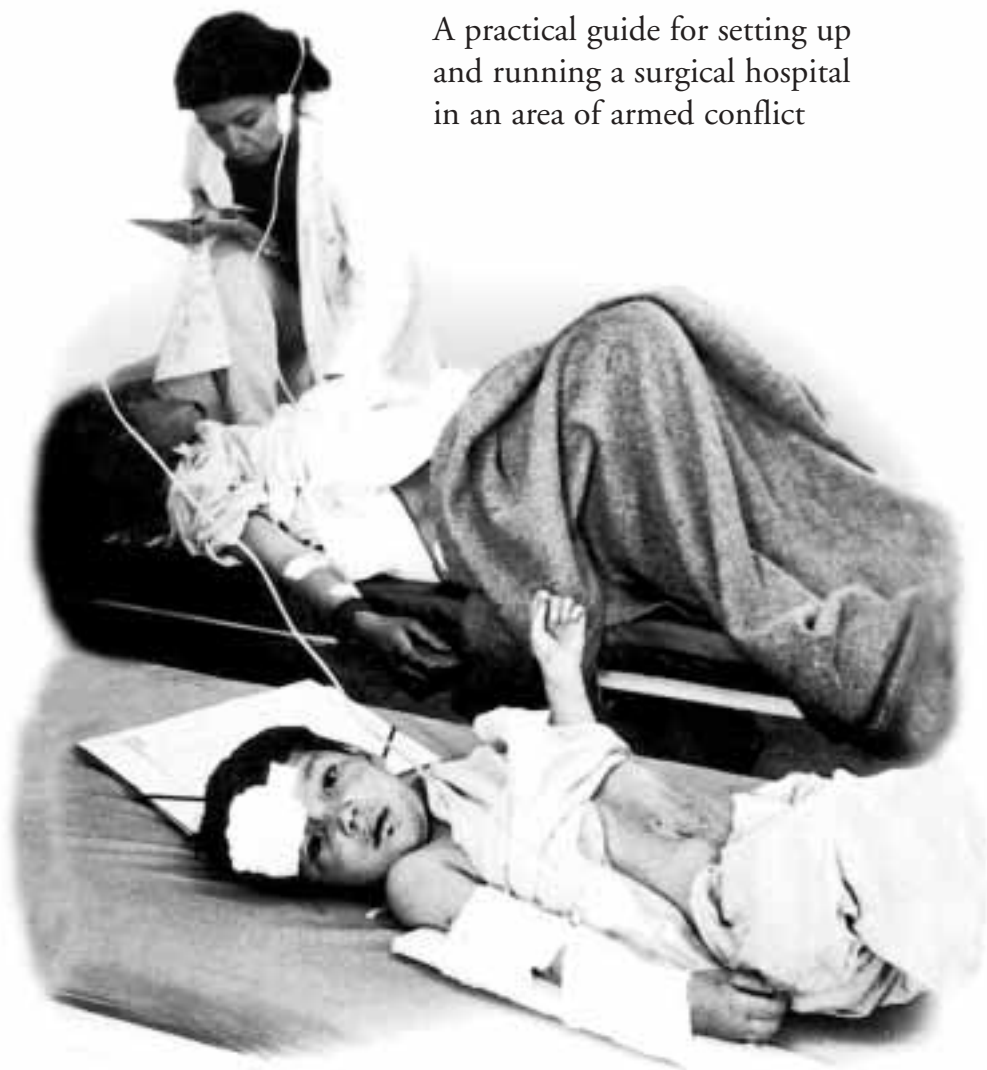


HOSPITALS FOR WAR-WOUNDED

A practical guide for setting up
and running a surgical hospital
in an area of armed conflict



ICRC

HOSPITALS FOR WAR-WOUNDED



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This book is dedicated to the memory of

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HOSPITALS FOR WAR-WOUNDED

A practical guide
for setting up and running
a surgical hospital
in an area of armed conflict

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INTERNATIONAL COMMITTEE OF THE RED CROSS

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FOREWORD

The absence of adequate care and treatment for war-wounded prompted the founding of the International Committee of the Red Cross (ICRC) and the adoption of the first Geneva Convention in 1864. Today, the ICRC promotes respect for the 1949 Geneva Conventions and their 1977 Additional Protocols, which afford protection for all victims of war: the wounded, the shipwrecked, prisoners and civilians. Furthermore, they protect the medical and nursing staff who care for the sick and the wounded.

Over the last 15 years, the provision of surgical care for victims of war, whether civilians or combatants, has occupied an important place in the ICRC's activities. Hundreds of existing hospitals in many of the world's conflict zones have received protection and supplies via the ICRC. Large, independent ICRC hospitals have admitted more than 50,000 wounded in the conflicts in Cambodia, Afghanistan, Somalia, Sudan and Chechnya. The experience of setting up and managing these hospitals for war-wounded is presented in this book. The authors are nurses who have held key positions; their accumulated experience is enormous and impressive and their opinions well-founded.

This book is much more than a practical guide. It is a unique product of commitment, clarity of thought and sheer hard work; it has been written at a time when treatment of the wounded is no longer the exclusive domain of military medical services. It should not only be read with attention but also be kept close at hand as a reference work.

Dr Pierre Perrin
Chief Medical Officer
International Committee
of the Red Cross

PREFACE

We decided to put this book together when we realized how much experience we had gained over the past decade working in independent hospitals set up by the International Committee of the Red Cross (ICRC). We noticed that in ICRC hospitals as in other hospitals, the same lessons we had learned were having to be learned by others new to treating war-wounded and to running a hospital under the difficult circumstances that inevitably arise in conflict. Our primary motivation was to help those others avoid the mistakes we made and make sure that they do not have to start from a point of ignorance and confusion as we did. In 1994, we began to record some thoughts; paragraphs became pages and pages became chapters. We hope the result will be of help to anyone who is faced with the task of setting up or running a surgical hospital for war-wounded.

Independent ICRC hospitals have no onward referral; the patients stay until their surgical treatment is complete. There are no specialist surgeons; general surgeons work in accordance with basic surgical principles and, as a matter of policy, with a low level of technology. The patients are nursed by people who have little previous experience of working in a hospital. Defining the “standard” of care required for treating war-wounded is difficult. However, we are sure that the standard attained in ICRC hospitals, the point of reference for everything written here, provides a minimum of acceptable care whatever the circumstances. Hence the concept of “standard lists” of equipment and medicines and “standard procedures”. A team approach to patient management is an absolute necessity for achieving those standards.

The authors

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INTRODUCTION

When war breaks out, any existing health care system is rapidly disrupted and overwhelmed. Resources may be in short supply. Qualified medical and nursing staff may have left or be simply insufficient in numbers. The hospital infrastructure may be damaged. The water supply may be cut off. The power supply may be unreliable. Fuel may be difficult to obtain.

