



**Medical Aid
International**

Supporting Healthcare in Low Resource Environments



North-west Uganda. Assessing the needs with the hospital staff.

Introduction



*Tim Beacon, CEO,
Medical Aid International.*

Over twenty years ago, Medical Aid International was born from CEO and founder Tim Beacon's personal experience visiting a rural Ugandan hospital. Here, he witnessed the agonising challenges of providing adequate healthcare to the world's most vulnerable people. The non-existent or obsolete equipment; lack of maintenance and training; and contextually inappropriate donated devices from the West spurred Tim to found Medical Aid International in 2001 from his garage.

As a social enterprise, Medical Aid International's objective is to advance patient care in low and middle income countries (LMICs) through long-term, sustainable change. We achieve this by supplying essential healthcare equipment tailored to the specific LMIC context as well as through skill development and capacity building.

Twenty years on...

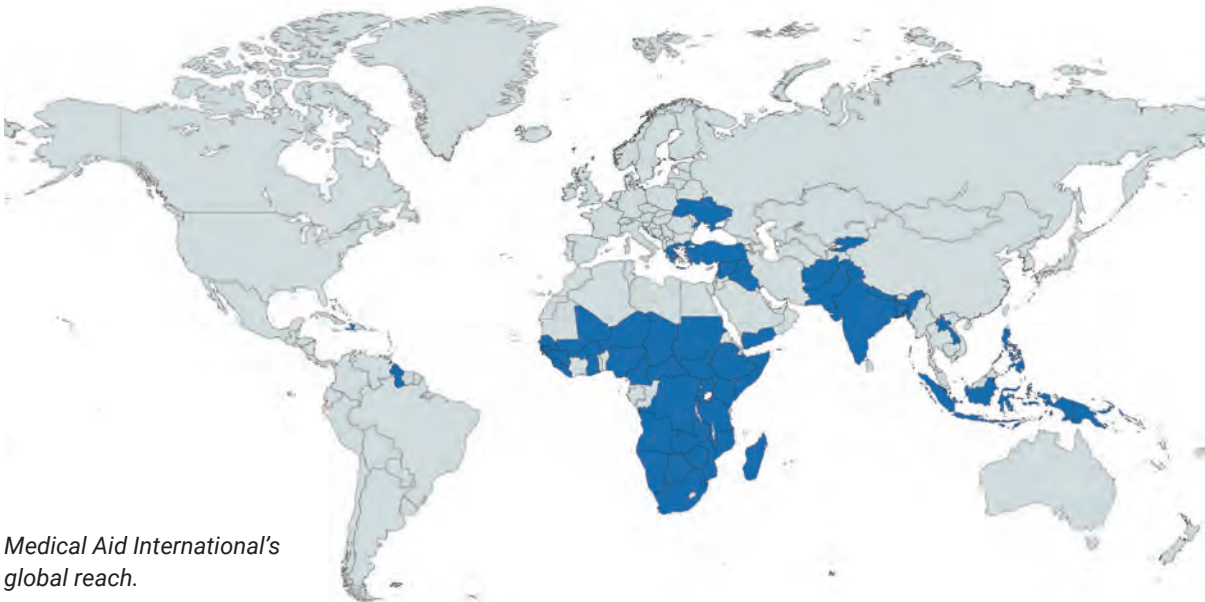
Striving to advance the sustainable development goal of good health and wellbeing for all has been, and continues to be, a truly enriching and remarkable journey. From our base in Stagsden, Bedfordshire, UK, we have vastly grown our organisation to include clinicians, medical device experts, logistics specialists, biomedical engineers, business professionals, and dedicated volunteers. This is in addition to our invaluable network of partners comprised of healthcare charities, humanitarian causes, faith-based organisations, non-government organisations (NGOs) and multi-million-dollar giants of industry.

We are a global entity that both saves and transforms lives through coordinated long-term, effective, efficient, and sustainable solutions. Our work drives substantial and enduring positive impact on clinical outcomes, patient quality of life and survival.

What's in this brochure: a life-changing future

It is critical we continue to give others the opportunity to inform, support, aid, and encourage LMIC healthcare providers.

It is our hope that this brochure achieves precisely this. This document highlights Medical Aid International's wide range of healthcare solutions for every operational discipline. We aim to support those less fortunate than us, and also to empower them to support themselves.



*Medical Aid International's
global reach.*



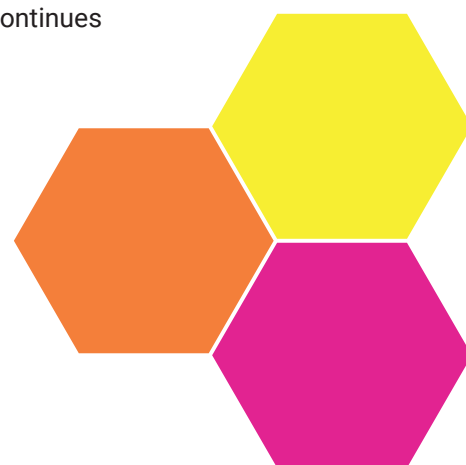
Rwenzori Mountains, Uganda/DRC border. Hiking in the mountains to run an outreach clinic with Rwenzori Women For Health.

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Acronyms

BP – Blood pressure	LED – Light-emitting diode
CE – Conformité Européenne	LMIC – Low and middle income country
CEO – Chief executive officer	MAI – Medical Aid International
CO₂ – Carbon dioxide	MCQ – Multiple choice question
COVID-19 – Coronavirus disease 2019	MRI – Magnetic resonance imaging
CPAP – Continuous positive airway pressure	NGO – Non-government organisation
C-section – Caesarean section	NIHR – National Institute for Health and Care Research
CT – Computed tomography	SpO₂ – Oxygen saturation
DRC – Democratic Republic of the Congo	UK – United Kingdom
ECG – Electrocardiogram	UN – United Nations
ESU – Electrosurgical unit	USA – United States of America
FIGO – International Federation of Gynaecology and Obstetrics	WHO – World Health Organization
IV – Intravenous	



The Problems We Solve



Clubfoot patient whose legs were straightened in an MAI equipped operating theatre the next day, western Kenya.

For LMICs, sourcing and maintaining suitable healthcare equipment is a universal challenge. Charities, NGOs, churches, and medical equipment distributors struggle to supply remote rural clinics and larger urban hospitals alike.

Imported equipment may be prohibitively expensive and unsuited to local conditions (e.g. unreliable electricity and gas). Additionally, supply chains and skilled maintenance personnel are often non-existent. Medical Aid International disrupts the frustrating cycle of healthcare inadequacy by providing critical resources such as consultancy, context-appropriate equipment, effective training, and ongoing support and maintenance. This turns projects on paper into life-saving realities.

Our long-term, effective, sustainable aid has an immediate and enduring positive impact on clinical outcomes, survival, and patients' quality of life.

What makes us different?

At Medical Aid International, we distinguish ourselves by providing comprehensive and customised healthcare solutions that meet the specific needs of our end users. We go beyond simply delivering a standardised list of generic equipment to a hospital or clinic; instead, we offer tailored, modular solutions that can be seamlessly integrated into an end-to-end healthcare response.

Our approach involves several key elements that set us apart:

- 1. Advisory and consultancy services:** We provide expert advice and consultation to ensure accurate and successful project outcomes right from the start.
- 2. Procurement, recycling, repair, and donation:** We source appropriate new equipment, recycle and repair donated equipment in addition to designing our own bespoke solutions. This comprehensive approach allows us to offer cost-effective solutions while ensuring the highest quality standards.
- 3. Logistical expertise:** We handle all logistical arrangements, including the necessary documentation, to ensure the safe and prompt delivery of equipment.
- 4. Ongoing support:** Our commitment extends beyond project completion. We provide continuing support to our partners, ensuring they receive the assistance they need even after the initial implementation.
- 5. Local training and capacity building:** We prioritise the empowerment of local teams by providing training and upskilling opportunities. Our goal is to leave a lasting legacy of healthcare equipment knowledge, enabling greater self-sufficiency and confidence among healthcare professionals.

By offering cost-effective procurement, our innovative gifts in kind model, and carefully selected donated equipment, we enable healthcare budgets to be utilised more efficiently. With our extensive experience, knowledge, and wide network of suppliers, we provide comprehensive support and guidance to clinical projects from conception to completion and beyond.

Developing Local Teams Through Training:

In addition to delivering aid, we are dedicated to supporting local teams to take ownership of their medical equipment, fostering greater confidence, skills, and self-sufficiency. One such initiative is our online Biomedical Engineering Course, which reflects our commitment to driving positive and long-lasting change across LMICs.

Our well established course, developed based on our extensive experience working with local teams, offers accessibility from anywhere in the world and is cost-effective. The course is City & Guilds Assured, with each student receiving a certificate upon completion. We invested significant resources and worked diligently to establish this programme, witnessing its positive impact on healthcare teams' morale, patient wellbeing and recovery.

At Medical Aid International, we are dedicated to making a lasting difference in healthcare by driving sustainable change, providing tailored solutions, and upskilling local teams.



Northern Senegal. The EcoClave™ in use at a new maternity unit.

The Global Surgery Agenda

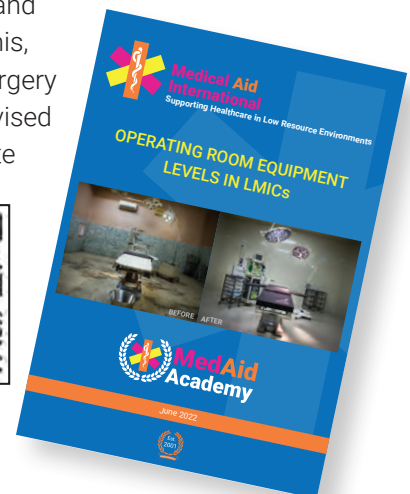
Through our work we strive to address the National Institute for Health and Care Research (NIHR) Global Surgery areas of prioritisation:

1. Reduce surgical site infection
2. Reduce morbidity and mortality after high-risk surgery
3. Increase capacity for routine surgery
4. Improve access to surgery
5. Strengthen research across rural surgery networks

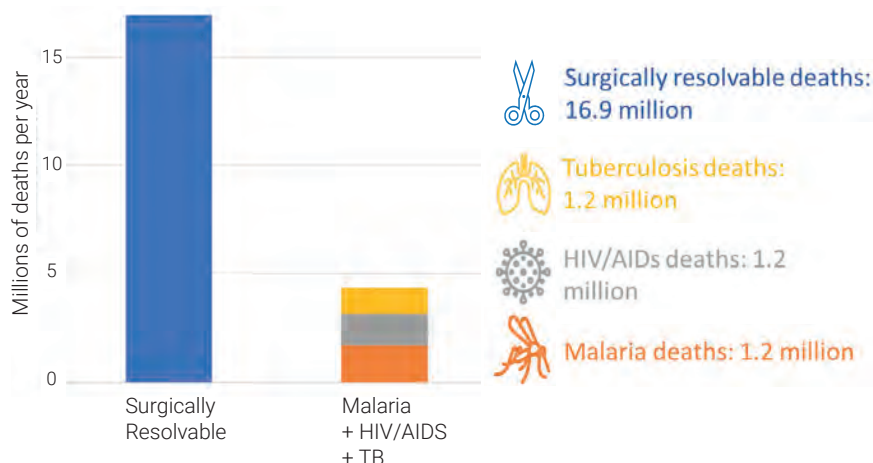
None of these advancements can be achieved without a fully equipped and contextually appropriate operating room, vital components being safe anaesthetic machines and patient monitoring equipment, which drastically reduce morbidity and mortality. Sterile instrumentation is also key and significantly reduces surgical site infections.

The provision of essential surgical equipment, operating room furniture, and biomedical education will increase capacity for routine surgeries. All of this, affordably sourced at the district hospital level, will improve access to surgery by minimising both the delay in reaching and receiving care. We have devised a singular solution to address all the aforementioned needs: our Complete Operating Room Package.

Our research confirms this complete, fit for purpose operating room meets the needs of LMIC healthcare facilities. In line with NIHR's fifth prioritisation, we conducted a comprehensive survey of 75 operating rooms across seven countries. The results indicated an urgent need for functional operating tables, safe anaesthetic equipment, suction, robust sterilisation methods, reliable lighting, and effective patient monitoring.



Lack of surgical provision kills more people each year than HIV/AIDs, Malaria and TB combined



143 Million
additional surgeries are required annually to close the global surgery gap

5 Billion
people lack access to safe, affordable surgical care



The Lancet. 2015. *Global Surgery 2030: Evidence and Solutions for Achieving Health, Welfare, and Economic Development*.

