and now managed by a father and son, Karl and Markos Hildebrandt, the second and third generations of the family, respectively. They employ indigenous technicians and especially Mr. Lakew Tiluhan, originally trained by Ethiopian Airlines and now also a highly experienced expert in medical engineering. Before the group left Gottingen to perform the last service in 2003, he received special training at Atlas CopCo, the manufacturer of the medical gas compressors and in oxygen concentrator technology at the F. Stephan GmbH. He is now skilled and experienced enough to fully maintain and service the compressor and concentrator unit, which is now of adequate size to meet demand. Mr. Tiluhan is supported and assisted by Mr. Befekadu Mekonen, a highly motivated technician at the Black Lion Hospital, who also has acquired extensive skills in this technology during both installation periods of the concentrator system.

The Gottingen association is working to obtain a long-term service contract with Pharma Share Co. to ensure the system is maintained by the two skilled and responsible technicians with an adequate supply of spare parts from Gottingen.

**Outlook**

Utilizing concentrator technology to produce oxygen for medical use is not only beneficial for developing countries but highly developed countries may also profit from this inexpensive alternative to conventional oxygen supply. Not only in remote or potential disaster areas such as oil rigs, high mountainous regions, field hospitals or hospital ships can concentrator oxygen be produced safely and at low cost but independent doctors or clinics and hospitals could use this technology to cut costs.

However, the current European Pharmacopoeia imposes severe restrictions on the use of concentrator oxygen. The International Standard ISO10 083, Oxygen Concentrator Supply System for Use with Medical Gas Pipeline Systems, currently under revision with our participation, does not allow the use of concentrator oxygen in Europe as the concentration of oxygen produced (>90%) is lower than that prescribed in the European pharmacopoeia (>99%). No risks from using this slightly lower concentration have been identified and, on the contrary, long-term experiences from other countries, such as Canada, have clearly demonstrated the advantages of this method. Paradoxically, the installation in Addis may therefore be of assistance in obtaining approval for the use of this modern technology in Europe.

The use of oxygen concentrators in Addis may thus prove to be the reference location for this technology in other countries of this region. In the near future, robust and appropriate medical technology, developed for Ethiopia and similar countries could be tried at the Black Lion Hospital. This could well be the place where such adapted technology could be developed, proven and taught, thus establishing a centre for medical engineering at the Black Lion Hospital. At present Professor Kettler is discussing the possibilities of securing long-term ties between Ethiopia and Germany with the German Association of Anaesthesiology and Intensive Care Medicine (Deutsche Gesellschaft für Anaesthesiologie und Intensivmedizin, DGAi).

Our experiences with the Black Lion Hospital has shown that they are of mutual benefit and should not only be continued but also strengthened and expanded in the future.
Dying to Give birth: obstructed labour in the Hindu Kush

Just north of the Hindu Kush, that great mountain range that crosses Afghanistan from east to west, lies the remote and rugged province of Badakhsham: a land of snow-capped peaks, deep valleys and raging rivers, where time appears to have stood still. It is tempting for the traveller to romanticise these mountains and people who live in them but for one shocking statistic: it is in this province that the world’s highest ever maternal mortality ratio has been recorded.

In May 2003, my husband, Eric, and I took the decision to work for Medair (a humanitarian aid organisation) in Afghanistan. Three months later, Eric became their Country Director, based in Kabul, and I, after 4 months language study, moved to Badakhshan to help develop a comprehensive Emergency Obstetric Care (EOC) facility in a health clinic in the district of Yawan. The EOC was to serve a population of almost 100,000 in an area of approximately 400Km². The lack of such facilities has been highlighted in the Afghanistan National Health Resources Assessment (ANHRA) which states that only 11 of Afghanistan’s 32 provinces (34%) have capacity to provide comprehensive EOC and only 17 of the country’s 174 hospitals (9.8%) are able to perform caesarean sections.

Before arriving in Afghanistan, I was very aware that the country has one of the highest maternal mortality rates in the world (MMR: 1,600 maternal deaths per 100,000 live births) and that maternal death is the leading cause of death among women of reproductive age (15-49 years). Vast differences in MMR exist between urban Kabul (400/100,000) and rural Badakhshan where the MMR is 6,500/100,000, the highest ever recorded. As in other global reports, the commonest cause of maternal death was haemorrhage (30%). However, obstructed labour was the second leading cause (23%) in the country as a whole but the first in Badakhshan.

One obvious reason for the shockingly high MMR in this region is its geographical inaccessibility. High mountains and wide rivers with few roads and fewer bridges make travel difficult in the summer months and near impossible in winter. For example, travelling from Yawan to Faiabad, the city with the only hospital in the Province, requires a two day horse ride over 4000m mountain passes during the seven month period when the road is impassable. The river Amu at Yawan can be forded by vehicles for only five months of the year whilst during the rest of the time, supplies or patients have to be carried by donkey over a flimsy footbridge further upstream. Another reason, already mentioned, is the lack of health care facilities and in particular, those capable of performing caesarean section and providing blood transfusion.

Why obstructed labour should be so prevalent was one question on my mind as I began working in the clinic in Yawan. The answer, I think, lies in the combination of poverty, malnutrition and lack of

Table 1: A comprehensive Emergency Obstetric Facility is able to:
1. Administer antibiotics
2. Administer parenteral oxytocic drugs
3. Administer parenteral anticonvulsants for pre-eclampsia and eclampsia
4. Perform manual removal of placenta
5. Perform removal of retained products (via manual vacuum aspiration)
6. Perform assisted vaginal delivery
7. Perform surgery (i.e. caesarean section)
8. Perform blood transfusion
exposure of the skin to sunlight giving rise to growth stunting and osteomalacia in women.

The staple diet of the region is naan bread and tea supplemented by rice, beans and yoghurt. Eggs and meat are expensive and there is little fruit and fewer vegetables to be had. Women live and die within their own homes, their lives defined by the children they bear and, more specifically, the male children. On the rare occasions they are permitted to leave the home, they do so covered with the burqa. From puberty, therefore, their skin is never exposed to direct sunlight. Almost all the women who attended the clinic at Yawan complained of muscle and joint pain mainly affecting the lower back and knees. It is sadly not uncommon for young women, unable to walk because of pain to be had. Women live and die within their own homes, their lives defined by the children they bear and, more specifically, the male children. On the rare occasions they are permitted to leave the home, they do so covered with the burqa. From puberty, therefore, their skin is never exposed to direct sunlight.