Surgical units are particularly susceptible to disruption because they depend on a basic minimum of infrastructure (secure buildings, water and electricity) expertise in surgery, anaesthesia, nursing and technical matters, an organized system of patient management and the regular provision of supplies. The additional burden of casualties, both military and civilian, arrives just when the hospitals are most likely to be in difficulty; the necessary minimum of infrastructure and expertise is rarely available. Assistance for such hospitals must be considered in terms of both materials and expertise. Both can be supplied by aid agencies. In the absence of any functioning hospital, a new surgical facility has to be set up; this an expensive commitment. The needs are long-term and do not disappear with the end of the fighting.

An independent hospital run by and aid agency employ - and dismiss - its own staff. It has control over the distribution and use of supplies, and can thus ensure accountability. It can also provide free treatment; this reaffirms the role of the hospital as an independent, neutral place where the wounded may be treated in safety whatever their allegiance.

The organizational structure and system of patient management described in this book is that adopted in independent ICRC hospitals. It may seem to be an “ideal recipe”. However, it not only provides for a realistic and achievable standard of care but also constitutes a tried and tested system that works. Details of management structure may differ, but the principle of a standardized, team approach to patient management under clear leadership can be applied to any hospital which admits large numbers of war-wounded. Flexibility of approach is important but, whatever the circumstances, the wounded patients must be managed according to properly applied basic surgical principles. This book is about providing the means for such management.

Medical and nursing staff working in hospitals for war-wounded tend to come from different countries, with variable training and experience. Aid agency staff are also likely to have short contracts; this leads to a rapid turnover of experienced staff. Locally employed staff rarely have nursing experience. This book offers practical advice to the key people (see Chapter 1.3) involved in setting up or running a hospital for war-wounded: the field director of a medical aid agency, the director of an existing hospital, the head nurse, the hospital

administrator, the operating theatre nurse, the surgical ward nurses and the nurse responsible for staff training.

Chapter 1 outlines how to set up a hospital in a difficult and potentially dangerous environment and gives checklists of essential points. Chapter 2 focuses on the administrative details involved in the daily running of the hospital. It covers all aspects of hospital organization, including personnel management, organizing supplies, and running the kitchen, laundry and other support services. Chapter 3 addresses patient management from admission to discharge, nursing care and organizational aspects of triage. Chapter 4 explains how to set up and run the operating theatre. Chapter 5 proposes a framework for a training programme for unqualified staff. The appendices comprise lists of standard materials and drugs.

Although the nursing guidelines focus specifically on the management of war-wounded patients, the general guidelines on hospital infrastructure and organization may be applied to any hospital set up in an emergency or disaster situation.

Chapter 1

SETTING UP THE HOSPITAL

Surgical care for war-wounded requires a combination of a well-organized hospital *infrastructure and adequate expertise*. Both are necessary. A hospital cannot function with only one of these two elements. This applies whether a new hospital is being set up or an existing hospital is being adapted for the new role of treating the wounded.

*The wounded need **access to a safe place** supplied with **water and power** where they can receive **competent surgical treatment** backed up by **good nursing care** within a **well-organized system** which receives **adequate supplies**.*

These conditions apply equally to a hospital set up under canvas in an emergency, an existing hospital adapted for war-wounded or a new surgical hospital established for the specific purpose of treating war-wounded.

Consider

- Time:** How urgent are the needs?
- Finance:** Where are the funds coming from, in the setting-up phase, in the longer term?
- Security:** Where is a safe place for the hospital?
Take into account the nature of the conflict (aerial bombing, shelling, confrontation lines, the presence of anti-personnel mines).
Obtain guarantees of security from all parties to the conflict.
- Access:** Is the hospital easily accessible for patients, staff and supplies?
This may depend on **security**.
- Infrastructure:** Buildings - do they exist? Can they be adapted? Are tents needed?
Water supply - consider quantity, quality and storage. Is there a risk of interruption or contamination? Back-up needed.
Power supply - does it exist? Is it adequate? Independent back-up needed.
Fuel - are sources reliable? Alternatives and back-up needed.
Communications systems - do they exist? Are they reliable?
Is an independent system needed?
- Expertise:** Are trained personnel available locally? Does expertise need to be imported?
- Supplies:** Are supplies available locally? Will they need to be imported?
Are lines of supply secure?

To bring all these essential elements together requires coordination and careful time management. A plan of action (see Fig. 1) provides a strategy for action within a specified time-frame.

PHASE	KEY PERSONNEL	ADDITIONAL PERSONNEL	EQUIPMENT & SUPPLIES	TASKS
1 NEGOTIATE	Medical coordinator/ hospital director	Interpreters	Vehicles Fuel Accommodation Radio/communication	Contact/written agreements with: Ministry of Health Military authorities
AGREEMENT REACHED				
2 LOCATE HOSPITAL	PLUS: Head nurse Hospital administrator Water and sanitation/ construction engineer	PLUS: Drivers	ORDER: Initial medical supplies Special technical material (X-ray, lab., etc.)	ASSESS SITE OR BUILDING FOR: Security Access Construction/sanitation Logistics
HOSPITAL SITE AND/OR BUILDINGS LOCATED/RENTED				
3 INFRASTRUCTURE AND EXPERTISE	PLUS: Operating theatre head nurse Teaching nurse Lab technician X-ray technician Physiotherapist	RECRUIT: Administrative staff Security staff Construction/sanitation staff Special technical staff (X-ray, physio) Lab technician Porters	ORDER/PURCHASE: Construction/sanitation material Hospital furniture Non-medical equipment and furniture Operating theatre and sterilization material Food	CONSTRUCT OR ADAPT BUILDINGS: Power supply Water supply Sanitation system Stores/shelves
INFRASTRUCTURE IN PLACE				
4 ORGANIZE THE SYSTEM	PLUS: Experienced ward nurses (6)	RECRUIT: Local medical/nursing staff SUPPORT STAFF: Porters Kitchen Laundry Sterilization		TEACHING NURSE: gives initial first aid/hygiene courses OPERATING THEATRE NURSE: trains sterilization staff PHYSIOTHERAPIST: trains physio staff WARD NURSES: establish nursing policies/procedures set up wards
BEDS AND EQUIPMENT IN PLACE - SUPPLIES IN PLACE				
5 OPEN THE HOSPITAL	PLUS: Surgeon Anaesthetist		ORDER: Follow-up medical supplies	Open 1st ward (20-25 beds) Start 1st training programme for ward staff
6 EXPAND HOSPITAL CAPACITY	PLUS: Experienced ward nurses			Open 2nd ward Start 2nd training programme for ward staff
MONITOR SITUATION CONSTANTLY - BE PREPARED TO EXPAND HOSPITAL CAPACITY				

Fig.1 Example of a plan of action for setting up a 50-bed surgical hospital.

1.1 PRIORITIES

NEGOTIATION AND INFORMATION

Plans to set up a new hospital must be discussed with everyone concerned. Most important are the Ministry of Health, Ministry of Defence and local military commanders. Existing clinics, first-aid posts and hospitals must be taken into account as they will have an influence on how and which patients reach your hospital. If possible, the proposed hospital should become part of the existing health system; a separate surgical hospital set up specifically to care for the war-wounded may help other health structures concentrate on their routine work without having to divert scarce resources to treat war-wounded.