Our Unique Solutions

When it comes to healthcare solutions, compassion and generosity are not enough; the resources must be appropriate to the recipient's circumstances, applicable to their environment and be a long-term, sustainable solution.

Hospitals and healthcare facilities in LMIC environments are often supplied with Western donated equipment that is simply incompatible with the local environment: being delicate, technicality sophisticated, and dependent on expensive and inaccessible consumables. The following considerations are often neglected which can render products useless:

- **Electricity supply issues:** Utilities can be unpredictable in LMIC regions. If donated equipment has neither batteries nor alternative power source it will cease to function during power failures, thus jeopardising patient safety.
- **Technical incompatibility:** North American donated equipment often operates at a different voltage to local standards causing hospitals to incur additional costs for voltage transformers. It also facilitates the dangerous scenario that untrained personnel will connect the equipment directly to the local power supply, and inadvertently destroy it or injure themselves.
- **Prohibitive cost of consumables:** Anaesthetic machines and other devices often rely on consumables that must be regularly replaced. These can be prohibitively expensive for healthcare facilities in LMICs.

At Medical Aid International, we not only source, repurpose and adapt equipment, we will reject it if it's not fit for purpose. This prevents the accumulation of unusable equipment, often referred to as "equipment graveyards" at LMIC healthcare facilities. This is an essential component of the equipment management cycle as many of these facilities do not have the appropriate means or resources to safely dispose of faulty equipment themselves.

If the solution doesn't exist, we will design and build it ourselves, or commission it where necessary. Additionally, we developed and supply our Biomedical Engineering Training Programme to ensure the equipment we supply keeps working, treatment keeps going, and patients keep recovering.



Ethiopia. Demonstrating the LMIC appropriate anaesthetic machine.

How We Provide Value

At Medical Aid International, we specialise in making budgets go a very long way as we appreciate that money is often the limiting factor for projects. This is through a combination of carefully cultivated relationships with suppliers around the world, as well as our own product development work. Having been active in the LMIC healthcare sphere and disaster relief sectors for over 20 years, we have a well-established reputation for providing innovative, simple, sustainable, and cost-effective solutions across the globe.

Alongside the provision of the new medical equipment, we procure ex-demonstration and pre-owned equipment in order to maximise budgets. Our team of highly capable engineers refurbish and conduct safety inspections on all equipment to ensure it will meet the needs of LMICs. This equipment is either donated or purchased at prices far below market value.

Additionally, we will stretch budgets further through gifts in kind. Our patient-centred philosophy means we will maximise the volume of any shipping freight to provide healthcare facilities with essential supplies. Such items supplied to previous projects have included: mattresses, neonatal resuscitators, surgical instruments, reusable operating room linen and gowns, patient trolleys and more, all at no additional cost.

What sets us apart, in addition to our experience, is our extensive network of equally experienced individuals and suppliers in this field. This ensures that we will always arrive at a practical and effective solution tailored to the specific environment and budget. For example, where possible we supply machines which are not dependent on expensive consumables. This eliminates the need for their ongoing supply and is more cost effective in the long run.

The inclusion of our very successful online Biomedical Engineering Course, which comes complete with a professional tool kit, ensures that the engineers on the ground can maintain the newly supplied medical equipment, thus safeguarding the investment. Our trained biomedical engineers are valuable assets, as they can repair equipment at sites across the region and train others, disseminating their knowledge and expertise.



Eleven caesarean sections were performed in the first four days after the shipment arrival, in partnership with the Semiliki Trust, DRC.

Comprehensive Solutions

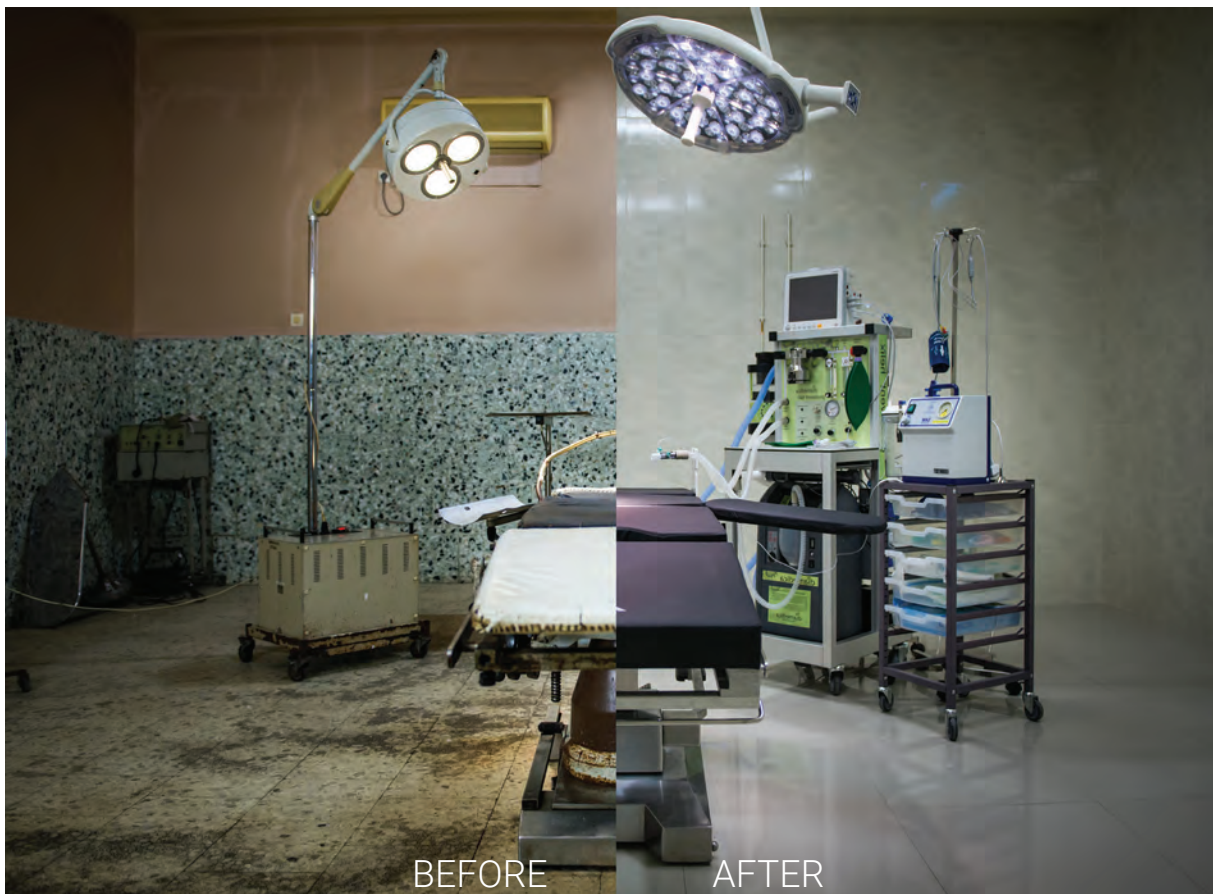
All-In-One and Ready To Go

With our vast experience working in low resource environments, we understand the challenge of providing safe and effective surgery. Our Complete Operating Room Package is designed to overcome all of these challenges and, thus, delivers a complete surgical solution, ready for use in as little as two hours.

Not only that, it is tailor made for these environments and is designed to run with only a single requirement: electricity. No complicated consumables or other resources are required. However, we appreciate that electricity in these settings is not always reliable. As such, much of our equipment is manually operated (such as our operating table) or is accompanied by a battery backup. If required, we can also provide generators.

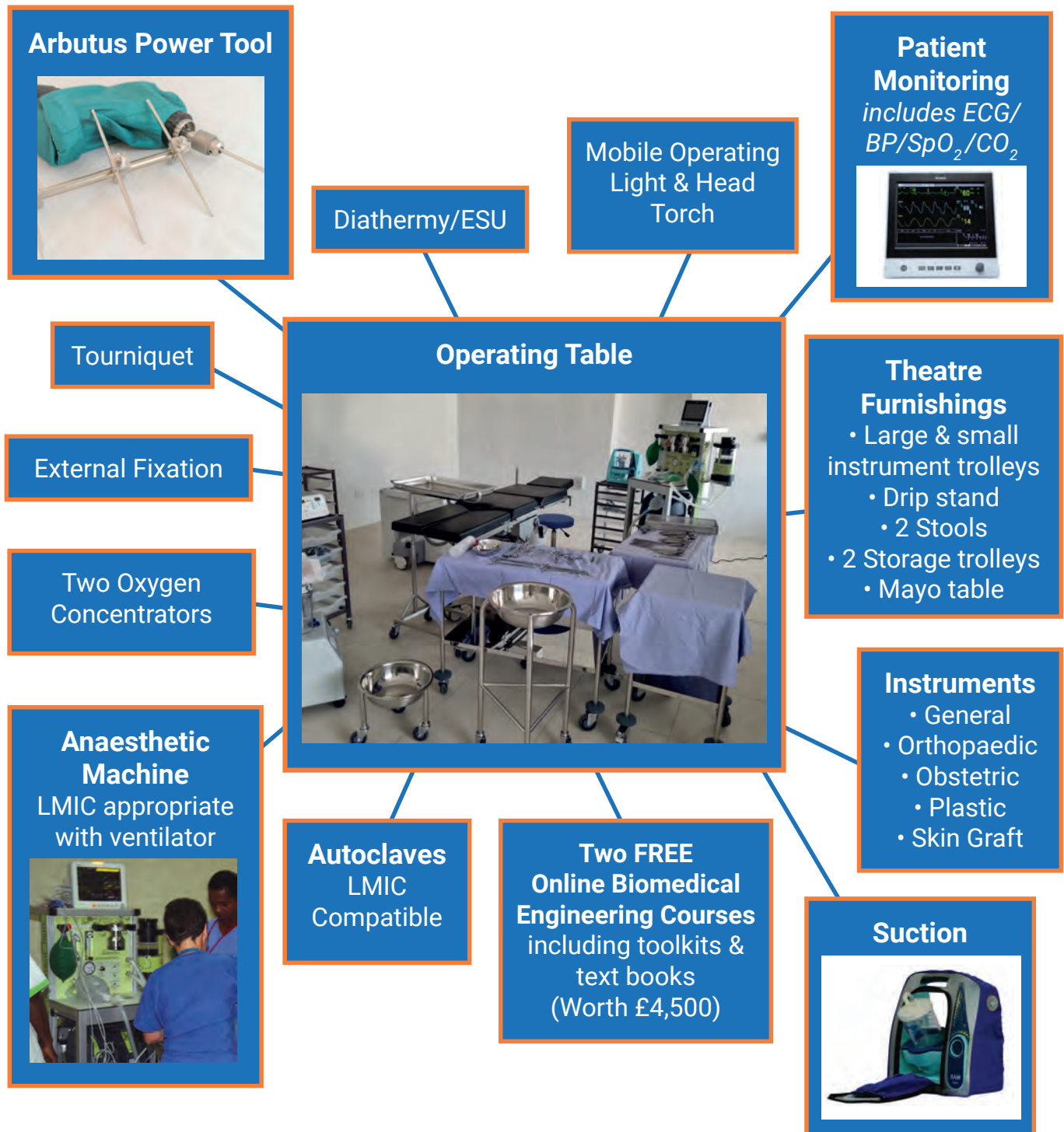


A patient being treated for malaria in a rural clinic, Uganda.



A project completed in partnership with Mercy Ships.

Our Complete Operating Room Package



Our services include warehousing and packaging of the equipment, shipping, customs clearance, and on-site delivery. Additionally, installation, commissioning, and training are an integral part of what Medical Aid International does and are included in the listed price. Part of this training includes two places on our online Biomedical Engineering Course.

Full Package Specifications

Can be tailored to each project

● Manual MAI Operating Table with attachments:

- 2 Arm boards, 1 arm table
- Lithotomy poles
- Shoulder supports for steep Trendelenburg
- Gel headrings sized neonate to adult
- 1 Wedge
- Optional fracture table available

● Furnishings:

- 3 Operator stools
- 2 Large instrument trolleys
- 2 Small instrument trolleys
- 3 IV stands
- 1 Mayo table
- 6 Storage trolleys
- 2 Bowl stands
- 1 Swab bucket
- 2 Patient recovery trollies

● LMIC appropriate anaesthetic machine with ventilator:

- Reusable laryngoscope set
- Difficult intubation equipment
- Starting stock of airway devices

● Patient monitoring:

- 1 Operating room monitor measuring ECG/BP/SpO₂/CO₂
- 2 Recovery monitors measuring ECG/BP/SpO₂
- All monitors supplied with 2 of each size accessory: adult, child, and neonatal

● Miscellaneous:

- 4 Suction machines with reusable suction jars and tubing
- 1 Diathermy machine/ESU
- Instruments to include: general, plastics, trauma, obstetrics
- 1 Manual tourniquet
- 4 Oxygen concentrators
- 1 Defibrillator
- 1 MAI Emergency Bag
- 4 Pulse oximeters with adult, child and neonatal accessories
- 1 LMIC appropriate autoclave
- 1 LED operating light with battery backup (mobile or ceiling mounted)
- 2 Biomedical Engineering Courses, including textbooks and toolkits
- 1 Arbutus orthopaedic power tool with starting stock of external fixation and K-wires



Treating a fractured arm in a Medical Aid International equipped unit. Previously, there were no surgical facilities for fracture management in the region.