Literacy rates are very low, especially among girls: only 5% can read and write according to a recent UNICEF/CDC study.\(^2\) The education of girls has been clearly linked to improvements not only in maternal health but also to the health status of the family and the community\(^4\) so it is encouraging to see girls’ schools opening in villages throughout the province.

Women tend to marry in their early teens but the contraceptive prevalence rate among women of child-bearing years has been estimated at 2% and the total fertility rate at 6.9 per woman.\(^5\) Certainly, these figures fit with my experience in Yawan where few women had heard of contraceptive methods, fewer were permitted by their husbands to use them and they, in any event, lacked consistent access to them.

The clinic at Yawan was extremely basic: five rooms with minimal furniture, no electricity and no running water. During my first week, whilst trying to set up a room to be used for the EOC, a young woman arrived having been in labour with her third baby for three days. She had been carried on the eight

hour journey by men from her village on a wooden stretcher. She was in obstructed labour. Sadly, her baby had died but her uterus was intact and I managed to find suitable instruments with which to perform a craniotomy and deliver the infant.

A few days later, another woman with a similar story arrived. During her three days in labour, a “doctor” in her village had given her intramuscular oxytocin, a dangerous but common practice and the day before being carried to the clinic, her contractions had stopped. She had ruptured her uterus and the baby was dead. It was not possible to transfer her to Faizabad as the road was impassable so I had no option but to operate on her in the clinic. Suitable instruments were found in a store room and sterilised in an autoclave heated with firewood that had been gathered by the clinic staff. The office generator was carried to the clinic and a light bulb rigged above the wooden table that was to double as examination couch and operating table. Anaesthesia was induced with ketamine and diazepam and I was acutely aware of the absence of blood for transfusion. The uterus had ruptured in the lower segment but fortunately bleeding was not excessive. After delivering the baby through the abdomen, the quickest and safest option was to repair the uterus and ligate the fallopian tubes, a procedure for which I had earlier obtained consent.

Shortly after this, another woman arrived after being in labour for seven days. Her
contractions had stopped on day 3 and she had developed profuse bloody diarrhoea. She was septic and severely malnourished with a ruptured uterus and a dead foetus. Her family had carried her for two days over the mountains and onward travel to Faizabad would have taken a further two days at least. We operated again but with very little hope of a good outcome. We found a hydrocephalic baby in her abdomen and a uterus that had ruptured posteriorly. Again there was minimal blood loss but the tissues were infected and very friable. Following a subtotal hysterectomy and high doses of ampicillin, gentamicin and metronidazole, she recovered and was able to return to her village.

Subsequently women have been brought to the clinic in obstructed labour at a rate of approximately one per week and have required either a destructive delivery, caesarean section or a hysterectomy. So far, all the women have survived their ordeal but it remains a fact that the majority of women are still delivering and dying in their own homes and with such a high prevalence of obstructed delivery, maternal morbidities such as vesico-vaginal fistulae must be common. Only one woman with this condition has attended the clinic so far, but a community survey of the Province would be necessary to determine the true prevalence.

Indigenous female obstetricians and midwives are desperately needed to staff this clinic on a rotational basis but, so far, it had proved impossible to find women willing to work in this isolated rural area. This is, in part, because it is culturally unacceptable for women to travel or live apart from their husbands or other close male relatives, partly because there are not good schools for their children and partly because of worries about security. The lack of female healthcare workers was highlighted in the ANHRA report which found that nearly 40% of basic health facilities had no female health provider. In this society, where women are often not permitted to be examined by male doctors, female staff are essential.

Extensive international studies have clearly demonstrated that projects that focus on reducing maternal mortality by providing good quality EOC facilities with skilled personnel attending births and a good referral system can dramatically reduce MMR. It is encouraging that the government of Afghanistan has made reproductive health a priority and that the Ministry of Health is currently working with the United Nations and NGO's such as Medair to focus on this issue. However, much more needs to be done to address the issues surrounding the high mortality rate amongst Afghan mothers. Until then, the beauty and remoteness of the Hindu Kush will continue to conceal both the fear and the death that accompany an event the Western world more readily associates with joy and life.

References
Dr Sereima Bale  
Senior Lecturer in Anaesthesia  
Fiji School of Medicine

2004 was a busy year at the Fiji School of Medicine.

Two students passed the Diploma of Anaesthesia and six students will progress to their Masters in 2005. This year, one student completed his Masters and another will graduate pending completion of his research project.

The Annual Pacific Society of Anaesthetists Refresher Course was held in Suva in October. There were 18 delegates from 9 different countries (Fiji, Papua New Guinea (PNG), Tonga, Samoa, American Samoa, Cook Islands, Palau, Solomon Islands and Vanuatu). Locums were organised for those from Cook Islands, Tonga, Samoa and Fiji. There were 5 visiting speakers and topics were based around anaesthesia emergencies. This was the biggest Refresher Course yet held and the first to include a PNG physician anaesthetist.

It is hoped to run the 2005 Refresher Course in the Cook Islands, however, there is some doubt about funding as AusAID has not confirmed continuing financial support. Travel expenses involved in running courses in the Pacific Islands are huge because of the distances involved.

Primary Trauma Care courses were again run for final year medical students. A total of 57 students attended the two courses held during the year. A PTC instructors course was held in February.

2005 brings to us Dr Charlie Collins as Lecturer in Anaesthesia. Charlie is originally from the UK and has worked in Nepal for the past few years. We look forward to him joining the team.