Early contact with all the parties to the conflict helps ensure the safety of the hospital and makes negotiation easier in the future. Military factors are important. Will all the wounded have access to the hospital? Is the hospital in a strategically important area? Can the hospital staff get to work? Curfews or other restrictions on movement may be in operation.

The local inhabitants should be informed by whatever means possible where the hospital is and why it is being set up, and told that everyone has access to it whatever his or her allegiances in the conflict.

The location of the hospital may also be determined by other factors such as access to water and logistic supply lines.

Consider

Draw up written agreements with the central, local and military authorities to ensure:

- permission to set up the hospital
- clarity on all sides about the role and functioning of the hospital
- security guarantees for the hospital, patients and staff, including an understanding by all parties of the independence, neutrality and impartiality of the hospital and its staff
- access to the hospital for patients, staff and supplies
- permission to employ local staff
- logistic supply lines
- permission to operate communications systems
- permission for expatriate medical personnel to practise

FINANCE

Expenditure is high in the setting-up phase. It is difficult to estimate the real cost of running the hospital in the initial phases until you know the number and pattern of admissions. Make sure there are funds available for what you want to do. Inform your financial donors.

SETTING UP A HOSPITAL IS EXPENSIVE

Consider

Planning phase: Cost of survey/assessment of needs
 Cost of consultations/meetings
 Donor appeals, press releases
 Recruitment of expertise
 Purchase of hospital material
 Transport/logistic set-up
 Administration of planning phase

Setting-up phase: Travel and transport
 Communications systems
 Preparation of hospital infrastructure
 Vehicle fleet
 Recruitment of local expertise/staff
 Preparation of logistic supply lines
 Purchase of locally available supplies
 Installation of material and equipment
 Training of personnel
 Initial running expenses
 Administration of setting-up phase

Running phase: Travel, transport/vehicle fleet
 Communications systems
 Staff salaries
 Rent and insurance for hospital compound and/or buildings
 Electricity/power/fuel
 Maintenance/construction
 Water/sanitation
 Food
 Ongoing purchase/ordering of supplies
 Ongoing donor appeals/press releases
 Administration of running phase

PROTECTING THE HOSPITAL, PATIENTS AND STAFF

The hospital premises must always be respected by the combatants. Without security and protection for the buildings and staff, the hospital will not function.

THE SECURITY OF THE HOSPITAL IS THE PRIMARY CONSIDERATION

There are two main factors involved in the protection of a hospital in time of war:

- the protection given to medical structures and personnel under *international humanitarian law*
- practical measures taken to *physically protect* the buildings, patients and staff from explosions or fighting close to the hospital

Protection under International Humanitarian Law

In situations of **armed conflict**, **international humanitarian law** limits the use of violence and protects those who are not or no longer taking part in the hostilities (civilians, wounded and sick combatants, prisoners of war). The Four Geneva Conventions of 1949 and their two Additional Protocols of 1977 contain rules applicable in international and internal armed conflicts. Almost all States are bound by the Geneva Conventions.

The main aim of humanitarian law is to protect the civilian population from the effects of war. Civilians therefore enjoy a far-reaching immunity. In particular, they must not be attacked and are entitled to receive assistance if they lack essential goods indispensable to their survival, such as foodstuffs and medical supplies.

The International Committee of the Red Cross (ICRC), as a neutral and independent institution, has the task of monitoring the implementation of humanitarian law. In addition, the ICRC brings protection and assistance, without adverse discrimination to the victims of armed conflict and disturbances.

Humanitarian law specifically protects **medical transports** and **civilian and military medical units**, in particular **hospitals**: they must be respected and protected at all times and must not be the object of attack.

All the **wounded and sick and the medical personnel** caring for them must also be respected and protected.

Medical units enjoy neutral status as long as **they are not used to commit acts harmful to the enemy** such as sheltering able-bodied combatants, storing arms and ammunition or being used as military observation posts; otherwise their protection ceases and they become legitimate military targets. This is why **strict controls** must be established in order to safeguard the protected status of medical units and transports.

To enhance the protection of **medical units** and **medical transports**, they should be clearly **marked** by the **red cross** or **red crescent emblem**, of the largest possible size. The emblem is the visible sign of the protection conferred by the Geneva Conventions and their Additional Protocols.

During **armed conflicts**, **only** the following may use the red cross or red crescent emblem as a means of protection:

- the **medical units** of the **armed forces**
- hospitals, other medical units and medical transports that have received **special permission** to use the emblem
- the medical personnel, medical transports and material that a National Red Cross or Red Crescent Society has put at the disposal of the medical service of the armed forces

In order to ensure effective protection in wartime, use of the emblem must be strictly controlled in peacetime.

In **peacetime** the emblem may **only** be used by:

- the **medical services** of the **armed forces**
- National Red Cross or Red Crescent Societies, in order to indicate that persons or goods have a connection with the Society in question (here the emblem must be of small dimensions)
- exceptionally, ambulances and aid stations exclusively assigned to the purpose of giving free treatment to the wounded and sick, with the authorization of a National Society

The ICRC and the International Federation of Red Cross and Red Crescent Societies are authorized to use the emblem for all their activities.

The number of **cases of misuse of the emblem** is unfortunately very high. In peacetime, hospitals, clinics, doctors, pharmacies, ambulances, NGOs and commercial companies tend to use the emblem in order to benefit from its reputation, even though they are **not entitled to do so**. This creates problems, as it clearly **weakens the protective value of the emblem in wartime**.

Any case of **misuse of the emblem** should be **reported** to the relevant National Red Cross or Red Crescent Society, the ICRC or the International Federation of Red Cross and Red Crescent Societies.

PHYSICAL PROTECTION AND SECURITY OF THE HOSPITAL

Taking measures for the physical protection of the hospital makes the patients feel safe and allows the medical staff to carry out their work in a relatively secure environment.

The hospital should not be near military installations, as these might become targets. Be aware that front lines move, and that the nature of the conflict or of the weapons used may change.

All parties should know that the hospital is a neutral area. They should also know that a strict principle is enforced: no weapons or ammunition are allowed in the hospital.

Security guards are needed to keep all entrances to the hospital secure and to apply the “no weapons” rule.



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Fig. 2a It must be made perfectly clear that no weapons can be allowed.



© J. Karlsson - Kabul

Fig. 2b Identification of the hospital by use of a distinctive emblem (in this case the red cross), by using large flags and a sign painted on the roof.