One of three completed Medical Aid International operating rooms, Rwanda.



Medical Aid International is also able to provide containerised solutions for operating rooms, sterilisation, and imaging.

Our Healthcare Solutions

Operating Tables

The focal point of the operating room is undoubtedly the operating table. Unconscious, the patient is unable to control their body and limb placement. Thus, it is critical that the operating table has the capacity to move and support the patient to ease the strain on the surgeon and operating room staff. Medical Aid International is acutely aware of the need for safe and high-quality operating tables. This need is illustrated in our recent publication: *Operating Room Equipment Levels in LMICs*. 75 operating rooms across seven countries were assessed via an online equipment survey. Medical Aid International has developed the MAI Operating Table, a European-manufactured, CE marked solution that meets the needs addressed in the report.

These four questions can help ascertain if an operating table is fit for purpose:

1. Is it safe and comfortable?

Patient safety and comfort is of paramount importance. Old and ill-maintained operating tables can inadvertently expose patients to metal. This exposure can result in burns and electric shocks from diathermy machines/ESUs during surgery.

2. Is it functional?

In order for patients to be safely and successfully operated on, surgeons must have clear and easy access to the surgical field. This requires a fully functional and adjustable table.

3. Does it have all the key attachments?

Operating table attachments such as arm boards and lithotomy poles are more than mere accessories. They are critical components in the delivery of safe surgery, and are therefore essential requirements.

4. Is it manually operated?

In low resource settings the inevitability of power cuts is a fact of life. We believe it is best to prepare for such scenarios by not relying on electric operating tables. A fully manual operating table ensures that power cuts, blown fuses, or cross continent voltage discrepancies will not affect patient care.

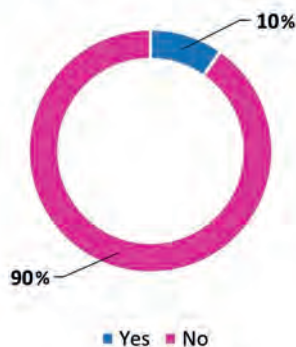


An example of dangerous LMIC equipment.

The MAI Operating Table

Purpose Built and Designed for the Challenges of Low Resource Environments

Is Your Operating Table Safe, Functional, with All Key Accessories and Manually Operated?



Proportion of LMIC operating tables which have safe mattresses, (i.e. no bare metal exposed), are height adjustable, can tilt head down, have all key accessories (arm table, arm boards and lithotomy poles), and are manually operated, across all operating rooms (in %).

Medical Aid International. 2022.
Operating Room Equipment Levels in LMICs.



MAI Operating Table, Rwanda.

Features

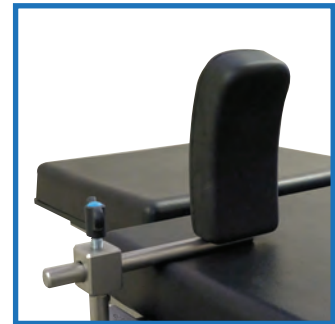
- Easy to transport and disassemble for community outreach or disaster relief work
- Supplied with essential attachments (2 arm boards, an arm table, lithotomy poles, gel headrings in 3 sizes, wedge)
- Wide range of additional attachments available
- Wide variety of configurations, suitable for all types of surgery
- CE marked, high quality European manufacture
- Manual operation, no electricity required
- Stainless steel construction
- Radiolucent
- Value for money
- Variety of bases available



Table ends can be removed for paediatric patients.



Trendelenburg to 35°, essential for fistula procedures.



Optional shoulder supports for steep Trendelenburg.



Option to remove individual legs at bottom of table.



Optional fracture table for lower limb trauma.



Sitting position for shoulder procedures.



Option to angle individual legs at bottom of table.



Arm table for hand and arm operations.



Arm boards for easy IV access.



The EcoClave™ in use at a hospital, western Uganda.

Sterilisation

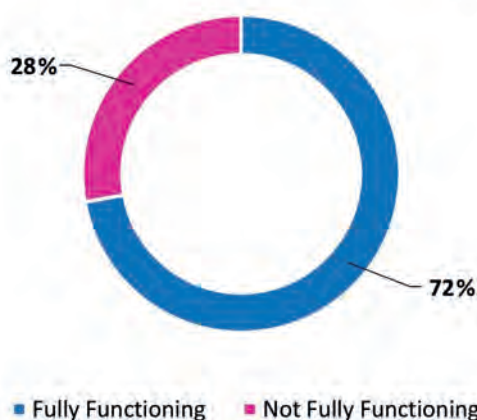


All American autoclave.



Typical Western autoclave unsuitable for low resource settings.

Is Your Autoclave Fully Functioning?



Proportion of autoclaves that are fully functioning, taking account of all autoclaves present (up to 4) at each facility (in %).

Medical Aid International. 2022.
Operating Room Equipment Levels in LMICs.

Sterilisation is the decontamination process by which bacteria and harmful micro-organisms are killed. In critical environments like hospitals and operating rooms, sterilisation is a fundamental practice that saves lives. Warm water and soap, whilst a powerful disinfectant, are not sufficient to destroy organisms that cause serious infections. Instead, sterilisation requires a high temperature, high pressure, and steam, which are achieved via the use of an autoclave.

Sterilisation of surgical instruments, implants, and other medical equipment in LMICs is a major challenge, particularly in rural locations. This is due to an absence of affordable, serviceable, and manageable autoclaves, many of which are reliant on unstable electrical grids.

Medical Aid International can advise and consult with healthcare facilities to ensure their autoclave is contextually appropriate and fit for purpose. For example, in many rural environments with limited electrical supply, pressure cooker autoclaves are ideal. However, in the most disadvantaged settings, financing and sourcing the consumables (i.e. kerosene) for such equipment is unfeasible. In these situations, ineffective, sporadic or non-existent sterilisation endangers patients' lives by increasing rates of surgical site infections. The World Health Organization (WHO) estimates 11% of all individuals undergoing surgery in LMICs will become infected during the process.¹

¹WHO. 2018. *Global guidelines for the prevention of surgical site infection*, 2nd ed.



"The EcoClave™ has greatly impacted infection control in a way that means instruments and dressing packs are sterile, and procedures are done without any fear of infection."

– African source

"Using the EcoClave™ has halved our electricity costs."

– African source



An EcoClave™ demonstration at an MAI symposium.

Challenges to Sterilisation in LMICs

- **Unreliable electricity:** Most autoclaves require three-phase electricity, but healthcare providers in low resource environments often have one-phase electricity, unreliable electricity supplies, or no electricity at all. Power blackouts and interrupted supply affect sterilisation cycles, and render the autoclaves useless when the power is off.
- **Fuel efficiency:** Non-electric pressure cooker autoclaves typically found in low resource environments use large amounts of kerosene or wood as a fuel source. This makes them prohibitively expensive to run. Healthcare facilities may resort to using open fires to sterilise equipment. This is a dangerous alternative as it can cause severe burns. Consequently, sterilisation is abandoned because it is too expensive and hazardous.
- **Technically demanding:** Large electric autoclaves are complex pieces of equipment, which require training to use properly. Healthcare workers may have difficulty accessing appropriate training and either operate the autoclave incorrectly or refuse to use it, meaning instruments are not sterilised.
- **Maintenance:** Western-style electric autoclaves are fragile and are frequently damaged in transit, especially to places with difficult transport links. They require significant maintenance to run and frequently malfunction. If on-site biomedical engineering support is not available, autoclaves remain non-operational as there are neither the spare parts nor the expertise to fix them.

With patient safety at the heart of our mission, Medical Aid International has designed a bespoke solution: the EcoClave™. Intended specifically for LMIC environments, the EcoClave™ is a non-electric, simple to use, maintenance-free, robust, and fuel-efficient wood burning pressure cooker autoclave.



"The EcoClave™ sterilises both dressings and instruments; items that are very key when dealing with any surgical procedures... The EcoClave™ has greatly aided in the achievement of this effort because we now see a quicker wound healing process among our patients as compared to those who received care before the installation of the EcoClave™."
– African source



Providing the correct equipment also presents excellent education opportunities.



The Primary Trauma Care group.

The MAI EcoClave™

The EcoClave™ has been specifically designed to address the challenges that currently prevent effective sterilisation in remote, low resource environments with minimal or very unreliable electricity.

The solution

The MAI EcoClave™ is designed to be:

- Safe
- Fuel efficient
- Simple to operate
- Reliable and maintenance free
- Inexpensive

Medical Aid International has further developed the robust, low maintenance, All American autoclave for LMIC use. By adding an external aluminium frame with a wood burning furnace the need for an electrical supply is eliminated. As an alternative, it is also possible to use a stove to heat the pressure cooker. The unit is fully insulated and fireproofed, maximising the heat channelled to the All American pressure cooker, thereby increasing fuel efficiency. It also comes with an adaptable flue that directs smoke outside the facility.



A set of instruments sterilised in an EcoClave™ during a training session. The Bowie Dick tape has changed colour indicating full steam penetration has taken place. This was through three layers of reusable theatre linen.

Achieves the four elements of sterilisation

1. Temperature: 121°C (250°F)
2. Pressure: 15–22 PSI
3. Steam: Optimal temperature and pressure in combination with water ensures sufficient steam
4. Time: Reaches optimal temperature and pressure within 15–20 minutes, add additional 30 minutes to achieve complete sterilisation

Technical specifications

- Capacity: 39.5 litres (8.7 gallons) – holds three large general surgical sets
- Main unit dimensions: 53 cm wide x 70 cm deep x 93 cm tall (excluding chimney) (20.9 in x 27.6 in x 36.6 in)
- Takes 15–20 minutes to reach appropriate sterilisation temperature and pressure
- From cold requires only 1–3 shoe boxes of wood
- Minimal maintenance required
- Comes with additional flue pieces

The EcoClave™ – easy to use, step by step

1. Clean instruments, implants, and/or linen in warm soapy water to remove all debris
2. Wrap/pack appropriately (indicator tape is recommended)
3. Pour 2.5 cm (1 in) of clean water into base of EcoClave™
4. Place wood in burner and light
5. Remove lid, place wrapped equipment to be sterilised into autoclave
6. Preheat until steam is continuously pouring out of the pressure release valve. When this occurs, close valve, pressure gauge will now start to climb
7. Close door in front of burner to reduce heat
8. Once gauge needle is in the green (sterilisation) zone, maintain heat for 30 minutes so pressure and temperature stay constant
9. After 30 minutes, release steam by opening valve
10. Remove objects from EcoClave™



See a BBC news film of an EcoClave™ at:
<https://vimeo.com/837916164>

Anaesthesia

Anaesthetic Challenges

Safe surgery is not possible without the use of anaesthetics, whether general or regional. General anaesthesia is used to render patients unconscious for surgeries that would otherwise be too painful and dangerous if awake. Complete sedation is achieved through a combination of medication (i.e. anaesthetic agents) either inhaled via a mask or delivered intravenously. These medications may relax the airway, limiting the intake of oxygen. Thus, it is critical that trained personnel have the equipment and resources needed to manage patients' airways while anaesthetised.

Administering anaesthesia is a high risk procedure, exacerbated by the poor operating conditions and complexities of LMIC and remote environments. Consequentially, providing safe and effective anaesthesia in these regions is exceptionally challenging.

Additionally, patients are often medically unfit for the invasive procedure but are not flagged as high-risk, given that full preoperative assessments are not always available due to lack of trained personnel.

Furthermore, Western anaesthetic machines, often donated to LMICs, are entirely unsuitable for this environment. The table opposite discusses this in more detail.