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**World Anaesthesia:**  
**What we are doing and how you can help**

This seminar is run by the World Anaesthesia Society whose aim is to encourage and support the development of anaesthesia in developing countries

**Date:** Wednesday 8th June 2005

**Venue:** Association of Anaesthetists of Great Britain & Ireland  
21 Portland Place, London, W1B 1PY

**Organisers:** Dr Karen Henderson (Brighton) & Dr Iain Wilson (Exeter)

£110 for members of the AAGBI and/or WAS and £220 for non-members - 5 CEFD points will be awarded

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<td>Short term missions, long term care: Eritrea/Botswana Drs W Casey (Cheltenham) &amp; Dr A Baldom (Manchester)</td>
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<td>Personal practice: spending time in Cambodia Dr Matt Jarrett, Royal Marsden Hospital, London</td>
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<td>Primary Trauma Courses: success throughout the world Dr J De Courcy (Cheltenham)</td>
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<td>Somaliland: making something from nothing Dr Max Ervine, King's College Hospital, London</td>
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<td>Tanzania: education and more Dr Philip Thomas, Royal Sussex County Hospital, Brighton</td>
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Further information can be obtained from Dr Karen Henderson Email: was@aagbi.org
Henning Ruben

Henning Ruben of Copenhagen died on 4th December, 2004. Ruben's name is known worldwide among anaesthetists and others as the inventor of the Ruben non-rebreathing valve but this, of course, was only part of his greatest contribution which was the invention of the self-inflating bag.

In his own words, he had the idea for this device when, as a result of a strike by Danish truck drivers in 1954, supplies of oxygen in Danish hospitals ran dangerously low. He asked a bicycle mechanic to weld together the ends of four bicycle wheel spokes. He then fed these into a rubber anaesthetic reservoir bag and, with the aid of a piece of string, pulled them into an oval shape. He then found that, if he compressed the bag, on release it would regain its previous shape drawing in air. Thus the self-inflating bag was born and subsequently manufactured by the Danish company AMBU-TESTA, becoming known as the AMBU bag and copied by other manufacturers all over the world. However, the non-return valve which was part of the apparatus was always known as the Ruben valve. Ruben gave an account of the development of the AMBU bag in his paper at the 1st International Symposium on the history of anaesthesia in Rotterdam in 1984.

Although starting his professional life as a dentist, Ruben decided to become an anaesthetist in 1945, immediately after the war. After his appointment to the Finsen Institute in Copenhagen, he embarked on his life-long programme of inventing and research. He taught on the WHO anaesthetic course in Copenhagen in 1955 and was immensely popular as a bon viveur and raconteur. He received many honours during his life and, in 1964, the self-inflating bag was declared by the American Medical Association to be among the most significant medical innovations in the past 25 years.


John Zorab: jzorab@compuserve.com

Jacques Boureau, MD, FFARCS

Jacques Boureau died on 5th May, 2004 at his home in the Antibes. He was born on 9th April, 1909 in Paris. His father, Maurice Boureau, was a physician and, after schooling in Paris, the young Boureau studied medicine at the University of Paris. His father had spent some time in administering anaesthetics for Professor Antonin Gosset, one of the leading French surgeons of his day and was one of the first professional anaesthetists in France. So young Boureau might be said to have been brought up in an atmosphere of anaesthesia. Indeed, his doctoral thesis was on Rectal Anaesthesia with tribromethanol. When his father died, Gosset asked him to continue as his anaesthetist. He was called for military service at the beginning of the war in 1939 but released in 1940 after the fall of France.

A few years ago, Jacques Boureau was the subject of an article in Anesthesia and Analgesia - Current Researches. The article pointed out the difficulties French anaesthetists had in challenging the dominance of the surgeon in post-war France. Boureau was in the forefront of this struggle and went on to become one of the leaders of French anaesthesia and, later, became influential in the founding of the World Federation of Societies of Anaesthesiologists. In 1942, he was appointed to the public hospitals of Paris for part-time work as an anaesthetist. In 1946 he founded and became first President of the professional organisation of French Anaesthetists, “Syndicat des Medecins-Anesthesistes Francaise”.

In 1951, he became the first anaesthetist to be chosen to be General Secretary of the “Societe Francaise d’Etudes sur l’Anesthesie et l’Analgesie”, the committee of which had hitherto been entirely in the hands of surgeons. It was at this time, that Boureau joined the “Interim Committee” that had been set up to explore the possibility of establishing an international organisation for anaesthesia. He remained an active member of the committee and, at the foundation of WFSA on 9th September 1955, Boureau was one of those elected to the first Executive Committee. Shortly after, in 1958, Boureau was elected President of the French society which had, by then, changed its name to the Societe d’Anesthesie, d’Analgesie et de Reanimation. In 1960, he was elected to the Fellowship of the Faculty of Anaesthetists of the Royal College of Surgeons of England. In 1963, he was transferred to the Sainte Anne hospital.
World Anaesthesia Society: where we go from here
A Proposal

Iain Wilson, President, WAS
iain.wilson5@virgin.net

When World Anaesthesia was formed, one of its principle aims was to provide a cheap and readily available source of educational material for anaesthetists working in developing countries. Update was born as an add-on textbook that was distributed free-of-charge to anaesthetists in such countries who requested it. Initially, it was only available in English and in paper format. It is now available, thanks to a dedicated collection of doctors/translator around the world, in French, Spanish, Russian and Mandarin. It is available on the Internet (www.world-anaesthesia.org) and, thanks to support from the WFSA and the AAGBI among others, is also available on CD.

Although widely used and much appreciated, Update cannot, and does not seek, to take the place of all other anaesthetic textbooks and journals. Many anaesthetists in poorer parts of the world work without access to any modern books or journals. In contrast, many other anaesthetists in affluent countries have access to considerable amounts of educational material which is used for a short time and then discarded. If anaesthetists in one part of the world sent their books and journals to colleagues overseas, we could do much to reduce this imbalance.

World Anaesthesia, in conjunction with the WFSA Publications Committee wishes to put anaesthetists who are willing to donate books or journals in touch with anaesthetists in developing countries who have requested this type of assistance.

- Donors who are willing to send (by surface mail) current journals and/or recent textbooks (published after the year 2000) to Anaesthesia departments in the developing world should send an email to me at the address above with details of what you wish to donate.
- If your department would like to receive books or journals please email or write to us and we shall do our best to help.

Please give details of yourself, the size of your hospital and department, how many anaesthesiologists work in your department and what books or journals you have available.