Essential

- Location:** Is the hospital in a safe place?
- Negotiations:** Are all parties to the conflict aware of the existence, purpose and independent status of the hospital?
- Information:** Are all hospital staff aware that their behaviour may affect the security of the hospital?
Are the local population aware of the existence, purpose and independent status of the hospital?
- Identification:** Is the hospital clearly identifiable as a medical facility?
- Use large flags and/or paint the distinctive sign on the exterior walls and the roofs.
 - Illuminate the flags and markings at night.
- Physical protection:** Are the buildings and personnel protected against possible damage from explosions?
- Use sandbags to protect entrances and exits.
 - Cover window glass with adhesive plastic to minimize splintering.
 - Make sure all staff know where the safe places are in case of danger (in shelters or basements, under staircases) and when to use them.
 - Staff should not take unnecessary risks.
- Security:** Security guards must be posted at all entrances/exits.
- Guards check **all** persons entering the hospital to make sure they are not carrying weapons (any weapons found may be left at the entrance in a secure place).
 - Guards are able to speak a common language with all hospital personnel.
- Telephone/short-range radio communication at all entrances/exits.
Patients' entrance should only be wide enough to admit a patient on a stretcher.
- Entrances and exits:** Separate entrances/exits for vehicles and people.
Separate entrances/exits for staff and patients.
Entrances/exits clearly marked.
- Visitors:** Guards record the names of all visitors entering the hospital and the purpose of their visit.

NO WEAPONS ARE ALLOWED IN THE HOSPITAL



Fig. 2c The patients' and visitors' entrance to the ICRC hospital in Kabul. Security guards check all visitors for weapons.

© ICRC/Didier Bregnard - Kabul

COMMUNICATIONS

Communication with the outside by telephone or radio is vital; important security information can be received along with information about casualties, supplies etc. Contact with civil and military authorities must also be maintained.

A short-range radio system enables key people to communicate quickly within the hospital.

Make sure that the equipment is properly maintained and that the people concerned know how to use it.

Consider

- Long range:** Telephone/long-range two-way radio is essential for security, logistics, information exchange.
- Short range:** Telephone/short-range radio for contact with vehicles and ambulances, first-aid posts, other health facilities linked to the hospital. Also for security and to give advance warning of serious casualties or large numbers of patients arriving at the hospital.
- Internal:** Telephone/short-range radio is needed for communication within the hospital.
- Licensing:** All radios and frequencies must be licensed by the appropriate authorities.
- Behaviour:** All messages and conversations by radio should be restricted to professional matters, and transmitted in a language which everyone understands.

LOGISTICS AND TRANSPORT

The transport system for patients, fuel, food, personnel and medical supplies must be reliable. Early planning and attention to detail are the only way to guarantee secure lines of supply. The requirements for vehicles are considered below.

Vehicle requirements

- Types of vehicles:**
- to transport war wounded to the hospital, transfer patients to other health facilities, discharge patients
 - to transport hospital staff to and from work
 - to transport heavy materials or bulk supplies
- Identification:**
- vehicles clearly identifiable as non-military, by means of flags or use of a distinctive sign
- Safety:**
- all vehicles equipped with radio, fire extinguisher, first-aid box, spare tyre, tools
 - regular maintenance of all vehicles by authorized workshop, an independent workshop may have to be set up
 - observation of local traffic regulations is essential (speed restrictions, limits of alcohol consumption)
 - vehicles always parked ready to leave
- Drivers:**
- available day and night
 - valid driving licence (eyesight test) and basic knowledge of mechanics
 - responsible for cleanliness, refuelling, general condition of vehicles
 - refuelling done routinely when tanks are half empty to ensure adequate supply in emergencies
 - responsible for maintaining the vehicles' log-books



© J. Hayward - Khao-I-Dang

Fig. 3 Ambulances and vehicles for transporting staff and supplies in the ICRC compound on the Thai-Cambodian border. Note that all vehicles are clearly marked and are parked in a position allowing them to leave easily and quickly.

1.2 HOSPITAL INFRASTRUCTURE

THE BUILDINGS

Single-storey buildings with solid walls are best. A wall or fence around the perimeter of the hospital compound helps to keep out thieves and the crowds that arrive with an influx of civilian casualties. Security considerations are addressed in Chapter 1.1: Priorities.

The hospital may have to increase its bed capacity very rapidly. The size of the compound should allow for this.

Buildings need heating and ventilation appropriate to the country and climate. Measures to control flies, mosquitoes, cockroaches, rats and mice have to be considered as well.

The building(s) need to be large enough to accommodate the following services:

Medical

Admission room
 Operating theatre
 Intensive nursing ward
 Surgical wards
 Laboratory
 X-ray
 Sterilization
 Nursing administration
 Pharmacy
 Physiotherapy
 Teaching

Non-medical

Administration
 Security
 Transport
 Construction/maintenance
 Kitchen
 Laundry/tailor
 Stores

The surgical wards should be large enough for the expected capacity of the hospital. Calculate approximately 6m^2 for each bed - for example, 50 beds will need 300m^2 of ward space.

The compound should also have enough space for:

Medical

- Triage area
- Additional wards/tents
- Patients’ recreation area

Non-medical

- Vehicle parking lot
- Water storage
- Generator/fuel store
- Medical gases store
- Incinerator/garbage/sharps disposal
- Mortuary

This does not include staff accommodation



© R. Coupland - Kabul

Fig. 4a The ICRC hospital in Kabul, Afghanistan. The buildings are low and the large compound is surrounded by high walls for security.

TENTS

Tents provide a *temporary* solution for a hospital set up for a short-term operation, to provide additional ward space or for the triage area. Tents are not ideal, as they are easily damaged, unstable and difficult to heat in cold weather or keep cool in hot weather. Whenever they are used, tents should always be erected around a solid base, especially if they are to be used for the operating theatre.



© ICRC/D. Landwehr - Quetta

Fig. 4b The compound of the ICRC hospital in Quetta, Pakistan, was large enough to allow space to set up tents for additional surgical wards following an influx of wounded.

WATER AND POWER

Try to avoid dependence on external sources for a constant 24-hour supply of water and electricity; both can easily be disrupted. On-site *generator* and *water storage facilities* are needed as backup.

Approximate water requirements for a surgical hospital

- minimum supply - 100 litres/patient/day (for drinking, washing, cooking)
- average consumption in independent ICRC hospitals - 300 litres/patient/day
- average consumption in hospitals in developed countries - 1,000 litres/patient/day

Approximate power requirements for a surgical hospital

Minimum power requirements for a surgical hospital of 50 beds:

- 100 KVA for essential services only (operating theatre lights, heating or air-conditioning in the operating theatre, sterilization, X-ray, refrigeration, general lighting and power points)
- increase by 1.5-2.0 KVA per bed up to 200 beds
- include extra 20% generator capacity to allow for expansion of activities, emergencies or changing circumstances

THE HOSPITAL WILL NOT FUNCTION WITHOUT WATER AND ELECTRICITY

WASTE DISPOSAL

Proper disposal of solid and non-solid waste avoids health hazards.

Consider

Size of system:	Don't underestimate the size of the waste disposal system needed. It may be difficult or dangerous to increase the capacity of an established system.
Hospital waste:	An efficient incinerator is the safest way of disposing of contaminated solid waste (syringes, dressing materials).
Sharps disposal:	Incineration.
Human waste:	The main sewage system may be damaged, disrupted, non-functional, non-existent. A septic tank may be the best solution.
Waste water:	Large quantities (for example, from the laundry) may need a separate drainage system.
Local culture:	Local habits regarding defecation will influence the type of toilets or latrines constructed.
Environment:	Consider the impact of <ul style="list-style-type: none"> • open burning of solid waste • the use and disposal of plastic material and plastic rubbish bags • potential contamination of water supplies by liquid waste

1.3 PERSONNEL

Needs for *skilled people* are always high in the setting-up phase: the infrastructure must be put in place, the systems of hospital and patient management organized and additional personnel trained.