Anaesthetic Solutions

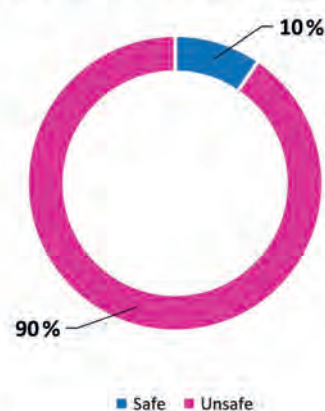
Indispensable Equipment for LMIC Operating Teams

At Medical Aid International we ensure that all healthcare facilities are appropriately equipped to handle the anaesthetic needs of their patients. We prioritise the procurement and distribution of innovative, robust, simple, and sustainable technologies specifically designed for low resource environments. These solutions are described in the table opposite.

For their simplicity, and subsequent low maintenance/servicing costs, we recommend the use of a self-contained system (rather than a circle system). This negates the requirement for expensive consumables typically required for circle machines, (e.g. soda lime). Our report, ***Operating Room Equipment Levels in LMICs*** found that only 10% of circle anaesthetic machines surveyed contained the necessary soda lime and monitoring. Accordingly, we deemed the remaining 90% of circle anaesthetic machines unsafe.

Another benefit of self-contained systems is that expensive anaesthetic agent monitoring is not as vital as for circle machines. This allows safe anaesthesia to be performed in low resource environments, where anaesthetic agent monitoring is rarely present.




Proportion of Safe Circle Anaesthetic Machines



Proportion of operating rooms with safe closed anaesthetic machines (i.e. meet our benchmark standards), of those that use closed anaesthetic machines (in %).

Medical Aid International. 2022.
Operating Room Equipment Levels in LMICs.

Table Showing Anaesthetic Solution Options

Anaesthetic Solution	Benefits	Important to Know
<p>Portable draw-over system</p> 	<ul style="list-style-type: none"> • Requires no electricity • Can be used for all age groups • Can be attached to an external ventilator • Small and portable • Generally the lowest-cost option • Low maintenance 	<ul style="list-style-type: none"> • Can be transported in luggage • Supplementary oxygen can be given • Can be supplied with a trolley to facilitate storage • Can be used on newborns • Ideal for LMIC environments, outreach, and disaster relief
<p>Self-contained system</p> 	<ul style="list-style-type: none"> • Equipped with an inbuilt ventilator • Requires no external gases, due to inbuilt oxygen concentrator • Can run without mains power for a limited period 	<ul style="list-style-type: none"> • Larger than draw-over machines, so there may be freight cost implications • Requires mains electricity the majority of the time • Can be connected to external gas supply, if available • Ideal for LMIC environments
<p>Circle system</p> 	<ul style="list-style-type: none"> • Used in major medical centres globally • Works with much lower flow rates of gas, as it recycles the patient's gases • More advanced ventilator 	<ul style="list-style-type: none"> • Needs extensive stocks of soda lime to extract CO₂ from patient's gases • Requires regular servicing on a yearly basis, unlike the solutions above • Requires CO₂ and anaesthetic agent monitoring • Most expensive anaesthetic option; rarely suitable for LMIC environments

Patient Monitoring:

Vital Knowledge of Vital Signs

Patient monitoring equipment is critical in ensuring that anaesthetised patients remain stable throughout the operating procedure. Vital signs such as heart rate, blood pressure, oxygen saturation, and expired carbon dioxide must be continuously monitored during surgery to ensure the cardiovascular system, nervous system, and respiratory system continue to function even while unconscious. Patient monitoring is the first line of defence, alerting the medical team when they need to make a life-saving intervention. However, monitoring functions can add huge costs to anaesthetic equipment, meaning LMIC healthcare facilities often go without.

Crucially, at Medical Aid International, we supply monitoring solutions that have been designed specifically to suit the demands of LMICs. Our recommended solutions deliver the same benefits as integrated anaesthetic/monitoring machines, but at a far lower cost.

We can supply affordable hand-held devices for oxygen saturation (SpO₂) measurement, carbon dioxide monitoring (capnography), heart rate and blood pressure monitoring. Additional equipment for anaesthetic agent monitoring and ECG reading can also be supplied. Wherever there's an anaesthetic challenge in an LMIC environment, we have a context-appropriate response.

All our recommended monitoring solutions are supplied with accessories to suit all ages (from neonate to adult). Examples of the main parameters that must be considered when procuring patient monitoring equipment are shown in the table opposite.

Is Blood Pressure and Pulse Oximetry Available in All Sizes?



Proportion of LMIC operating rooms with both blood pressure monitoring and pulse oximetry available in all sizes (adult, child, and neonate) (in %).

Medical Aid International. 2022.
Operating Room Equipment Levels in LMICs.



Medical Aid International recommended capnograph and pulse oximeter.



Medical Aid International recommended pulse oximeter.

Table of Key Parameters for Patient Monitoring Solutions

Parameter	Considerations	Important to know
Accessories	<ul style="list-style-type: none"> • All monitors sent must cover the full patient age range • Two of each accessory should be sent to enable spares availability 	<ul style="list-style-type: none"> • Age range must comprise neonatal, child, adult • Try to use the same brand of monitors throughout a facility so accessories can be shared
ECG	<ul style="list-style-type: none"> • In many LMIC environments the availability of ECG electrodes is minimal or non-existent 	<ul style="list-style-type: none"> • Note the contrast with the West, where ECG is regarded as a standard monitoring procedure
Blood pressure	<ul style="list-style-type: none"> • A vital parameter to be measured, particularly as many patients undergo spinal anaesthesia, which can significantly drop their blood pressure 	<ul style="list-style-type: none"> • An electronic blood pressure device is preferable, but a basic sphygmomanometer can be used
Oxygen saturation (SpO ₂)	<ul style="list-style-type: none"> • A vital parameter and an easy one to measure 	<ul style="list-style-type: none"> • There are a multitude of LMIC-appropriate models available including finger models as well as larger handheld ones
Carbon dioxide measuring (capnography)	<ul style="list-style-type: none"> • A truly vital adjunct that many are, however, less familiar with • Essential for use with circle machines • Very desirable for all types of general anaesthetic 	<ul style="list-style-type: none"> • Gives an instantaneous readout as to whether a patient is breathing or not
Anaesthetic agent monitoring	<ul style="list-style-type: none"> • As discussed above, in a closed system the anaesthetic agent levels should be monitored 	<ul style="list-style-type: none"> • Monitors with this facility are extremely expensive and this should be a consideration when budgeting for anaesthetic machines

Other requirements for safe anaesthesia

- To give safe anaesthesia, working suction is required
- Laryngoscopes with a full range of blades should be supplied with a spare handle
- Equipment for difficult intubation such as bougies and Magill forceps should also be supplied
- Battery backup should always be available in case of a power failure



System in use in the DRC. This was the only viable solution in this situation.

Imaging

Digital X-ray System

Old, unreliable X-ray equipment presents a number of difficulties. In addition to these challenges, LMICs face the added burden of impossibly high costs for X-ray consumables (i.e. film, and chemicals for film development). Furthermore, the remote location of many healthcare facilities means physicians and technicians struggle to share physical X-ray films with colleagues at other institutions for an initial diagnosis or a second opinion.

In response to these challenges, Medical Aid International provides a variety of relevant solutions, some of which are fully portable, with AI diagnosis software, and can be used in outreach clinics. All X-ray systems we supply are digital, meaning there are no expensive consumables required, and images can instantly be electronically shared. Each system is supplied with a comprehensive, but user friendly, software package that makes it possible to merge images, measure lengths and angles, zoom in, and alter contrast. The software has full patient data record capability and creates digital images, which can easily be shared with other authorised medical professionals anywhere in the world.

Digital X-ray systems are ideal for the urgency of intra-operative fracture treatment (where the X-ray occurs on the operating table), as the surgeon can view images less than a minute after exposure.

Ultrasound

Ultrasound plays a vital diagnostic role in LMIC healthcare. We offer a variety of solutions ranging from phone and tablet-based options, up to larger systems that include multiple probes and advanced software packages.

An X-ray Revolution for LMICs

Delivering X-ray solutions in LMICs, especially remote locations, has always been a major challenge. X-ray suites are invariably impractical due to cost, size and weight constraints of transport, alongside installation challenges. To overcome this, our solution has always been mobile X-ray machines.

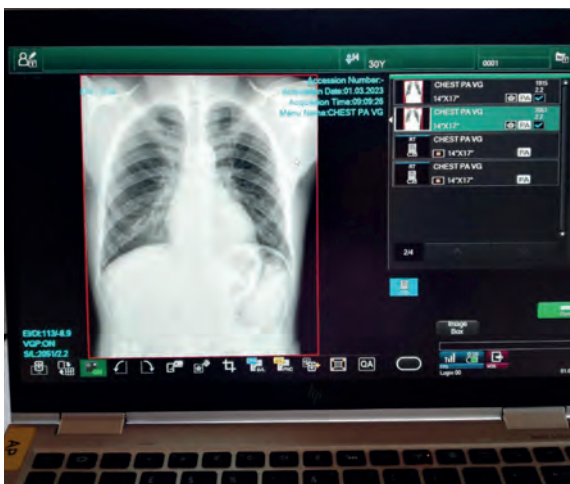
Our partner Fujifilm now offer an incredible solution – which we are proud to distribute. It has revolutionised our ability to offer vital X-ray support, even in the most remote environments. The Xair is a very small, portable, battery operated X-ray machine that has the power to image adult chests and pelvises. It can be used in hospitals and can also be taken to outreach clinics.

The Xair offers many advantages in the demanding LMIC environment, namely:

- Portability: it can be used all over the clinic very easily as well as off site for outreach clinics.
- The low weight and volume make it easy to transport, thus reducing costs very significantly.
- Fujifilm are a very well-respected company who have shown a real desire to support healthcare in the LMIC environment.
- The system can be used independently or networked into existing IT infrastructure.



Images can be easily exported as JPEG files.



An image taken on a portable X-ray system, remote DRC.



System in use in the DRC.

Orthopaedic Solutions

Orthopaedic and trauma care are essential medical specialties that are necessary for the treatment of injuries, prevention of disability and saving lives. Whilst these services are critical in all countries, they are especially important in LMICs where the burden of musculoskeletal injuries and diseases is high, and access to quality care is often limited. In these countries, road traffic accidents, workplace injuries, and falls are common causes of disability and even death.

Unlike many other specialties, orthopaedics requires significant instrumentation and implants for a successful operation. When the required kit is unavailable, patients are often left waiting with open, life threatening injuries until resources can be found or funded. The treatments that are available often immobilise the patient and confine them to extended hospital stays which increase their risk of infection and impose a massive economic burden on the family and community.

Medical Aid International source instruments and implants from all over the world which help alleviate the burden of orthopaedic care for both the physicians and the patients.



*The Pro System
demonstrating
cannulation capability.*



The Hex System in use.

The Arbutus Orthopaedic Power Tool System

Medical Aid International are proud to distribute cost-effective equipment, such as the pioneering Arbutus Orthopaedic Power Tool System. Already in use by surgeons in LMICs and the US military, it is specifically designed for low resource environments. This innovative, cost-effective solution utilises a standard industrial drill with an FDA approved drill cover. This reusable, autoclavable, pathogen-proof sterile barrier converts an industrial drill into a licensed and approved surgical device. This delivers a reliable, easy to sterilise solution – only the low volume cover and attachments need sterilising, meaning with the multiple covers and batteries supplied, surgeries can be performed sequentially.

This revolutionary yet simple solution is significantly cheaper than the standard surgical drills available in the West.

Two models are available: the Hex System, which is typically used for non-cannulated procedures, and the Pro System, which can be used where a cannulated device is preferable, for instance intramedullary nailing or the insertion of circular frame wires or K-wires.

A solution to meet all clinical needs



Inserting the drill into the sterile cover.



The Pro System.



The Hex System.

Orthopaedic products we supply

- External fixation, including circular frames
- K-wires
- Rush nails
- Small and large fragment plates and screws
- Intramedullary nails
- Tourniquets
- Instrument sets and all accessories, including consumables



Clubfoot repair, western Kenya.



The Medical Aid International/FIGO instrument set in development.

Fistula Care

Championing Women's Health and Wellbeing

A major repercussion of poor medical equipment supply in LMICs is inadequate obstetric care. One devastating consequence of insufficient prenatal care and lack of skilled medical personnel during birth is prolonged obstructed labour. This can result in an obstetric fistula, causing both urinary and faecal incontinence.

In addition to the physical symptoms of an obstetric fistula, there are social and psychological impacts as well. These women are often abandoned by loved ones and ostracised from their communities.

Fistulas are almost entirely preventable with timely access to obstetric care. However, once a fistula has occurred, it must be surgically repaired. Thus, we advise, develop, and supply fistula repair equipment across the globe. For this work we partner with influential organisations to actively advance women's health.