**Tutorial of the week**
We also wish to pilot a new project: Tutorial of the Week. This is an ambitious initiative that aims to provide a weekly, web-based anaesthetic tutorial to anyone with web access. The tutorial will also be emailed to anaesthetists who can receive e-mail but cannot browse the web. They will appear on the World Anaesthesia Society website, www.world-anaesthesia.org.

In time, the tutorials will cover a wide variety of anaesthesia and critical care topics and will build up into an on-line library of information. Tutorial may be presented in a variety of formats but those which encourage the anaesthetist to reflect on the material or on their own practice would be ideal.

**If you wish to write a tutorial:**
- Tutorials may be submitted in a variety of formats including short articles (maximum 1200 words), case reports, multiple choice questions or data interpretation. Diagrams, photos and X-rays may all be included but ensure that the files are not too large and, therefore, slow to download.
- Remember that English is not always the first language of our readers and for this reason keeping the language straightforward will make your tutorial more effective.
- Tutorials posing questions to the recipient, in an interactive style, will be more stimulating to read.
- Recommend solutions that are not reliant on sophisticated investigations, drugs or equipment
- Include the e-mail address of the author (optional) so that readers can request further clarification.
- References should be kept to a minimum and should be mainly web-based, concentrating on websites with material that is free to access.

- Tutorials should be written in Microsoft Word or as a PDF file and submitted by email.

After receiving a potential tutorial, we will obtain an independent reviewer’s opinion as to whether the material is suitable for web publication. If the tutorial is suitable for publication, the author will be given a publication date. If the material is considered unsuitable, an e-mail will be sent explaining why. Normally, the editor and reviewers will not seek to modify tutorials.

We wish to start this project in March 2005. If you are willing to help in any way, we would be delighted to hear from you. There will be opportunities to help organise the project, write tutorials or act as a reviewer.

**If you want to receive the tutorials:**
- Log on to the World Anaesthesia Society website (www.world-anaesthesia.org) on a regular basis. Eventually we hope to provide one tutorial each week, but this will take time to achieve. All previous tutorials will be available on the website.
- If you cannot browse the internet, but can receive e-mail, please e-mail me and I will put you on our e-mailing list for tutorials. E-mails will be sent as small files to minimise download time. We regret that we will be unable to send tutorials by post or by fax.
- Remember that mistakes may occasionally occur with our material: we apologise in advance but we cannot accept any liability for this.

**Contact for WA/WFSA Book and Journal Donation Scheme and Tutorial of the Week:**
World Anaesthesia
Pound Cottage
Christow
Exeter EX6 7LX
United Kingdom.
Email:carol@world-anaesthesia.org
The first WFSA Refresher Course in anaesthesia to be held in Rwanda took place in Kigali, the capital, between 2-6 August 2004. It was supported by the Centre Hospitalier de Kigali (CHK), the WFSA, the AAGBI and the Belgo-Ruwandese co-operation fund and several private sponsors. A total of 65 physicians attended as well as nurse anaesthetists and clinical officers from all parts of Rwanda and Uganda. In total, there were 53 participants from Rwanda and 12 from Uganda.

The course co-ordinator was Dr Henry Bukwirwa who, amazingly, managed to organise the whole course despite having only been resident in Rwanda for two months. The visiting lecturers included Dr Jeanne Frossard and Dr Roger Eltringham, both from the UK and sponsored by the WFSA and the AAGBI respectively, Dr Steve Tendho from Mbarara in Uganda and Dr Vitalis Mungaiy and Charles Rangiri, both from Kigali. The latter is in charge of the training of clinical officers in Rwanda.

Jeanne went to Rwanda a week before the course was due to begin to take part in a brainstorming session on planning a curriculum for training physician anaesthetists. Unfortunately, this was cancelled but she was able to spend her time teaching interns, medical students and trainee clinical officers as well as helping in the preparation of the refresher course.

The venue for the course was the School of Banking and Finance. It had a large lecture theatre and good projection facilities including a LCD projector but no blackout facility, so it was difficult to use acetates on an overhead projector.

Each day, there were a series of themed lectures in the morning and small group discussions on the same subject in the afternoons. The afternoon sessions were held in both English and French. This format proved to be very successful, was popular with the students and gave the lecturers an opportunity to answer questions and discuss controversies. Topics covered included:

- **Monday**
  - Emergency situations

- **Tuesday**
  - Obstetrics

- **Wednesday**
  - Trauma, based on the Primary Trauma Care manual

- **Thursday**
  - Equipment

- **Friday**
  - Research presentations, course assessment and closing ceremony

Whilst the course was running, Henry had arranged for visiting technicians from Uganda to teach equipment maintenance and repair to the technicians from Kigali hospital. Ten were trained and amongst the equipment repaired was a Boyle’s machine, pressure regulators and oxygen concentrators.

During the day devoted to trauma, we concentrated on the primary and secondary survey (in both English and French) and then lectured on chest and abdominal trauma and the management of head injuries. In the afternoon session, we split into three groups for practical training. Although not a proper Primary Trauma Care (PTC) course, we hope that it gave the attendees a taste of PTC and hope that we will be able to organise a formal course in the future. We were able to give participants a certificate of attendance at the one day course but did not have enough PTC manuals to distribute to all.

Additional lectures were given on a variety of subjects including pain management, intensive care, post-operative recovery and the role of the WFSA. The secretary general of the Ministry of Health gave a lecture on Continuing Medical Education and three surgeons (including the director of the hospital and the chief of surgery) came to speak, although other locally invited lecturers, unfortunately, failed to attend.

The audience were both Anglophone and francophone in approximately equal numbers but this potential difficulty was overcome by Jeanne’s ability to lecture in both languages and to interpret and answer questions although, inevitably, this slowed down proceedings.

In addition to the main programme, presentations of research projects were given. There were seven presentations from Rwanda and two from Uganda. The prize for the best presentation (anaesthetic books) went to Olive Umotoni from Rwanda for her presentation on pre-operative visiting. Other activities undertaken during the course were a visit to the local hospital, an Intensive Care ward round, interviews with the Secretary of State and the Secretary General from the Ministry of Health, a television interview and a lecture to medical students on anaesthesia as a career.