Experienced professionals are recruited for the key positions; this forms the basis of *expertise*.

As a first step, *general workers* are needed for construction, cleaning, putting up beds, etc. *Additional staff* are required to look after the patients on the wards and to work in the kitchen, laundry, administration and other departments. People capable of performing medical or nursing duties can be identified, recruited and trained at an early stage.

Medical, nursing and other technical staff may be difficult to find. Educated and wealthier people, among them qualified medical personnel, are often the first to leave in times of war. If other hospitals exist, medical and nursing staff should not be recruited from them; these are needed to maintain the normal health services.

Unskilled people may be recruited and trained to fulfil all the necessary roles, especially caring for the patients on the wards (see Chapter 6: Teaching untrained personnel).

KEY PEOPLE

A core group of *qualified and experienced* staff is detailed below. Each of these people must understand and accept his/her role and responsibilities and agree to follow the standard treatment protocols.

TEAMWORK AND COOPERATION ARE ESSENTIAL

Key people needed for a surgical hospital

Hospital director/medical coordinator	Head operating theatre nurse
Head nurse	Nurses in charge of the surgical wards
Hospital administrator	Teaching nurse
Water and sanitation/construction engineer	Physiotherapist
Surgeon(s)	Pharmacist
Anaesthetist(s)	Laboratory technician
	X-ray technician

The *hospital director/medical coordinator* has overall responsibility and maintains the links between the hospital and people and events outside the hospital.

The *hospital administrator* is responsible for all non-medical departments, for budgeting and finance and for the overall administration of the hospital (see Chapter 2: Running the hospital).

The *head nurse* is in charge of all medical departments, is the team leader within the hospital and is in charge of all aspects of patient management (see Chapter 3: Managing the patients).

These three roles may be combined or separate, depending on the size of the hospital.

Different key people are needed at different stages (see Fig.1: Plan of action).

Recruiting expertise in phases

Phase 1	The <i>medical coordinator/hospital director</i> carries out all necessary negotiations with local authorities.
Phase 2	The <i>water and sanitation/construction engineer</i> , the <i>head nurse</i> , the <i>hospital administrator</i> assess and advise on the hospital site and begin recruiting staff (administration and construction staff, drivers, etc.).
Phase 3	Once the site/buildings have been identified, the <i>laboratory and X-ray technicians</i> , the <i>physiotherapist</i> , <i>pharmacist</i> , <i>operating theatre head nurse</i> and <i>teaching nurse</i> are recruited to advise on technical construction matters, begin to order and organize medical and surgical supplies, identify and begin training the additional staff needed.
Phase 4	When the infrastructure is in place, <i>experienced ward nurses</i> are recruited to finish fitting out the wards, organize the system of patient management and help with training.
Phase 5	The <i>surgeon</i> and <i>anaesthetist</i> are recruited.
The hospital opens	The wards are staffed solely by the experienced ward nurses while the initial teaching programme for nursing staff is under way.

ADDITIONAL STAFF

The overall number of additional staff required varies with the capacity of the hospital and the previous experience of these staff. There must be enough to cover all essential departments 24 hours a day, seven days a week.

As a general guide for initial administrative purposes calculate 1.7 employees (medical and non-medical) per bed, excluding the key people. For example, a 50- bed hospital will require 85 additional employees.

Additional staff required for a surgical hospital

Medical

Ward nurses/assistants
 Operating theatre assistants
 Anaesthetic assistants
 Sterilization staff
 Laboratory technicians
 X-ray technicians
 Pharmacy staff
 Physiotherapy staff
 Porters
 Cleaners

Non-medical

Administrative assistants
 Accountant
 Secretaries
 Interpreters (if necessary)
 Purchasing officer
 Storekeepers
 Drivers
 Security guards
 Kitchen staff
 Laundry staff
 Tailoring staff
 Water and sanitation/
 construction workers
 Carpenter
 Electrician

RECRUITMENT

Recruitment and employment is best coordinated by the head nurse and hospital administrator. The same approach must be taken for all departments.

Consider

Set basic standards, for example:

- basic level of education required (literate and numerate)
- ability to speak and write a common language
- willingness to be flexible about working hours
- specific abilities for jobs requiring particular skills

Be aware of cultural constraints:

- male employees may not be able to care for female patients and vice versa
- female employees may not be able to work during the night
- male employees may be under an obligation to do military service

Avoid:

- recruiting qualified medical and nursing staff from existing functional health structures
- recruiting all or the majority of staff from a single ethnic/tribal, religious or family group

1.4 HOSPITAL EQUIPMENT AND SUPPLIES

Hospital equipment and supplies should be kept to essentials. High technology does not transfer well into this situation.

The equipment, whether for the construction of the hospital or for the kitchen, laundry or medical departments, should be simple to install and operate. It should also be easy to maintain and robust enough to survive heavy wear and tear.

SOPHISTICATED EQUIPMENT IS EXPENSIVE AND DIFFICULT TO MAINTAIN

Hospital supplies (food, fuel, medical and non-medical supplies) are best limited to a standard list of items. This facilitates regular resupply, especially in the case of imported items.

STANDARD LISTS

A standard list is a basic, limited list of essential supplies, both medical and non-medical, which corresponds to an appropriate standard of care and the type of activities carried out at the hospital. All items on a standard list should always be available from a central store or reliable supplier.

Adherence to a standard list helps to eliminate requests for and donations of unnecessary or inappropriate supplies, especially medical supplies and drugs.

Standardization provides a simple framework within which resources can be used to maximum effect, promotes continuity in patient care, helps to simplify staff training and makes it easier to introduce new and inexperienced staff into the system.

HOSPITAL EQUIPMENT

Beds, mattresses, bedlinen, chairs, tables, office furniture, kitchen equipment, specialized medical equipment, etc. have to be imported if they cannot be made or purchased locally. It is a false economy not to install, check and maintain them correctly.

Consider

Time: Is it urgent to open the hospital quickly? If so is it quicker to import than make or buy locally?

Cost: Good-quality basic equipment may be expensive, but saves money in the longer term.

Quality: Can equipment of adequate quality be made or purchased locally?

HOSPITAL SUPPLIES

Wherever possible, hospital supplies, both medical and non-medical, should be purchased locally. However, enough *initial supplies* should be available for the hospital to work independently of local possibilities until regular sources are established.

Stocks of all *consumable supplies* should be maintained at a level that allows the normal functioning of the hospital and, in addition, should include an *emergency stock*.

The type of *medical supplies* needed depends on the nature of the hospital's work. Obstetric or paediatric equipment may be needed. Anti-personnel mine injuries consume a lot of dressing material. Patients with burns need specific dressing material and large quantities of infusions. Thus the *standard list* of supplies for the hospital is drawn up according to the required standard of care and specific needs.