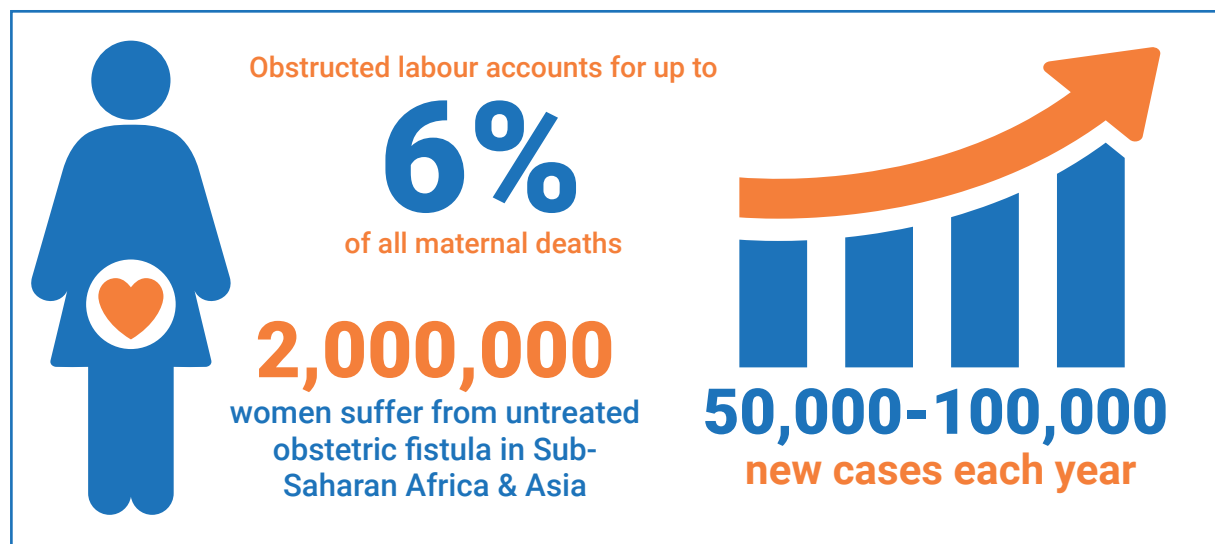
We work closely with the International Federation of Gynaecology and Obstetrics (FIGO), which is dedicated to improving healthcare for women and newborns and advancing the science and practice of obstetrics and gynaecology.

Just one of the many positive outcomes of this relationship has been our joint development of a specialist fistula instrument set, which we have supplied to hospitals and healthcare facilities globally.

Even our operating table solution was designed with these women in mind as it can achieve Trendelenburg position and includes shoulder supports, which are critical for fistula surgery. Additionally, it is easily transportable for fistula outreach clinics. Our work in rural clinics helps us to identify patients who are at risk of obstetric complications including fistulas.



A happy recipient of fistula instrument sets.



WHO, 2018. *Obstetric Fistula*.

The MAI Emergency Bag

Portable First Response for Patients of All Ages

The challenging and often austere conditions in LMICs are exacerbated by weak healthcare systems, limited resources, and a shortage of medical personnel. LMICs are more vulnerable to natural disasters, communicable diseases, and conflict, all of which can result in casualties. Effective and immediate emergency care can mean the difference between life and death for critically ill or injured patients.

Medical Aid International has created a portable Emergency Bag with essential life-saving equipment to support airway, breathing, circulation, and bone and soft tissue injuries for neonates, children, and adults. It includes reusable resuscitators, a pulse oximeter, airways, a stethoscope, bandages, and more. The MAI Emergency Bag is composed entirely of manual and battery-operated equipment, is robust enough for journeys through harsh terrain, and is light enough to be carried on foot or bicycle.

Our Emergency Bags are designed for use both within and outside the hospital. Whilst in the West such bags might only be utilised in the field, our kits are often used within the walls of the healthcare facilities. For those emergencies outside of the hospital, the bag includes a headtorch, four high-visibility vests, and gloves. This ensures first responders remain visible and safe while treating their patients. When resources are low, the life-saving equipment in these bags is often a patient's only hope.

We tailor our Emergency Bags with the kit most needed for each context, whether that be a remote clinic in Africa or a conflict environment, such as Ukraine, where we sent over 100 Emergency Bags. Each bag was supplemented with additional equipment, such as: tourniquets, surgical instruments, chest seals, IV cannulas, tension pneumothorax needles, and Celox bandages.

Designed for the Realities of LMICs

The MAI Emergency Bag was intentionally designed for the multifaceted nature of healthcare in LMICs. Not only does it contain life-saving essentials for the patient, but it ensures the safety of the first responder.



The MAI Emergency Bag and its contents.

- Reusable bag-valve-mask (BVM), adult, child, neonate with full range of reusable masks
- Finger pulse oximeter
- Airways 000-5 x5
- Nasal airways 6,7,8,9 x3
- Tough cut scissors
- Headtorch
- Stethoscope
- High-visibility vests x4
- Gloves x10 pairs
- SAM splint x1
- Ambulance dressings x2
- Crepe bandages x6
- Safety pins and adhesive tape
- Triangular bandages x3
- Notepad and pen



Emergency Bag in use, Ukraine.



Emergency Bag on hand in an operating room, Zambia.

The MAI Neonatal Resuscitation Package

Infant fatality is an all too common tragedy in LMICs. Much can be done to improve neonatal care, none of which is complicated. However, millions don't survive childbirth simply due to a lack of resuscitation equipment. In response to this, Medical Aid International has developed a Neonatal Resuscitation Package which includes:

- Reusable neonatal bag-valve-mask (BVM)
- Airways
- Pulse oximeter with neonate, child, and adult probes (optional)
- Stethoscope
- Penguin suction device
- Headtorch

“

"I was working one day in a new paediatric operating room that we had just finished commissioning and we were doing our first case. Suddenly a nurse ran in and asked if anyone had a resuscitator for a child that had just been delivered by C-section who was not breathing. I grabbed our Emergency Bag and rushed in and, using our neonatal BVM started to breathe for the baby. Forty five seconds later she started to breathe on her own; a life saved."

– Tim Beacon, CEO, MAI



MAI Neonatal Resuscitation Package.



MAI Emergency Bags, replenishment stock, and pulse oximeters ready to dispatch to Ukraine.

Emergency Response in Conflict and Crisis

At Medical Aid International, we are committed to providing rapid and effective emergency response in conflict and crisis situations around the world. Our team of experienced healthcare professionals and logistics experts are ready to act at a moment's notice, bringing lifesaving medical equipment, supplies, and personnel to those in need.

In Conflict

Ukraine

During the ongoing conflict in Ukraine, many medical facilities have struggled to acquire the necessary medical supplies due to supply chain challenges resulting from increased demand. Through our strong relationships with suppliers, we were able to continue to provide life-saving equipment to our partners in Ukraine.

In collaboration with various independent and government-run organisations such as UK-Med, and International Christian Medical and Dental Association (ICMDA), we distributed over 100 of our emergency bags adapted for warzone environments. We also supplied additional stock and supplementary trauma splints, and tourniquets etc. We supplied more than 400 external fixation devices. External fixation is the ideal warzone fracture solution as it can be rapidly applied by even general surgeons with minimal instrumentation.

Syria

Medical Aid International worked in Syria during the height of the civil war, equipping five complete operating rooms and a children's unit in Aleppo, in addition to supplying £50,000 worth of external fixators and 2,500 trauma kits. We were able to supply all of this equipment in the middle of the ongoing conflict, ensuring that medical aid reached those in need.

In Crisis

Türkiye

Within one week of the catastrophic 2023 Türkiye/ Syria earthquake, Medical Aid International delivered aid via Humanity First and a private individual. This quick turnaround exemplified our ability to cut through bureaucracy and expedite the logistics to ensure essential resources make it to those in need.

Nepal

In 2015, Nepal was hit by a devastating earthquake that killed over 8,000 people and injured tens of thousands more. Medical Aid International played a vital role in the response in both a logistical and advisory capacity. Tim Beacon deployed with the UK-Med team to provide support and medical equipment across the affected regions.



Nepal. Disaster relief following the 2015 earthquake with UK-Med and Save The Children.

COVID-19

The COVID-19 pandemic posed unprecedented challenges to healthcare systems around the world. Medical Aid International was deeply involved in dealing with the pandemic, advising on ventilators and CPAP devices, procuring PPE, and supplying intensive care units and associated equipment to LMICs. We have an effective and efficient programme of recycling healthcare equipment, which we applied to 2000 oxygen concentrators donated from an NHS medical supplier. These concentrators were refurbished and tested by Medical Aid International engineers and community volunteers before being deployed to hospitals devoid of supplementary oxygen and overburdened by the pandemic.

These refurbished resources provided critical life-saving care and saved our partners more than £1.5 million. Our environmentally conscious model of recycling medical equipment saves lives and enables budgets to be maximised.

Ebola

In response to the 2014 Sierra Leone Ebola outbreak, we supplied comprehensive personal equipment and survival kits for each member of the UK-Med team being deployed. In this demanding environment, it was critical that the first responders remained healthy and fit for duty. CEO Tim Beacon's background in travel health informed the supply selection process.



A Medical Aid International engineer running safety checks on refurbished oxygen concentrators.



Distributing blankets at a rural health centre, Uganda.



Refurbished oxygen concentrators leaving Medical Aid International headquarters as a part of our COVID-19 response.



Biomedical Engineering



Improving Healthcare

In LMICs, access to healthcare resources is often limited. Medical equipment plays a critical role in saving lives, but the inappropriate deployment and lack of proper maintenance can lead to equipment malfunctioning, putting patients' lives at risk. The solution? Well-trained and appropriately equipped biomedical engineers and biomedical engineer technicians.

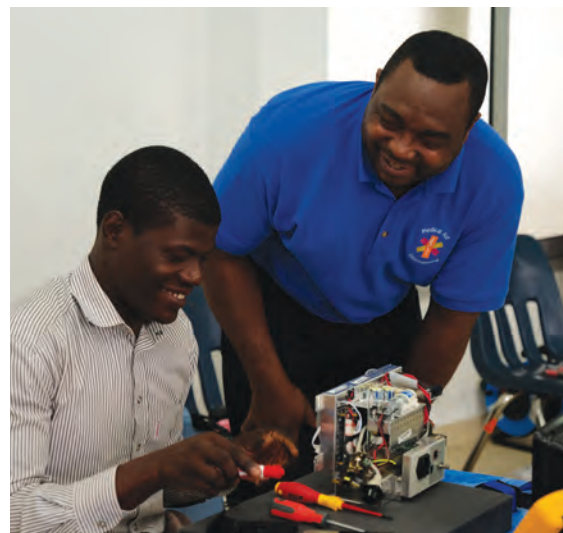
At Medical Aid International, we believe that training biomedical engineers is crucial for improving healthcare in LMICs. For many years, we have been training biomedical engineers in-country, through residential training courses. This programme had become vital in enabling healthcare institutions in LMICs to keep their equipment functioning better and more safely for longer – which, in turn, positively impacts clinical outcomes.

But these courses were not only relatively expensive, and therefore only accessible to a minority – they also became unworkable in the light of COVID-19-related restrictions on travel and social contact. The Medical Aid International online Biomedical Engineering Programme was our response to this, specifically designed to address the unique challenges faced by those in LMICs. Our course is appropriate for individuals with varying biomedical engineering qualifications, and for hospital fixers or facility managers with a passion for learning and knowledge.

Course Overview

The course exemplifies critical thinking and advocates for biomedical engineer integration into the hospital decision-making processes. It equips biomedical engineers with fundamental theory and physiology, in order to deepen their understanding of medical equipment and its uses. In addition to this, we make sure to fully equip our students with the tools needed to maximise their impact. We provide our students with a comprehensive, professional toolkit, four engineering textbooks, and a digital library of service manuals.

Biomedical Engineers are not only responsible for procuring, installing, and maintaining medical equipment but also for training the end user. For user training to be well-received, biomedical engineers must be able to convey confidence in themselves and their skills. Our course has instilled a level of confidence among its graduates that did not previously exist. The course is Assured by City & Guilds; upon completion of the course, each graduate will receive a framed certificate.



Medical Aid International Biomedical Engineering Course Units

- Unit 0** Health and Safety
- Unit 1** The Frequency Spectrum
- Unit 2** Electrical Safety
- Unit 3** Electrocardiogram (ECG)
- Unit 4** Defibrillation
- Unit 5** Patient Monitoring
- Unit 6** Infusion Devices
- Unit 7** Premature Baby Incubators (PBIs)
- Unit 8** Ultrasound
- Unit 9** Surgical Diathermy/ESU
- Unit 10** Hygiene Guidelines
- Unit 11a** Anaesthetics, Oxygen and Suction Devices
- Unit 11b** The Operating Department and Sterilisation
- Unit 12** First Aid
- Unit 13** Train the Trainer and Applying what you have Learnt



"After the Medaid course my communication skills have improved because I have gotten a deeper understanding into how the machine works... when I meet the doctors and nurses, I am able to confidently explain to them what's going on with the machine."