The closing ceremony included an appreciation by the Secretary of State at the Ministry of Health, the Hon. Innocent Nyarihirira, of the work done by Henry Bukwirwa in mastering the course and of the enthusiasm of all those who attended it. The formation of the Rwandan Society of Anaesthetists with sixty members was announced and all the participants lined up with sixty members was announced.
up for a commemorative group photograph.

Comment
The first Rwandan refresher course was an unqualified success and was clearly appreciated by the delegates who unanimously asked for it to become an annual event. We wish to express our thanks to the AAGBI and the WFSA for their financial assistance, to Henry Bukwirwa for his energy and enthusiasm in overcoming all difficulties and making the course possible and to the Minister of Health for his support and encouragement.

Adequate anaesthetic equipment is sorely lacking in Rwanda as are drugs and textbooks. However, the current president of the country is very keen on IT and there were banks of computers, with internet access, available for communal use in the hospital. The majority of the presentations were given using PowerPoint and many people seemed to be computer literate expressing a preference for having the lectures available on CD rather than paper. It would be of great benefit, at least in Rwanda, to supply lectures on CD for distribution at the end of the course in future.

Rwanda is now a stable country recovering from the traumas of its recent history. The development of anaesthesia in the country was clearly impaired by that tragedy and we recommend that the WFSA and the AAGBI continues to support future courses in Rwanda.
Experience with the Glostavent in Vietnam

Dr Hoang Sy Binh
Dr Cong Thang
Than Hoa Hospital
Vietnam

Than Hoa hospital is a 620 bedded general hospital in the city of Than Hoa, 250 km south of Hanoi in the Socialist Republic of Vietnam. It is a referral centre for the surrounding area serving a population of approximately 3.7 million people in the Than Hoa province and the adjacent regions of Eastern Laos. The hospital has 10 operating rooms, a recovery room with 10 beds and a 14 bedded Intensive Care Unit. Approximately 15,000 operations are performed in the hospital each year.

The hospital acquired its first Glostavent in 1999 from the charity Medical and Scientific Aid for Vietnam, Laos and Cambodia. Further Glostavents including several by the British Embassy have been donated over subsequent years and there are now a total of 7 machines in use in the hospital, 5 in the operating rooms and 2 in the Intensive Care.

Compressed air from the concentrator rather than oxygen has been used as the driving gas for the ventilator as the hospital does not have a piped oxygen supply and cylinders are large, bulky and inconvenient to use especially if the ventilators have to be moved from room to room.

The Glostavents have been used successfully on all sizes of patient although the relative insensitivity of the tidal volume adjustor has meant that it has not been used extensively for children under 5 years of age.

Because of its simplicity and reliability, it has proved very popular with the anaesthetic staff and is now used almost exclusively for patients requiring general anaesthesia. At a conservative estimate, the Glostavent has been used to provide anaesthesia for at least 25 patients per day for a period of over 3 years and a total of approximately 20,000 procedures have been undertaken without mishap.

Throughout the same period and under the directorship of Dr Le Ba Hung, it has been used as a ventilator in the Intensive Care Unit for an average of 2 patients per week and an estimated total of 300 patients (Fig 1). The longest continuous period of ventilation was 5 days. Servicing and maintenance has been undertaken by the engineering department in the hospital workshops under the direction of Mrs Dao Thi Thuyet (Fig 2). During this entire period, outside help has only been required on one occasion. At all other times, Mrs Thuyet and her staff have had sufficient skill and expertise to provide total maintenance for the equivalent of 21 Glostavent years.

In a part of the world where the supply of oxygen is both expensive and erratic, an anaesthetic machine that can produce its own oxygen is seen as a great advantage, not only for its convenience, but also for its economy. The saving on the cost of oxygen alone has been calculated to be in the region of $10 per machine per day.

Electrical power failures occur in our hospital 2-3 times each week and manual ventilation of patients is necessary until power is restored. The ease with which it is possible to change between controlled, assisted and spontaneous ventilation with the Glostavent is seen to be a great advantage.

As the director of the hospital, and together with my colleagues, I wish to express my thanks to the charity, Medical and Scientific Aid for Vietnam, Laos and Cambodia, for the donation of the Glostavents and in particular to Dr Madelene Sharp of Coventry, England for making the donation possible. My thanks are also due to the British Ambassador for his generous help. With the planned extension of both our Intensive Care Unit and recovery room, a request for a further 10 Glostavents has been made. As a result of our own experience to date, we are optimistic that this request will be met on both safety and economical grounds.

PS.

More information about the Glostavent can be found at www.glostavent.com. It is manufactured and marketed by Diamedica in the UK (www.diamedica.co.uk) from whom more information can be obtained (info@diamedica.co.uk)
Initial Experiences with the Glostavent in Nigeria

Dr Russell Hedley
Dr Angela Orunta
Princess Royal University hospital
Farnborough Common
Orpington
Kent BR6 8ND
UK

In 2004, a Glostavent was purchased for the Vom Christian Hospital (VCH) which is situated near to Jos in the Plateau State in Northern Nigeria. The machine was bought by a medical aid organisation called Medic Assist International (MAI). In February 2004, we spent one week at Vom providing the anaesthetic staff with support and training in the use of the machine. The Glostavent was designed by Dr Roger Eltringham, a consultant anaesthetist at Gloucestershire Royal Hospital in the UK for use in the developing world. It consists of a draw-over anaesthetic system using the Oxford Miniature Vaporiser (OMV), a Manley Multivent ventilator and an oxygen concentrator. The oxygen concentrator is essentially a compressor that drives air over a zeolite catalyst that removes nitrogen and so produces oxygen. The oxygen is then used to enrich the air used in the draw-over system. The compressor also provides driving gas for the Manley Multivent if ventilation of the lungs is required. If the electricity supply fails, oxygen cylinders can be used to power the Multivent or the patient can be ventilated manually. The major advantage of the Glostavent is economy particularly in rural areas where the purchase and supply of cylinder gases is often difficult. It was, therefore, ideally suited to the situation we found in Vom.