Disposable material (pre-sterilized, disposable surgical linen, etc.) may be useful initially; it enables the hospital to begin work as soon as the infrastructure is in place. Avoid dependence on imported disposable supplies.

It is useful to identify different groups of hospital supplies. This simplifies ordering and organization of the stores. The following groups may be helpful:

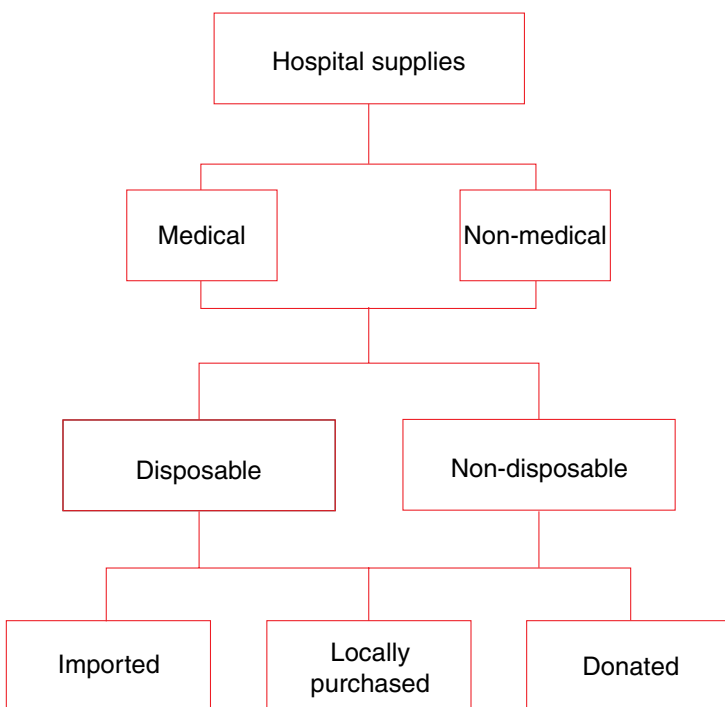


Fig. 5: Groups of hospital equipment and supplies.

Priority checklist:**Non-medical equipment and supplies**

Administration:	Office furniture Office equipment Stationery
Communications:	Radios Telephones Tools and spare parts
Safety and security:	Flags Spotlights Paint Fire extinguishers, water hoses, sand buckets
Vehicles/generators:	Fuel,oil Tools and spare parts
Stores:	Shelves Refrigerators Padlocks
Kitchen:	Dishes, cups and cutlery Cooking pots and utensils Ovens Food and drinks
Laundry/tailor:	Cloth Sewing material Washing, drying, ironing equipment Washing powder/ soap
Waste disposal:	Incinerator Rubbish bins
Water supply:	Reservoirs Pipes Pumps Water purification chemicals/filters, Jerrycans Tools and spare parts
Cleaning:	Bowls Buckets Mops Cloths Brushes Soap/disinfectant

Medical equipment and supplies

Anaesthetic equipment
Bedpans/urinals
Blood bank/laboratory supplies
Dressing material
Gloves
Injection material
Instruments (surgical and for ward use)
Linen (bedsheets, pillows, blankets)
Medical hospital furniture (beds, trolleys, stretchers, etc.)
Orthopaedic equipment (wheelchairs, crutches, etc.)
Sterilization (autoclaves and supplies)
Surgical (operating theatre furniture, disposable surgical supplies)
Surgical linen (drapes, gowns, masks, etc.)
Sutures
X-ray (machine, films, protective clothing, developing equipment, etc.)

Drugs and pharmaceutical supplies

Anaesthetic and related drugs
Analgesics, antipyretics, antiinflammatory
Antiasthmatics
Antibiotics, sulphonamide
Antihistaminics, antiemetics
Cardiovascular drugs
Corticosteroids
Dermatological products
Disinfectants
Diuretics
Eye, nose preparations
Gastrointestinal drugs
Intravenous infusions
Laboratory, blood bank reagents
Obstetric drugs
Spasmolytics
Tranquillizers
Tropical disease drugs, antihelmintics
Vaccines

*(for a list of consumable medical supplies
needed for 100 hospital admissions of
war-wounded see Appendix 1)*

SOURCES OF SUPPLY

The advantages and disadvantages of different sources of supply will have to be considered.

Imported supplies

- Advantages:**
- quality
 - availability
- Disadvantages:**
- cost
- Important:**
- local customs laws and transport regulations must be followed
 - special rules may apply, e.g. for anaesthetic and analgesic drugs, corrosives, highly concentrated solutions
 - transport difficulties may arise, e.g. need to protect boxes from heat or rain, labelling of boxes, necessity of list of contents and proforma invoices, need for forklifts or loaders which may not be available

Locally purchased supplies

- Advantages:**
- availability
 - cost
- Disadvantages:**
- uncertain quality assurance
 - fluctuating price
 - items may suddenly be no longer available
- Important:**
- there may be local regulations about purchase, handling and storage of drugs
 - purchases of drugs and pharmaceutical products should only be made from state registered pharmaceutical traders who can supply certificates of quality

Donated material

- Advantages:**
- no cost
- Disadvantages:**
- donations may be inappropriate, unnecessary or useless
 - unsolicited donations may not conform with the standard lists
 - can create inappropriate demands
- Important:**
- donors should be informed of the standard lists
 - donations should be coordinated with regular supplies to maintain normal stock levels
 - donors should send advice of the agreed consignment in advance and enclose all necessary import documents, a packing list in a common language, a donation certificate and a proforma invoice
 - the recipient of donated material is accountable to the donor for its distribution and use and should report back

WAREHOUSING AND STORAGE

It is easy to underestimate the amount of storage space required. All supplies have to be sorted, checked and prepared for distribution. Bulk supplies need to be stored on pallets so that they are not in direct contact with the floor or walls. The storage capacity needs to be large enough to accommodate a substantial *working stock* and an *emergency stock*. Special and separate storage facilities for food and medical supplies are also needed. A cold chain may be necessary for the transport of vaccines or laboratory supplies.

Consider

Security:	<p>Are storage areas secure? Doors lockable, windows barred?</p> <p>Who needs access? Limit the number of people who have access.</p> <p>Who holds the keys? Where are the spare keys? Who has access to the spare keys?</p> <p>Are guards necessary by day or at night?</p> <p>Special conditions needed for storing fuel/food/medical gases/drugs.</p>
Environment:	<p>Are the storage areas weatherproof (dry, cooled/heated as necessary)?</p> <p>Are the storage areas protected against pests (mice, rats, birds)?</p>
Medical supplies:	<p>Should be stored separately under controlled conditions.</p> <p>Refrigeration for cool items.</p> <p>Separate medical gases store.</p> <p>(See Chapter 2: The hospital pharmacy store.)</p>
Food stores:	<p>Should be stored separately.</p> <p>Special care needed for perishable foodstuffs.</p> <p>Refrigeration required?</p>

In summary: a hospital set up under the conditions outlined in this chapter will be a safe place where the patient who needs a laparotomy can expect to have the operation performed in safety, under general anaesthesia with muscle relaxation and endotracheal intubation, by an experienced surgical team and to recover under 24-hour post-operative nursing supervision.