– Graduate, Ghana



Who Should Take This Course?

Our online Biomedical Engineering Course is ideally suited for individuals working in LMIC settings, including engineers, technicians, maintenance personnel, general fixers, and those responsible for equipment repairs. These individuals often find themselves in crucial positions without formal biomedical engineering training. Our course provides them with the opportunity to enhance their expertise and make a significant impact on healthcare delivery in their communities.

Why Choose Our Course?

- 1. Tailored for LMICs:** Unlike courses designed for high resource settings, our curriculum recognises the reality of LMIC environments. We address the specific challenges faced in resource-limited settings, emphasising practical skills, context-appropriate first aid, train the trainer techniques, and first-line fault finding. Our goal is to equip participants with knowledge that directly translates into tangible improvements in healthcare infrastructure.
- 2. Expertise and drive:** With over 20 years of experience, Medical Aid International understands the immense knowledge and passion possessed by local fixers and maintenance personnel. We have witnessed their dedication and eagerness to make a difference. Our course harnesses their existing capabilities and complements them with structured education and training, unlocking their full potential as biomedical engineering professionals.
- 3. Online learning flexibility:** Recognising the need for accessible and cost-effective education, we developed a self-paced online learning platform that allows participants to engage with course materials from anywhere in the world, at their convenience. This holistic programme includes a professional toolkit, textbooks, and an extensive electronic library of service manuals, ensuring participants have the necessary resources on hand.
- 4. Global reach:** Our online course enables us to reach a global audience of aspiring biomedical engineers. By providing comprehensive training to individuals in LMICs, we are fostering a network of skilled professionals who can drive sustainable change and improve healthcare in their respective regions.

By supporting local teams we strive to bridge the gap in biomedical engineering expertise, ultimately enhancing healthcare delivery for those who need it most.



Biomedical engineering students receiving their resources.



Biomedical engineer repairing a patient monitor.

How does the Biomedical Engineering Programme Work?

The training is simple to implement and easy to monitor. We provide comprehensive weekly update reports to motivate our students and encourage management to play an active role in their students' education. Since the course is delivered entirely online, it can be accessed from anywhere in the world and is currently available in both English and French.

There are 15 units, and at the end of each unit there is a series of multiple-choice questions (MCQs), totalling 300 over the entire programme. The student must achieve 100% in order to move onto the next unit. Students can retake the end of unit quiz as many times as necessary, but each time the questions and answers shuffle, to ensure genuine understanding and robust learning.

The programme also includes:

- A comprehensive, professional engineering toolkit
- Four textbooks
- A digital library of service manuals
- Reporting tools to enable sponsors and team leaders to track and support their students' progress
- A laptop in ruggedised military specification briefcase (a highly recommended optional extra)



Kenyan graduate using toolkit, including headtorch, to install an MAI supplied operating light.



Light successfully installed by graduate.



"Thank you very much Medical Aid team, you have helped me a lot as an engineer. Your knowledge that you have imparted on me will help to improve my professional career as a biomedical engineer, your textbooks will further widen my knowledge in biomedical engineering field. In Malawi biomedical engineers lacks resources, the tool kit that you have provided will help me to diagnose and troubleshoot the equipment accurately and with ease, now I will be able to work professionally and improve the quality of service delivery at my institution as well as the entire country. Thank you very much Medical Aid team for you overwhelming support."

– Graduate, Malawi



Hospital technicians assembling an infant resuscitator, Ghana.



Hospital receiving their biomedical engineering resource package, Uganda.



Professional toolkit and textbooks – all supplied as part of the training programme, with optional laptop and ruggedised, military-specification briefcase.



Working in partnership, Uganda.



“For WFSA, partnering with Medical Aid International has been a real plus. Not only are they experts in providing appropriate equipment for low resource environments, but their biomedical engineering courses address the essential skills needed to keep that equipment functioning properly. And we’ve been kept updated on students’ progress via regular progress reports and self-evaluations so we know where our investment is going. By supporting these courses we are making anaesthesia and surgery safer.”

– Stuart Halford, Head of Development, World Federation of Societies of Anaesthesiologists



Our trainee at a medical facility, Madagascar. Assessment visit revealed a lack of training, tools, and professional confidence.



Proud, fully trained, self-confident, now part of a motivated, properly equipped team.

Weekly Reports

To help support our students and partners, Medical Aid International provides a comprehensive reporting system as part of the Biomedical Engineering Course, including:

- Weekly or fortnightly progress reports
- A bespoke data analysis report – analysing student feedback and investigating the impact of the programme
- Student survey data that details the impact of the course
- Student enrolment management and support
- Access to all student data for the coordination group



Our progress reports consist of 4 key sections:

1. Group overview, showing a snapshot of student progress

8 of 8 Students Complete Average Time To Complete - 19:41:03

Group Overview

ID	Name	Completion Date	% Complete	% Complete Last Week	% Change	Time To Complete	Time Spent	Total Time Before	Time This Week	Time Last Week
#1	Student 1	27th November 2022 10:06 am	100	↑↑	100%	0%	19:33:00	20:25:15	20:25:15	0:00:00
#2	Student 2	2nd October 2022 11:53 pm	100	↑↑	100%	0%	14:03:45	16:13:00	16:13:00	0:00:00
#3	Student 3	11th November 2022 2:04 pm	100	↑↑	100%	0%	20:18:15	28:33:15	28:33:15	0:00:00
#4	Student 4	11th October 2022 8:06 pm	100	↑↑	100%	0%	17:44:45	18:14:45	18:14:45	0:00:00
#5	Student 5	30th September 2022 10:00 pm	100	↑↑	100%	0%	16:26:45	16:28:15	16:28:15	0:00:00
#6	Student 6	27th November 2022 10:30 pm	100	↑↑	100%	0%	15:28:00	15:29:45	15:29:45	0:00:00
#7	Student 7	3rd February 2023 6:12 pm	100	↑↑	100%	0%	23:00:30	23:01:30	23:01:30	0:00:00
#8	Student 8	15th December 2022 1:44 pm	100	↑↑	100%	0%	22:53:30	22:59:45	22:59:45	0:00:00

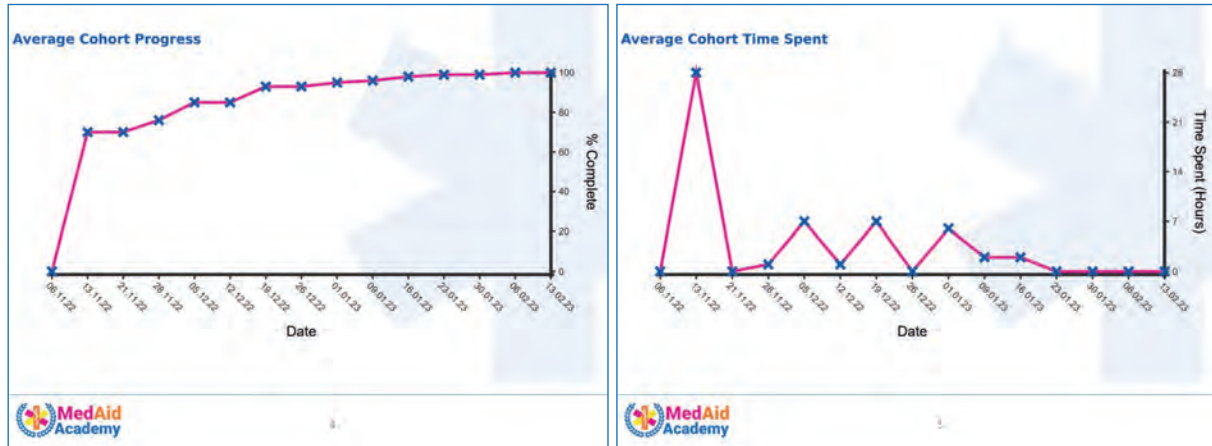
MedAid Academy 2

2. Progress tracker, showing past progress

Previous Progress		Previous Time Spent	
% Increase	0%	Average Time (Completed Students)	0:00:00
13.02.23 - Average % Complete	100%	Average Time Last Week (Completed Students)	0:05:26
06.02.23 - Average % Last Week	100%		
30.01.23	99%	% Time Increase	0%
23.01.23	99%	13.02.23 - Average Time (Unfinished)	0:00:00
16.01.23	98%	06.02.23 - Average Time Last Week (Unfinished)	0:00:00
09.01.23	96%	30.01.23	0:35:15
01.01.23	95%	23.01.23	0:52:49
26.12.22	93%	16.01.23	2:30:00
19.12.22	93%	09.01.23	2:45:15
12.12.22	85%	01.01.23	6:24:45
05.12.22	83%	26.12.22	0:00:00
28.11.22	76%	19.12.22	5:59:15
21.11.22	70%	12.12.22	1:22:00
13.11.22	70%	05.12.22	7:25:15
06.11.22	0%	28.11.22	1:17:30
		21.11.22	0:00:00
		13.11.22	9:05:00
		06.11.22	0:00:00

MedAid Academy 3

3. Progress graphics, allowing progress information to be easily understood



4. Individual progress, showing the MCQ results for each student

Group Members

Student 1
Working on Module 17 of 17 - Time to Complete 19:33:00

Test Name - Student 1	Score	Date Completed
Unit 0 - Healthy and Safety MCQ	50	10th October 2022 1:39 pm
Unit 0 - Healthy and Safety MCQ	66	10th October 2022 1:47 pm
Unit 0 - Healthy and Safety MCQ	91	10th October 2022 1:51 pm
Unit 0 - Healthy and Safety MCQ	100	10th October 2022 1:53 pm
Unit 01 - The Frequency Spectrum MCQ	60	10th October 2022 3:13 pm
Unit 01 - The Frequency Spectrum MCQ	60	10th October 2022 3:20 pm
Unit 01 - The Frequency Spectrum MCQ	90	10th October 2022 3:28 pm
Unit 01 - The Frequency Spectrum MCQ	100	10th October 2022 3:37 pm
Unit 02 - Electrical Safety MCQ	45	11th October 2022 9:22 am
Unit 02 - Electrical Safety MCQ	95	11th October 2022 9:52 am
Unit 02 - Electrical Safety MCQ	100	11th October 2022 10:24 am
Unit 03 - Electrocardiogram MCQ	48	11th October 2022 3:00 pm
Unit 03 - Electrocardiogram MCQ	100	11th October 2022 3:24 pm
Unit 04 - Defibrillation MCQ	72	12th October 2022 4:44 pm
Unit 04 - Defibrillation MCQ	81	12th October 2022 4:47 pm
Unit 04 - Defibrillation MCQ	90	12th October 2022 4:55 pm
Unit 04 - Defibrillation MCQ	81	12th October 2022 4:58 pm

We have also conducted research into the effectiveness of our Biomedical Engineering course. In short, the programme is extremely highly rated, with students rating it 9.64/10 for course satisfaction.

Each of the reports can be read by scanning the QR codes below:





Workshops: Effective Healthcare Support in Disaster and LMIC Environments

Innovative and Extensive Training Programmes

In conflict and crisis zones, access to healthcare is often limited or non-existent, and medical facilities may be damaged or destroyed. Medical Aid International responds to these challenges by deploying supplies to the front lines, providing emergency medical care and assistance to those affected by crisis, violence, displacement, or disease outbreaks.

The provision of medical equipment is key, but equally important is the corresponding training to make sure it can be implemented effectively. In the same way, whilst sending medical aid to disaster areas is vital, disaster relief training is necessary to achieve the best results. Stemming from our considerable experience, we have created a disaster relief training programme, teaching others to respond appropriately to the situation.

Who and how many is it for?

This multi-disciplinary programme is applicable to:

- Medical staff, all grades and specialties
- Logistics personnel
- Biomedical engineers

The programme is designed for up to 20 delegates, benefiting both clinical and nonclinical personnel.

What are the objectives?

The objectives of this course are to prepare the delegates to respond safely, effectively, and efficiently to healthcare crises. The emphasis is not only on the short term immediate need, but also exploring sustainable, long-term solutions to crises.

What subjects are included?

- Personal equipment and preparation
- First aid and survival skills
- Personal development, leadership and teamwork skills
- Procuring a mobile medical facility
- Setting up a secure, safe, and effective base of operation
- The wide-ranging clinical implications of working in a disaster zone
- Logistics

How will it be taught?