In this part of Nigeria, we found a startling contrast in the provision of hospital medical services. A mere 30 minutes drive from Vom, in Jos there are government-funded hospitals with well equipped theatres and modern anaesthetic machines and monitors and they appear to have no shortage of cylinder gases. Indeed, on the flight to Nigeria we discovered an American medical team heading for Jos with the equipment and expertise to undertake cardiac by-pass surgery. Vom, without government money seemed a world away and the Glostavent was a godsend. When we arrived at VCH, the anaesthetic equipment included an ageing Oxford Inflating Bellows (OIB) and, as the sole monitor, a mercury sphygmomanometer. There was no ECG or capnography and so, we were very pleased that we had brought a pulse oximeter with us.

Anaesthesia at VCH was administered by a nurse-anaesthetist who had never had to connect his anaesthetic equipment to a power supply. Unfortunately, during our first case using the Glostavent, blood dripping on to a plug caused it to short out. This did give us the opportunity to demonstrate what to do in the event of a power cut but the immediate response of our new-found colleague was to wheel out his trusty OIB! VCH has, in fact, a fairly reliable power supply from a generator and so the value of the oxygen concentrator was immediately recognised. It had not been uncommon for the oxygen cylinder supply to be running low on a Friday with no prospect of a further delivery until Monday.

Patients rely on relatives to bring them to hospital and contribute to their care including giving blood if a transfusion is needed. Even though a government hospital was 40 miles away, this was too far for many people to travel. This was powerfully brought home to us when we were walking to the operating theatre to anaesthetise a woman who had been in labour for two days and whose baby was dead. As we approached the theatre, the surgeon came out to tell us that the mother had also died.

Our time in Vom was short and passed very quietly with not much surgery being performed. However, in the week after we left, there was a severe outbreak of communal violence and many victims of trauma were admitted to the hospital. It seemed that the Glostavent had just arrived in time.

For further information, contact Dr Silas Bot
Medical Superintendent
Vom Christian Hospital (COCIN)
PMB 06, Vom
Plateau State
Nigeria
Catalyst: Medical memoirs of a World Anaesthetist
(ISDN 1-920785-38-8 RRP)

by Kester Brown

There is plenty to interest everyone in this fascinating book by one of the most famous anaesthetists in the world. To understand how one person can pack so much into a single career it is necessary to know something about his personality.

The overwhelming sentiment running through his career has been his concern for the welfare of others, especially the underprivileged. This combined with his boundless energy, infectious enthusiasm, an enquiring mind and a refusal to take ‘no’ for an answer have led him into some unlikely situations and resulted in remarkable achievements.

His childhood was spent in Kenya where his father was a medical missionary. Although several medical schools competed for his attention, he wisely chose St. Andrews University in Scotland whose ancient tradition of excellence had a profound influence on his subsequent career. The book traces his career from the time of his graduation at St. Andrews, his move to Canada and internship in London, Ontario through his experience of general practice in Yellowknife, his introduction to anaesthesia in Vancouver followed by specialist training in Toronto leading to his eventual appointment as consultant at the Royal Children’s Hospital in Melbourne.

He has worked in nearly every branch of anaesthesia and intensive care medicine and each of them interested him to such an extent that he was stimulated to undertake research projects leading to publications on a wide variety of subjects. The various innovations that were occurring throughout his career are described with such admirable clarity that even the lay reader will be able to appreciate their significance.

The reader is given an insight into his innovative methods of teaching at all levels. His ability to identify important basic principles and to impart this knowledge to his students has earned him the thanks of countless anaesthetists from all over the world (and their patients.)

His achievements at the Royal Children’s Hospital inevitably brought him to the attention of outside organizations and his subsequent involvement with the Australian and New Zealand College of Anaesthetists, the Australian Society of Anaesthetists and finally the World Federation of Societies of Anaesthesiologists is described. Achievements on this scale are hard to achieve without the support of a loving family and due credit is given to the contribution of his wife Janet and their family.

Roger Eltringham
reltringham@clara.co.uk

Copies of the book (AUS $30 + p&p) may be obtained from:

Better Bookshops
PO Box 12544
A’Beckett St
Melbourne 8006
Victoria
Australia
E-mail:
betterbookshop@brolgapublishng.co.au

Update in Anaesthesia, volumes 13-18, has been published as a single volume and is available from TALC (www.talck.org) at a very reasonable cost. Volumes 6-12 are also available in a single volume from the same source.

CDs containing all the back numbers of Update together with the Primary Trauma Care manual, Anaesthesia in the District Hospital (ed. Mike Dobson), the WHO formulary and the WHO Guide to the use of blood as well as recent volumes of Anaesthesia are available from the Association of Anaesthetists of Gt Britain and Ireland. (www.aagbi.org). The CD is available free of charge to those in developing countries.
Useful Information

World Federation of Societies of Anaesthesiologists (WFSA)
21 Portland Place, London, W1B 1PF
UK
Tel: (+44) 0207 631 8880
Fax: (+44) 0207 631 8882
Email: office@wfsa-office.org
info@wfsa-office.org
Web: www.anaesthesiologist.org

Courses in Anaesthesia for the Developing World
Oxford (UK): July (annually).
Contact: Dr. M. Dobson
Department of Anaesthesia
John Radcliffe Hospital
Headley Way
Headington,
Oxford OX3 9DU
UK
Tel: (+44) 01865 221589
E-mail: michael.dobson@nda.ox.ac.uk

Bristol (UK): December (annually).
Contact: Dr. Claire Jewkes
Department of Anaesthesia
Frenchay Hospital
Bristol BS16 1LE
UK
Tel: (+44) 01179 701212
Email: james.rogers@nbt.nhs.uk

Remote Situations, Difficult Circumstances, Developing Country Anaesthesia
Hobart or Launceston (alternate years), Tasmania, Australia
Contact: Dr Haydn Perndt
Royal Hobart Hospital
GPO Box 1061-L
Hobart, TAS 7001
Australia
Email: haydn.perndt@utas.edu.au

Primary Trauma Care Foundation
An organisation training doctors and nurses in the management of severely injured patients in the District Hospital.
Contact: PTC Foundation
Outeniqua House
313 Woodstock Rd
Oxford, OX2 7NW
UK
Email: ptc@nda.ox.ac.uk