Chapter 2

RUNNING THE HOSPITAL

2.1 ADMINISTRATION

No hospital can function without proper administration. It is a mistake to underestimate the importance of this. A large hospital will need a full-time administrator who is responsible for all *non-medical* departments. His/her task will include budgeting and handling of money, paying staff, organizing the kitchen, laundry and other non-medical services, and ordering and purchasing supplies. Certain responsibilities may overlap with those of the head nurse, depending on the size of the hospital, and these two key people must work very closely together.

FINANCE AND BOOK-KEEPING

Regular financial checks are necessary to maintain an overview of general needs, minimize running costs, remain within the budget and keep donors informed of projected needs.

Essential

Daily expenses: Keep enough cash in a currency which is locally acceptable to cover regular expenses (purchasing, daily wages, monthly salaries).
Maintain a cash reserve to cover unexpected needs.

Book-keeping: Keep a detailed record of all expenses and transactions, which should be accompanied by signed receipts.
File receipts according to type of expense (fuel, food, salaries, etc.).

Accountability: Account for your expenditure to your organization and to donors on a monthly or yearly basis.

OFFICES AND SECRETARIAT

Plan for office space. The number and size of offices and how they are equipped will depend on the daily workload. The head nurse's office is best located centrally. Administrative offices and archives can be placed further away.

Consider

- Space:**
 - for desks, chairs, storing files, etc., and for receiving visitors
- Environment:**
 - lighting
 - heating/cooling
 - power supply with enough electrical sockets
- Secretarial:**
 - centralized typing/computing facilities
 - internal messenger service
- Security:**
 - personal files of staff kept in locked filing cabinets
 - safe for money and confidential documents
- Computers:**
 - independent power supply
 - current stabilizers may be needed
 - all data should be copied to disks and kept in a safe place

PURCHASING

Buy locally if possible. Identify reliable local traders and suppliers who are able to give competitive prices. Employ one person (a purchasing officer) who is responsible for purchasing and small cash advances; he or she should check current market prices and the availability of materials.

Non-medical material, (stationery, cleaning materials, etc.) should be available in the hospital general store. Set up a system of regular ordering by all hospital departments and make regular checks on the amount and type of items distributed.

INVENTORY

Monthly inventories should be carried out in all stores (especially the pharmacy store), in order to keep an accurate record of stock and to allow timely ordering.

An annual inventory of *all* materials and supplies at the hospital (including beds, medical equipment, pharmacy stock, vehicles, etc.) is important for these reasons: first, to get a clear picture of the quantity and quality of existing materials and supplies (which may be used for insurance purposes); second, to detect theft or loss; and third, to see what new supplies need to be ordered.

2.2 FIRE SAFETY

Any hospital must consider the risk of fire and take preventive measures.

Consider

- Prevention:** Promoting general awareness among the hospital staff of the dangers of fire is the best preventive measure.
 Restrict cigarette smoking in the hospital.
 Make sure that all electrical equipment is properly installed and regularly checked and maintained.
- Preparedness:** Make an emergency plan in case of fire (what to do; how to sound the alarm; location of emergency exits; where to gather, how to evacuate the patients).
 Regular fire practice ensures that all staff know what to do and are able to react quickly and safely.
 Make sure that fire extinguishers of an appropriate type (water, dry powder, etc.) and emergency water sources (hoses and buckets) are carefully positioned and clearly marked.
- Special precautions:** Store fuel and medical gases separately and securely.
 Make sure that there are buckets of sand or dry powder fire extinguishers nearby.

2.3 PERSONNEL MANAGEMENT

Everyone must have a well-defined job in a clear management structure; all staff should know to whom they are responsible. Generally, all staff in medical departments refer to the head nurse and non-medical staff refer to the hospital administrator. The hospital administrator has overall responsibility for employment contracts and salaries of all staff.

Every staff member should carry an identity card (preferably with a photograph) and wear a name tag.

Make sure a list of the employees' addresses and telephone numbers is always available and regularly updated.

Essential

Job descriptions:

- are drawn up before staff are recruited
- outline the main responsibilities of the employee
- are a tool in case of need for disciplinary action

Duty rosters:

- make rosters for all departments
- provide for 24-hour cover where necessary
- allow for public holidays, annual leave, sick leave, compassionate leave
- be sensitive to local customs and culture

Keep records:

- document all leave and absence from duty

Staff rules and regulations should cover:

- disciplinary procedure
- reasons for dismissal
- the date of salary payments
- salary scales, grades and classes of staff
- special leave allowances
- provision of transport to and from work
- provision of uniforms
- food entitlement (on duty)

TERMS OF EMPLOYMENT

Expatriate personnel brought in by an aid agency have their contracts drawn up directly by that agency. Locally recruited staff need a contract of employment with the hospital or employer; initially it may be best to offer daily contracts. Employees can be given a formal long-term contract if their work is satisfactory during an initial trial period. Any contract should be written in a language which the employee understands.

Essential

Legality: Any contract of employment must have a legal basis according to the law of the country where it applies.

Local employment regulations regarding conditions of employment must be taken into account.

- Include:**
- working hours
 - outline of duties
 - outline of responsibilities of employer and employee
 - points specific to individual positions where appropriate
 - length of contract
 - period of notice for termination of contract
 - holiday and leave entitlement
 - salary (and insurance)
 - disciplinary procedure (refer to Staff Rules and Regulations)

Open a personal file for each employee which includes:

- details of contract
- leave taken
- address
- telephone number
- blood group and vaccination status

These files are kept in a safe place and are confidential.

In addition, a system providing medical consultations and care for locally employed staff may need to be set up where the existing health system is unable to cope.

SALARIES

The issue of salaries is the most controversial and difficult area of personnel management. If this is organized carefully from the beginning, problems are avoided later.

Consider

- the local cost of living
- fluctuations in market prices
- the level of responsibility of the employee
- the salaries offered by other organizations; a common approach avoids “competition”
- local official salaries, which are likely to be lower than those offered by aid agencies
- establishing an understandable system of salary scales and increases

**THE ISSUE OF SALARIES IS THE
MOST DIFFICULT AREA OF PERSONNEL MANAGEMENT****STAFF EVALUATION**

An annual and confidential evaluation of an employees’ performance is part of professional development and can be used for salary adjustment. Also, at the end of the contract, it helps the employer to write a letter stating the position held, length of employment and overall performance. This can be used as a letter of reference for future employment.

2.4 MAINTAINING THE HOSPITAL INFRASTRUCTURE

The water and sanitation/construction engineer is one of the *key people* mentioned earlier who is responsible for hospital construction and maintenance. This involves organizing a team of workers, establishing and equipping workshops, ensuring a 24-hour supply of water and power, and checking and servicing hospital equipment.