The programme spans 4 full days with teaching comprised of:

- Lectures
- Discussion groups
- Group work with presentations
- Outside based, high realism exercises
- Setting up a mobile surgical unit in a field location

The faculty

- Highly experienced faculty from a wide range of backgrounds, clinical and nonclinical, with a broad set of relevant expertise and experience.

Location

- Training can be conducted from our headquarters in Bedfordshire. The flexibility of the programme enables it to be hosted at almost any location across the UK or overseas.



Sterilisation workshop at an MAI symposium.



Training the Royal Navy and Royal Marines on civilian elements of disaster relief.

Our qualifications

Medical Aid International has established a solid reputation for disaster relief work. In 2013 we played an active role in consultancy, procurement and delivery of the UK Disaster Relief Hospital commissioned by the UK Government for MERLIN/Save the Children.

CEO Tim Beacon also deployed with the UK team to Nepal, following the 2015 earthquake, in a logistical and advisory capacity. We provided equipment and logistics support throughout the Ebola epidemic and responded to a wide variety of additional humanitarian crises, such as the Syrian conflict and COVID-19.

Tim Beacon has been an adventure training instructor, university healthcare lecturer, and visiting examiner for degrees and master's programmes in global health. He completed a post-graduate diploma in Travel Health at Glasgow Medical School, writing his thesis on *"What Makes a Good Expedition Medic"*, alongside *"The Gap Year Handbook: An Essential Guide to Adventure Travel"* (both available on our website). Tim, as a civilian, completed the UK Special Forces Patrol Medical Course and later worked as an instructor on the programme.

Workshops and symposiums

In addition to disaster relief training, Medical Aid International hosts a variety of LMIC healthcare workshops and symposiums. We provide demonstrations of our innovative solutions and educate clinicians, non-clinicians, civilian and non-civilian aid workers on appropriate medical equipment.



*Informal discussion on orthopaedic solutions during a residential training programme, Wales.
Professor Sir Keith Willett CBE talking to the chair of World Orthopaedic Concern UK, Ms Deepa Bose FRCS.*

Safe Surgery

Although brilliant and highly motivated, physicians in LMICs must overcome significant limitations in resources and surgical education and training. In order to assist these physicians, the WHO developed a surgical safety checklist to promote safe surgery practices and reduce the risk of surgical errors.

This checklist has been widely adopted across healthcare settings around the world and has been shown to improve patient outcomes and reduce complication rates.

Medical Aid International has expounded upon the WHO Surgical Safety Checklist adding clarity and specifications that make it uniquely applicable to LMICs. The key difference is that Medical Aid International's checklist focuses on confirming the availability of functioning life-saving equipment and consumables (e.g. resuscitation equipment and IV fluids) prior to initiating any operation. The intent is to ensure physicians can safely and efficiently perform the surgical procedures despite limited resources.

The Medical Aid International Surgical Preparation List is a straightforward, one-page checklist that encourages best practice through preoperative, intraoperative, and postoperative care.



A Medical Aid International equipped facility with the team using the MAI Surgical Checklist, northern Ethiopia.

The Medical Aid International Surgical Preparation List

The list below is designed to help ensure both the operating room and the entire team are prepared for the patient's complete journey through the operating department.



BEFORE YOU START:

Does everyone know what operation is being done and their role in the team?

ANAESTHESIA	SURGERY	RECOVERY
<input type="checkbox"/> Do you have the correct patient? <input type="checkbox"/> Has the anaesthetic machine been checked? <input type="checkbox"/> Do you have a working suction machine? <input type="checkbox"/> Do you have adequate patient monitoring? <i>Pulse oximetry and blood pressure should be the minimum, CO₂ monitoring highly recommended</i> <input type="checkbox"/> If using a circle machine, do you have anaesthetic agent and CO ₂ monitoring, and is the soda lime effective? <input type="checkbox"/> Do you have a source of oxygen? <input type="checkbox"/> Do you have working laryngoscopes? <input type="checkbox"/> Do you have the relevant airway control devices such as airways, ET tubes, LMAs? <input type="checkbox"/> Do you have emergency intubation aids? <input type="checkbox"/> Do you have the necessary drugs and IV fluids? <input type="checkbox"/> Do you have access to emergency drugs? <input type="checkbox"/> Do you have access to a manual resuscitation bag?	<input type="checkbox"/> Is the operation site marked? <input type="checkbox"/> Do you have the correct instruments and are they sterile? <input type="checkbox"/> Is working suction available? <input type="checkbox"/> Do you have the required sutures, swabs, drains, dressings, catheters? <input type="checkbox"/> Does the operating light work? <input type="checkbox"/> Is the operating table working and do you have the correct accessories for the procedure? <input type="checkbox"/> Is a system in place to ensure full instrument, needle and swab counts are completed? <input type="checkbox"/> If available, is the diathermy and/or any other electrical equipment working properly?	<input type="checkbox"/> Is someone allocated to recover the patient and stay with them until they go to the ward? <input type="checkbox"/> Do they know the recovery position? <input type="checkbox"/> Is oxygen available? <input type="checkbox"/> Is suction available? <input type="checkbox"/> Is there access to patient monitoring? <i>Pulse oximetry and blood pressure should be the minimum</i> <input type="checkbox"/> Do you have access to the necessary drugs and IV fluids? <input type="checkbox"/> Can you keep the patient warm? <input type="checkbox"/> Is there access to emergency equipment including airway devices, manual resuscitation bags and drugs?

The Rationale Of The Medical Aid International Surgical Preparation Checklist

Introduction

Checklists are a widely recognised method across many industries of ensuring safe and error-free procedures. The WHO Safe Surgery Checklist has demonstrated the vital role checklists play within the context of global surgery. In this highly complex and high-risk environment, where healthcare workers often have varying levels of training, the use of checklists is particularly valuable. To further enhance the WHO Safe Surgery Checklist, Medical Aid International has developed a succinct, efficient, and life-saving checklist. Created by Tim Beacon, a former Operating Department Practitioner, the objective of this checklist is to ensure that everyone in the operating room is fully prepared for every aspect of surgery.

The Rationale

The Medical Aid International Surgical Preparation Checklist is founded upon the following principles:

1. Patient surgical journeys consist of three distinct elements: anaesthesia, surgery, and recovery. These need to be clearly identified as separate elements as each comes with its own unique challenges.
2. The checklist must be adapted to reflect the unique working conditions and equipment limitations in LMICs. One critical consideration is the knowledge and training of the operating room staff, as many will not have practical operating room experience.
3. The checklist should create a mindset of preparation and serve as a teaching tool to encourage the provision of effective, sustainable, and appropriate equipment and training in LMIC surgical care.
4. The checklist must be specific to the operating room environment. Its objective must be to ensure a safe environment for the patient and the surgical team and allow for an effective and swift response in case of an emergency.
5. The checklist must be simple, clear, and efficient.

Comparisons with the WHO Checklist

The use of a surgical checklist is not designed to replace clinical judgement. The following points outline the distinct differences between the two approaches.

WHO: Before induction of anaesthesia/Medical Aid International: Anaesthesia

- The WHO checklist does not explicitly mention blood pressure monitoring, only pulse oximetry. The MAI checklist not only includes pulse oximetry but highlights blood pressure monitoring as an absolute minimum requirement. Blood pressure monitoring is particularly crucial in LMICs as many patients receive spinal anaesthesia, which can lower blood pressure.
- Contrary to the WHO checklist, the MAI checklist does not include direct questions to be asked by medical or nursing staff. We believe the WHO's questions regarding allergies, medication history, risk of blood loss, and prophylactic antibiotic use are better suited in a separate checklist. Instead, our checklist maintains a singular focus on the preparation of the operating room. Part of this preparation is confirming the right patient is prepped and the correct operation site is indicated.

- A crucial difference between the two checklists is that the MAI checklist assumes all patients have a high risk of aspiration and a difficult airway. In LMICs preoperative assessments are often less thorough and rarely performed by an anaesthetist. As such, we recommend all operations be prepared for difficult intubation. It is far better to be over-prepared than under-prepared.

WHO: Before skin incision/Medical Aid International: Surgery

- Medical Aid International has significantly expanded the intra-operative section of the WHO checklist. The clarity and specificity of our checklist ensures that all members of the operating room team are appropriately equipped with the resources needed for a safe operation.

WHO: Before patient leaves operating room/Medical Aid International: Recovery

- Post surgical care, or recovery, is often poorly managed in LMICs. This is a critical phase in a patient's surgical journey and requires significant attention. The WHO checklist does not cover patient recovery. In comparison, the MAI checklist elevates recovery alongside anaesthesia and surgery by dedicating one third of the checklist's content to this vital element. We provide specific guidance to ensure positive patient outcomes.

Summary

Checklists are universally proven to make events safer. However, it is important that they are relevant to the environment in which they are to be used, in order for them to be used effectively and for the long-term. It is our belief that The Medical Aid International Surgical Preparation Checklist achieves this objective.



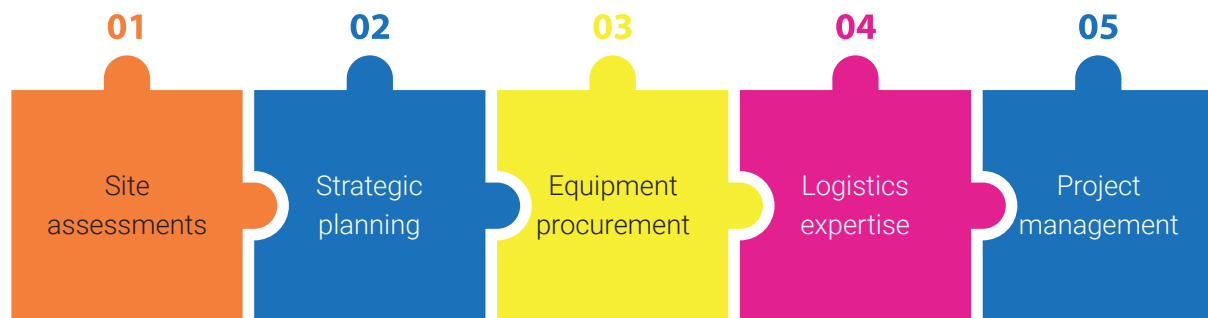
Orthopaedic surgical unit completed in partnership with CBM, Rwanda.
The Medical Aid International Surgical Preparation List.

Consultancy

Medical Aid International offers consultancy services that enable healthcare organisations and professionals in LMICs to drive sustainable change. Our tailored approach addresses the unique challenges faced in resource-limited settings, ensuring that our clients receive comprehensive and effective solutions that always benefit the patient.

A key focus for our projects is ensuring their long-term viability. We take steps to safeguard investments through providing essential, online biomedical engineering training to staff as well as ongoing support.

Our consultancy work includes



Site assessments

Having worked on hundreds of projects globally, we are uniquely qualified to identify existing healthcare system weaknesses and provide solutions. Our WHO inspired site assessment checklist allows us to provide detailed feedback to our customers and offer tailored recommendations. Our dedicated team can carry out this crucial work on site or conduct a remote assessment, allowing us to create a strategic plan for the project.

Strategic planning

Unlike generic consultancy services, we appreciate the reality and constraints of working in resource limited environments and can advise which solutions and equipment will be best suited to each project. We understand that equipment and strategies which may be applicable for a larger city hospital may not be appropriate for a rural clinic. With this in mind, we develop bespoke strategies which fit the needs of each project, providing practical, context-specific solutions that address the unique needs of our clients, leading to tangible improvements in healthcare infrastructure.

To further support our projects, we provide online biomedical engineering training as a core part of our offerings. Our effective, well-respected course is Assured by City & Guilds, with each graduate receiving a certificate upon completion.

We appreciate that finances are often the limiting factor for projects. Given our specialisation in low resource environments, we know how to complete projects on a tight budget. This allows us to advise our customers about areas where money can be saved and where funds are best prioritised.

Equipment procurement

Our strong relationships with a multitude of global medical equipment suppliers mean that we are able to secure equipment even when supply chains are disrupted. For example, during the COVID-19 pandemic where supplies were extremely limited, we were still able to secure key medical equipment, PPE, and consumables for our customers.

We also benefit from donations of medical equipment and supplies from the NHS, medical companies, other healthcare institutions, and individuals. After refurbishing this equipment, to ensure all quality and

safety standards have been met, we then provide this as part of our projects. The cost savings from this gifts in kind model are passed onto our customers.

Additionally, we offer comprehensive packages which can include an ongoing consumable supply, allowing for budgets to be forecasted accurately. By supplying consumables as well as medical equipment, we reduce the long-term complexity of procurement.