PTC Chairman: Dr Douglas Wilkinson (douglas.wilkinson@nda.ox.ac.uk)
PTC Administrator: Annette (admin@primarytraumacare.org)

Durbin plc
This organisation has bought ECHO and now supplies drugs and equipment to developing countries.
Contact: Durbin plc
Durbin House
180 Northolt Rd
South Harrow
Middx. HA2 0LT
UK
Email: www.durbin.co.uk

Equipment collection and distribution to the developing world
Carelift International Inc.
185 Walnut Street (Floor 22)
Philadelphia P.A. 19103
USA
Tel: (+1) 215 535 3590

Dr. William Rosenblatt
REMEDY
Dept. of Anaesthesia
Yale University School of Medicine
333 Cedar Street, New Haven
CT 06510
USA

Book Aid International
39-41 Coldharbour Lane
Camberwell
London SE5 9NR
UK
Tel: (+44) 020 7733 3577
The organisation is interested in receiving recent complete sets of journals and newish text books. These are collected free and distributed by Rotarians.

Society for Education in Anesthesia
International members are invited to join this Society that promotes techniques and excellence in the teaching of Anaesthesia.
520N Northwest Highway
Park Ridge, Illinois 60069-2573
USA
Tel: (847) 825 5586
Fax: (847) 825 5658
Email: sea@asahq.org
Web: www.seahq.org

The TOKTEN Project
Expatriate nationals returning to their country of origin are invited to apply for the post of project expert. Each project is sponsored by the United Nations who would meet the cost of international travel and pay a subsistence allowance ($90/day). Applications should be made to the Minister of Health of the host developing nation.

Technical Assistance at Low Cost (TALC)
A unique charity that supplies low-cost healthcare, training and teaching material to raise the standard of healthcare and reduce poverty worldwide.
Contact: David Moreley
Institute of Child Health
Guilford Street
London WCIN 1EH
UK
Web: www.talcuk.org
Useful Information continued

**Douleurs san Frontières (DSF).**

Goals:
1. To participate, to create or to encourage any structure involved in the treatment of pain and suffering (cancer pain, AIDS, acute pain, etc.)
2. To search for therapeutic methods, to provide training and to propagate knowledge about pain and suffering especially in developing countries.

For further information contact:
Douleurs sans Frontières  
Docteur Alain Serrie  
Hôpital Lariboisière  
2, rue Ambroise Paré  
75010 Paris, France  
Tel: (+33) 1 49 95 81 77  
Fax: (+33) 1 49 95 69 98  
Email: alain.serrie@lrb.ap-hop-paris.fr

or

Docteur Jacques Meynadier  
Centre Oscar Lambret  
BP 307 - 59020 Lille cedex, France  
Tel : (+33) 3 20 29 59 89  
Fax : (+33) 3 20 29 59 97  
Email : j-meynadier@o-lambret.fr

**International Anesthesia Research Society (IARS)**

2 Summit Park Drive 140  
Cleveland, Ohio 44131  
USA  
Tel: 216 642 1124  
Fax: 216 642 1127  
Email: amaggiore@iars.org

**The International Committee of the Red Cross (ICRC)**

The ICRC acts to help all victims of war and internal violence, attempting to ensure implementation of humanitarian rules restricting armed violence.

Contact: ICRC,  
Recruitment Division  
19 Ave. de la Paix  
CH-1202 Geneva  
Switzerland or your local society.

Web: http://www.icrc.ch

**Overseas Doctors Training Scheme (UK)**

Anaesthetists seeking recognised training posts in the UK should apply to:
Bernard Johnson Adviser  
Royal College of Anaesthetists  
8 Russell Square  
London WC1 B 4JX.  
UK  
Tel: (+44) 020 7637 4104  
Email: odtts@rcoa.ac.uk

**The SOROS Foundation** will consider applications from anaesthetists in Eastern and Central Europe for support for limited periods of study in the UK. Applications should be made in advance to the branch office of their country of origin whose address may be obtained from:
The Soros Foundation  
400 West 59th Street  
New York  
NY 10019  
USA  
Tel: (+1) 212 548 0600  
Fax: (+1) 212 548 4600  
Email: osnews@sorosny.org

**Teaching Videos:**
The following titles are available at £5 each:
1. Servicing the EMO & Tri-Service vaporisers.
2. The oxygen concentrator
3. The Manley multivent/ Glostavent
4. Servicing the anaesthetic machine

Contact:  
Dr. R Eltringham  
Gloucestershire Royal Hospital  
Gloucester GLI 3NN  
UK

**Job opportunities in the developing world**

These are listed in a bimonthly magazine produced by the International Health Exchange and on its website.

Contact:
IHE / RedR  
1 Great George St  
London SW1P 3AA  
UK  
www.ihe.org.uk

**US volunteers wishing to spend periods working in developing countries**

Contact:
1. Dr. Lena Dohlman  
Health Volunteers Overseas  
c/o Washington Station  
PO. Box 65157  
Washington DC 20035-5157  
USA  
Tel: (+1) 202 296 0928  
Fax: (+1) 202 296 8018

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Useful Information continued

Committee Chair
Overseas Teaching Program
American Society of Anesthesiologists
520 N. Northwest Highway
Park Ridge, IL 60068-2573
USA

World Anaesthesia
This organisation works to improve standards of anaesthesia throughout the world. In conjunction with the WFSA, it produces two publications, World Anaesthesia News and Update in Anaesthesia* (an add-on textbook) published twice-yearly. The annual subscription is £35, €50 or $65. For further information
Contact:
Dr. Iain Wilson
World Anaesthesia Society
Association of Anaesthetists of Great Britain & Ireland
21 Portland Place
London W1B 1PY
UK
E-mail: WAS@AAGBI.org
www.world-anaesthesia.org
* also available at:
www.nda.ox.ac.uk/wfsa

Courses on Anaesthetic Equipment Maintenance
One week residential courses for anaesthetic technicians are organised at the NHS training and conference centre. Applications should be sent to:
Geoffrey Dillow
Conference Centre
Wotton under Edge
Glos. GL12 8DA
UK

Association for International Development of Anaesthesia (A.I.D.A.)
Contact:
Professor Stanley Samuels
Department of Anesthesia
Stanford University Medical Centre
Stanford
California
USA
Tel: (+1) 415 723 6411
Fax: (+1) 415 723 8544
Email: Samuels@leland.stanford.edu

Commonwealth Medical Awards
Available to citizens of Commonwealth countries for limited periods of postgraduate study within the UK. Applications should be addressed to:
Medical Awards Administrator
Commonwealth Scholarship Commission
36 Gordon Square
London WC1H IPE
UK

Medecins Sans Frontieres (MSF)
offers assistance to populations in distress, to victims of natural and man-made disasters and to victims of armed conflict. They require volunteers for both long and short-term projects. If you are interested in obtaining more information, contact them at:
MSF
64-74 Saffron Hill
London ECIN 8QX
UK
Tel: (+44) 020 7404 6600
Email: office-ldn@london.msf.org
or
11 East 26th St.
Suite 1904
New York NY 10010
USA
Tel: (+1) 212 679 6800.
Email: http://www.msf.org or http://www.uk.msf.org

Dr M Dobson
Nuffield Department of Anaesthetics
The John Radcliffe Hospital
Headington
Oxford OX3 9DU
UK
Tel: (+44) 01865 221589/741166
Fax: (+44) 01865 221593/453266.
E-mail: michael.dobson@nda.ox.ac.uk

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Fax: (+44) 01452 812162
Email: wfcasey@doctors.org.uk

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UK
Tel: (+44) 01392 669098
E-mail: sumographics@blueyonder.co.uk
Anaesthetic websites to try

Resources

- African Anaesthetist: www.anaesth.tripod.com
- Anaesthesia & Critical Care Resources on the Internet: www.eur.nl/cgi-bin/accri.pl
- Anesthesia Web: www.anesthesiaweb.com/
- Anesthesia International: www.geocities.com/anestint
- Armenian Society of Anaesthesiologists: http://freenet.am/~armanest
- Bandolier (Evidence-based Medicine): www.ox.ac.uk
- Cyber Medical College: www.cybermedicalcollege.com
- Gaseous Anomaly: www.anesthesia.ml.org
- GASNet Anesthesiology Home Page: http://gasnet.med.yale.edu
- Illustrated Regional Anesthesia: www.nysora.com or http://depts.washington.edu/anesth/regional/welcome/html
- Indian Anaesthetists Forum: www.theiaforum.org
- Medical World Search: www.mwsearch.com/
- Primary Internet Resources for Anaesthetists: http://home.cc.umanitoba.ca
- Primary Trauma Care Foundation: www.nda.ox.ac.uk/ptc
- Society for Education in Anesthesia: www.seahq.org
- The Trauma Organisation: www.tauroma.org/
- Virtual Anaesthesia Textbook: www.virtual.anaesthsia-textbook.com
- Virtual Anesthesiologist: www.anesthesiology.de/Links/links.html
- Virtual Museum of Anesthesiology: www.omni.ac.uk/whatsnew/detail/1098648/html
- World Anaesthesia Online: www.world.anaesthesia.org

Journals:

- Anaesthesia: www.blackwell-science.com/ana
- Anaesthesia and Analgesia: www.anesthesia-analgesia.org
- Anaesthesia and Intensive Care: www.aac.net.au/home.html
- Anesthesiology: www.anesthesiology.org
- British Journal of Anaesthesia: www.bja.oupjournals.org
- JAMA: www.jama.ama_assn.org
- Journal of Anaesthesia and Intensive Care: www.aaic.net.au
- NEJM: www.contents/nejm.org

Associations:

- American Society of Anesthesiologists (ASA): www.asahq.org
- Association of Anaesthetists of Great Britain & Ireland: www.aagbi.org
- Australian Society of Anesthetists: www.asa.org.au
- Douleurs Sans Frontieres: www.douleurs-sans-frontieres.org
- European Academy of Anaesthesiology: www.eaa.euro-anesthesiology.org/
- International Anesthesia Research Society: www.iars.org
- International Society for Anesthetic Pharmacology (ISAP): www.isaponline.org
- International Society for the Study of Pain: www.iasp-pain.org
- International Trauma Anesthesia & Critical Care Society: www.itaccs.com
- National Confidential Enquiry Peri-operative Deaths: www.ncepod.org.uk
- Obstetric Anaesthetists Association: www.oa-anaes.ac.uk
- Royal College of Anaesthetists: www.rcoa.ac.uk/
- Society for Ambulatory Anaesthesia: www.sambahq.org
- Society for Critical Care Medicine: www.sccm.org
- Society for Computing and Technology in Anaesthesia: www.scata.org.uk
- South African Society of Anaesthesiologists: www.sasawebs.com
- World Federation of Societies of Anaesthesiologists: www.anaesthesiologists.org

The Editor would be delighted to hear of other sites that might be of interest and to learn of any site addresses that are incorrect or no longer function.
World Anaesthesia Society

Application Form

Are you a new member or renewing your subscription:  ☐ New  ☐ Renewing

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The current subscription is £35 (or equivalent $65, €50). If you have a UK bank account, please complete the attached standing order mandate and forward to your bank.

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E-mail address: _____________________

Job Title: _________________________

Speciality: _______________________

Grade: __________________________

Date of birth: _____________________
Particular interests:
(e.g. subspecialties of anaesthesia/care of the critically ill, education, distance learning, appropriate research writing, disaster relief, conflict situations, medical missionary, long term secular):

Languages spoken:

Availability:
Are you happy to answer enquiries relevant to your experience? Yes No
Are you able to write for WA publications? Yes No
Are you available for working visits abroad? < 1 month / 1 to 6 months / longer term
How much notice do you require? 2 weeks / 2 months / 6 months / > 6 months

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I wish to pay by: Visa / Delta / Eurocard / Mastercard
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Please return this form to:
Dr Karen Henderson, Treasurer, WAS, Association of Anaesthetists of Great Britain & Ireland, 21 Portland Place, London, W1B 1PY, UK. Email: was@aagbi.org