Logistics expertise

Since 2001 we have been supplying equipment to LMIC and disaster relief environments. Over these two decades, we have built up a valuable global network of key shipping, clearing, and other important contacts. Our longstanding relationships with locals on the ground means that we are able to create effective logistical plans. Leveraging this allows us to ship medical equipment quickly and efficiently across the globe.

Project management

Medical Aid International has experience of working alongside multi-national NGOs and local charities. We can accommodate long-term multi-million-dollar projects as well as one-time single equipment purchases. Regardless of project size, we are here to help. As part of our comprehensive project management solution, we can undertake and fully manage any project. Our support can include a site assessment, strategic planning, equipment procurement and delivery, as well as installation (where appropriate). By combining all other elements of our consultancy service together into a cohesive package, it allows us to take the challenges out of projects and handle their overall management.



Madagascar. Unloading the container for a new operating department in partnership with Mercy Ships.



Outpatient clinic, Uganda.

How We Work

Advice, Preparation, Project Management

We often advise organisations on the practical challenges and limitations of deploying and managing aid projects in these regions.

Below is some advice to consider when planning projects:

Choose equipment carefully: A combination of new, ex-demonstration, and donated goods enables budgets to be maximised to best effect. All equipment should be checked to ensure it comes with everything needed to make it usable.

Factor in the maintenance: Provision should be made in budgets for regular maintenance, even if that involves bringing in overseas engineers.

Low-tech doesn't mean low-quality: Crucially, there must be an acceptance that something that is less high-tech may still produce the desired outcome.

Plan for the future: Set up a training, staffing, and maintenance plan to ensure resources are used effectively in the long-term.

Involve, don't impose: Listening to end-users and other stakeholders is critical to ensure that what is being delivered will work for their needs and in their environment.

Assess needs: A detailed and accurate assessment of the receiving institution's clinical needs is critical, as each institution will vary. From this, a realistic list of appropriate equipment can be decided, and accurate costings calculated.

Assess infrastructure: Availability of electricity, gas, oxygen, and the state of the buildings all influence the required approach and subsequent solutions.

Assess local support: Understand the strengths and limitations of local skill (nurses, biomedical engineers etc.); consider investing in the training of these individuals to remedy shortfalls.

Watch for hidden costs: Some medical devices, whilst being extremely effective, require a costly supply of consumables. Budgets often won't cover this, so alternatives are necessary.



Amy sorting instruments for Ghana Rural Integrated Development (GRID).

Our Business Model Explained

As a social enterprise, we receive no government or charity funding. Thus, to continue furthering our positive impact on LMIC healthcare, it is necessary for us to charge for the resources and services we provide. We understand that financing is a key challenge for many projects, so we work with our customers to maximise their budgets while providing high quality healthcare resources.

We continuously invest in a variety of areas which benefit LMICs, such as the development of our online Biomedical Engineering Programme or funding our research projects.

Making Budgets Stretch Further

How do we make every budget stretch further? The secret is using our gifts in kind business model, coupled with carefully sourcing ex-demonstration and donated equipment.

Our gifts in kind model is explained in the graphic below:

- 1.** We calculate the most cost-effective method to ship the required resources for the project and leverage our existing strong relationships with logistics companies to find the best solution.
- 2.** There is often extra space in the shipping containers after we have packed them. This unused space would typically be wasted and classed as business inefficiency.
- 3.** We take this space and fill it with gifts in kind at no additional cost. These are tailored to each project and will have clinical relevance. This might include refurbished or ex-demonstration equipment, as well as brand new items.
- 4.** These gifts in kind are sent to the healthcare facility as part of the shipment, bringing huge benefit and cost savings.



The value of gifts in kind received depends entirely on the type of project and the overall budget involved.

Gifts In Kind Explained

Our gifts in kind are carefully chosen to be clinically relevant to each facility in order to bring maximum benefit, showcasing our patient centred mission.

Gifts in kind can include:

- Donated medical equipment which our highly trained biomedical engineers carefully refurbish (such as oxygen concentrators)
- Reusable, every day hospital items (such as surgical linen and gowns)
- A selection of new items (such as Emergency Bags, pulse oximeters, resuscitation equipment)
- Furnishings (such as waiting room furniture, office furniture, bins etc.)
- Mattresses
- Mobility aids (crutches, walking frames and wheelchairs)
- Nursing items (stethoscopes, thermometers, blood pressure monitors etc.)
- Surgical instruments (a mixture of new and donated)



Maternity unit, north-west Tanzania.



Working with a team to transport equipment supplied by Medical Aid International, northern Ghana.

How do we Refurbish or Use Ex-Demonstration Equipment?

In conjunction with our gifts in kind model, we also reduce project costs through refurbishing equipment. Utilising our industry contacts, we are also able to purchase ex-demonstration equipment at a fraction of its original cost.

Case Studies – Budgets we have Stretched

COVID-19: The outbreak of COVID-19 highlighted the importance of oxygen and unveiled the inadequacy of oxygen provision in many healthcare facilities across LMICs.

In 2020, we received donations of nearly 2000 oxygen concentrators, otherwise destined for landfill. A team of local volunteers (overseen by qualified engineers) cleaned, tested, and refurbished the machines. Those that did not meet our rigorous quality standards were appropriately recycled.

Through our efforts, we distributed concentrators worldwide to countries such as India, Nigeria, and Papua New Guinea. By refurbishing them, we were able to supply them at just £200, rather than their retail price of £1,300. This sustainable approach enabled a more equitable distribution of vital medical equipment.

Whilst the COVID-19 pandemic brought attention to the critical importance of oxygen, it is essential to recognise that oxygen concentrators have a vital role in hospital care for many other respiratory illnesses, such as pneumonia, or even supplying supplementary oxygen to postnatal mothers and babies. This means that the oxygen concentrators supplied as part of the COVID-19 response will continue to have a lasting impact.

We saved our clients over £1.5 million by using our refurbished oxygen concentrators.

Leyaata Hospital, Ghana: In 2019, we began equipping a newly constructed hospital in northern Ghana. After years of diligent efforts and multiple shipments, the hospital is now fulfilling its intended purpose.

The hospital, being a new facility with limited finances, faced the challenge of working within a constrained budget to cover essential items ranging from operating tables to office furniture. When working within the constraints of limited funding, the priority often lies in securing clinical equipment for healthcare facilities. However, it is important to recognise that a hospital, like any operational entity, also requires basic non-medical necessities such as chairs, desks, and filing cabinets. Whilst these items may not directly contribute to patient care, they play a crucial role in providing a functional and comfortable environment for doctors and administrative staff to carry out their essential work.

In response to COVID-19, industries within the UK shifted away from offices and embraced a remote working environment. Recognising this opportunity, we capitalised on the generosity of companies willing to donate their surplus office furniture. By acquiring these items at no cost, we were able to furnish the hospital's offices without compromising on quality or incurring additional expenses. At the same time, we were able to acquire high-quality, unused items, such as: drugs trolleys, drip stands, overbed tables, and bedside cabinets from decommissioned medical facilities in the UK.

The value of this initiative cannot be overstated. The donated furniture now serves the doctors and administrative staff at the hospital, enabling them to carry out their essential tasks in a comfortable and functional environment. By saving a significant amount of money on office furniture, funds were able to be reallocated to other critical areas of the hospital, ensuring efficient resource utilisation, and maximising the impact of the budget towards vital clinical equipment.

We fully equipped Leyaata Hospital for half the cost of purchasing all brand new equipment.

Donation

In LMICs, financial resources are often limited, making it crucial to maximise their use. We do this via strategic allocation of donated, refurbished, and new equipment ensuring optimal outcomes, while working within the budget constraints of our partner organisations.

We do this by adhering to three crucial principles. All donations:

- Must be suitable for the needs and limitations of the environment
- Must contribute to long-term, sustainable improvement of clinical outcomes
- Must exclude unsuitable items, due to the inevitably high disposal costs

We Help Donors to Get it Right

We want to help generous, charity-minded donors make the greatest impact in global health. To facilitate this process, we have established donation guidelines that outline our equipment needs.

These guidelines offer an encouraging message: there are numerous donated items, both new and pre-owned, that we can effectively utilise. The range of donations spans from small items like surgical instruments, bowls and kidney dishes to larger equipment such as tables, furniture, monitors, diathermy machines, and defibrillators, to name just a few.

It is worth noting that the majority of items can be utilised effectively; only a few exceptions fall outside our scope. Generally, we are unable to accept items that are out of date, as they may be ineffective or pose safety concerns. Similarly, single-use or consumable items, with a few exceptions, are often not viable due to their high costs in LMIC settings. Additionally, specific categories like catheters, colostomy bags, dressings, and certain orthopaedic accessories are typically not suitable for donation.

Our donation guidelines can be found on the page opposite.



Recycling oxygen concentrators as part of our COVID-19 response. Medical Aid International team members and volunteers at work in our hospital tents.



A recycled oxygen concentrator in use, Uganda.

Do you have a Corporate Social Responsibility budget?

If so, talk to us as we have many projects you could support.

We are always on the look out for:

Bowls, bowl stands, kidney dishes	Lead aprons	Patient trolleys
Crutches	Manual examination couches	Physiotherapy equipment
Emergency equipment	Minor procedure tables	Pre-hospital care items
Examination lights, and mobile and ceiling operating lights (LED)	Mobile X-ray machines	Reusable surgical instruments
GP surgery equipment	Nursing items	Sheets/blankets
Gynae/obstetric examination tables	Occupational therapy equipment	Training aids, such as manikins
Image intensifiers	Operating room furniture	Ultrasounds
IV stands	Patient monitors	Ward furniture



Recycled equipment at an emergency department, Madagascar.

If you are a major supplier with high levels of excess stock, please get in touch.

Getting items to us

We are delighted to collect donations but this does cost us. It is greatly appreciated if you can arrange delivery to our warehouse.

Please note that we cannot take the following:

- Out of date items
- Single use items (syringes, IV cannula)
- Orthopaedic boots, braces
- Catheters, dressings, colostomy bags
- In general, we cannot take consumables. There are exceptions, such as sutures and anaesthetic breathing adjuncts, as long as they are in date
- Pharmaceutical items

Keeping Costs Down

At Medical Aid International, we are dedicated to optimising the impact of donations while minimising costs for our generous contributors. To achieve this, we employ strategies that streamline the receiving and processing of donations, ensuring efficiency and effectiveness.

Our centrally located warehouse makes donating convenient and affordable. We also offer the added convenience of collecting donations directly from the donor, thus further simplifying the process.

We strive to make our donation process as smooth as possible for both large and small contributors. As donations significantly contribute to the advancement of healthcare in LMICs, donor support plays a pivotal role in improving the lives of countless individuals and communities, enabling access to essential medical resources and services.



Assembling ward beds, northern Ghana.

Healthy patients, healthy planet – our environmental commitment

At Medical Aid International, we are deeply committed to promoting the wellbeing of both patients and the planet. Through our environmentally conscious practices, we strive to make a positive contribution on global health while minimising our environmental impact.

By breathing new life into donated equipment, we extend its usefulness and prevent it from ending up in landfill. This approach not only supports sustainable resource management, but also allows us to provide high-quality, cost-effective solutions to healthcare institutions in need.

Additionally, we actively work to minimise the use of single-use consumables, recognising their detrimental environmental effects. Through careful procurement and strategic partnerships, we prioritise reusable alternatives and implement responsible waste management practices.



Our Mission Continues

Since its establishment in 2001, Medical Aid International has been at the forefront of LMIC healthcare. Our commitment to excellence is underpinned by ongoing research, continuous feedback from the field, and the tireless pursuit of innovative solutions.

We are unwavering in our dedication to providing high-quality healthcare. We have routinely proven our ability to rise to each new challenge and adapt to meet the needs of the rapidly evolving global health agenda.

A constantly discussed global health issue is the lack of biomedical engineering provision. Our ever-expanding network of biomedical engineering graduates from our online based programme, specifically aimed at the LMIC environment, is part of our approach to remedy this shortfall. This network fosters knowledge sharing, empowers local teams, and nurtures self-sufficiency in healthcare equipment management, ensuring a lasting legacy of positive change.

The story of Medical Aid International, propelled by the extraordinary dedication and resilience of the people it serves, continues to unfold. Whether you join us as a partner, healthcare professional, student in our training programmes, donor, or fundraiser, we invite you to be a part of the next chapter in our transformative journey. Together, we can create a future where accessible and quality healthcare knows no boundaries.





Before and after, working in partnership with Mercy Ships, Toamasina, Madagascar.





**Medical Aid
International**

Supporting Healthcare in Low Resource Environments

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