Consider

Maintenance of:

- the buildings and compound (roof and walls, doors and windows, fences and driveways, entrances/exits)
- the electric power supply and system (mains power line, generators, cables, switches, lamps, etc.)
- medical and non-medical equipment and machines (X-ray machines, suction machines, autoclaves, kitchen ovens, refrigerators, etc.)
- the quantity, quality and distribution of hot and cold running water (mains water pipe, storage reservoirs, water testing, water filter, pipes, taps, sinks, showers/baths, water heating system)
- sanitation and sewage system (septic tanks, sewage pipes, cleaning)
- safe waste disposal (incinerator, sharps and needles, infected materials)
- control of pests and vectors (mice, rats, flies, mosquitoes, etc.)

2.5 THE HOSPITAL KITCHEN

The kitchen must be able to provide two or three properly balanced meals per day. Purchase the food locally, offering contracts to ensure a regular supply; traders need to be informed of the quantity and quality of food required.

Dry food items which are required on a regular basis, are easy to store and have a long shelf life, (rice, pasta, cooking oil, tinned food) should be purchased in bulk; this ensures an adequate supply and constitutes an emergency stock.

A system of meal distribution and collection of used dishes, etc. must be set up. The number of meals required and any special meals should, if possible, be ordered a day in advance.

Essential

Hygiene:

Instruct all kitchen staff in basic hygiene.

Restrict access to the kitchen and food stores.

Ensure a supply of hot and cold running water.

Issue identifiable kitchen uniforms (colour coded), which are frequently washed and changed.

Ensure that kitchen staff regularly examined by a medical officer to ensure that they do not have infectious diseases. This should include regular stool examination for intestinal parasites and diarrhoeal diseases.

Check how food was transported and stored prior to reaching the hospital.

Food quality and quantity:

Introduce quality control for all food used in the hospital kitchen (inspection of meat, proper storage of perishable foodstuffs).

Observe local traditions and habits concerning the preparation, quality, quantity and consumption of food. Food items not normally included in the local diet may not be acceptable.

Food may also be needed for hospital staff when on duty, and for relatives staying in the hospital with patients.

The capacity and organization of the kitchen must be adequate to provide food and drink for 2 or 3 meals per day.

Special diets will be needed (soft/liquid diet, high-protein, high-calorie diets).

(See also Chapter 3.4: Nutrition.)



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Fig. 6a Attention to hygiene is important for the safe preparation of food in the hospital kitchen. Note that staff wear protective clothing.



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Laundry workers should also wear protective clothing. Simple equipment and techniques are best.

Fig. 6b

2.6 THE LAUNDRY AND TAILOR

A surgical hospital uses large quantities of linen for patients' beds, surgical linen for the operating theatre, medical and nursing staff uniforms, kitchen staff uniforms, etc. There must be enough linen available to cater for the daily needs and for emergencies. To provide the quantity required, the hospital must have both a laundry and a tailor workshop.

THE LAUNDRY

Consider

Space: There should be a separate washing room for **dirty laundry**, and a clean area for drying, ironing, folding and storing **clean linen**.

Washing: A constant supply of hot and cold running water, large sinks and a good drainage system are essential.

Before washing, laundry should be thoroughly searched for foreign material, sharps, etc.

Contaminated linen (from the operating theatre) is kept separate and soaked in disinfectant before washing.

Laundry staff should wear protective clothing while washing (thick rubber gloves, aprons, boots).

Washing machines may be considered, but they require constant water pressure and their consumption of electricity is high.

Don't underestimate the hot and cold water consumption of the hospital laundry, or the capacity of the waste water system required.

Drying: Depending on the climate, an indoor heated drying area may be needed. Ensure plenty of space for washing lines and good air circulation.

Drying machines consume a great deal of electricity.

Ironing: Provide large tables for ironing and folding linen, shelves for storage and electric or stove-heated irons as appropriate.

THE TAILOR WORKSHOP

All linen can be made up by the hospital tailor. The material should be purchased locally and in bulk. The tailor's room should be large enough to accommodate a cutting table and sewing machines, and space should be allowed for storing material and maintaining an emergency stock.

The following list outlines the main types of linen which will be needed.

Hospital linen

- uniforms for medical and non-medical staff
- surgical gowns, caps and masks for the operating theatre
- surgical linen (operating drapes)
- gauze compresses for the operating theatre
- bedsheets, pillow-cases, etc.
- pyjamas/gowns for patients

These items may require different kinds of material; for example, white material for bedlinen, strong green/blue pure cotton material for the operating theatre.

2.7 ORGANIZING THE HOSPITAL STORES

It is impossible for the patient to receive proper treatment if the hospital stores are disorganized. Set up a simple system of ordering, storing, and distributing all kinds of supplies at an early stage.

The stores must be easily accessible. Outside working hours, the nurse in charge should keep a key to the store in case additional supplies are needed. A separate store for an emergency stock is helpful.

The storage system, the stock cards and the order forms should all correspond to the categories of non-medical and medical supplies outlined in Chapter 1.4: Hospital supplies.

ORDERING SUPPLIES

After the initial phase in setting up the hospital, all departments will need a regular and uninterrupted supply of materials.

Essential

Place regular orders to suppliers to replenish the central store.

Purchase supplies locally if possible.

Check incoming supplies for damage, loss and expiry dates.

Check that incoming supplies match supplies ordered.

Maintain stock cards for each item, noting:

- incoming date
- outgoing date
- quantities delivered and distributed
- provenance and destination
- balance in stock
- expiry dates

DISTRIBUTING SUPPLIES

Establish an efficient system for supplying all departments. The arrival of requests from all the different departments at the same time should be avoided, as should multiple small requests. All departments should keep enough stocks for two to three days routine work, and for emergencies.

Standard forms should be used for orders and receipts, which should be signed by the person in charge of the department.

THE HOSPITAL PHARMACY STORE

Drugs and medical material need to be stored in special conditions; damage or loss is very serious. The person responsible must be specially trained. This person’s responsibilities also include the maintenance of specialized medical equipment and emergency access to the pharmacy store.

Essential

- Environment:**
 - a constant temperature of 15-25°C (the optimum temperature for storing most drugs)
 - thermometers to check room temperature
 - refrigerators with adjustable temperature, thermometers to check temperature
- Security:**
 - limits on the number of people who have access to the pharmacy
 - lockable cupboards to store narcotic and other drugs liable to misuse
 - power backup for refrigerators in case of supply failure
 - a system of signing for incoming and outgoing supplies
- Stock management:** All supplies arranged in groups according to category — medical supplies, drugs and pharmaceuticals (see Fig. 5).
- Expiry dates:** Check monthly and use supplies with earlier expiry dates first.
- Consumption:**
 - calculate monthly, or average monthly consumption of each item
 - keep records of consumption to establish baseline data of quantities needed
- Emergency stocks:** Keep additional stocks of all items for a specific period e.g., three months or in a specific quantity e.g., for 100 wounded.
- Training:** All pharmacy staff must be trained in all the above points. They should also be familiar with the generic and trade names of all medical supplies and know how to handle drugs and medical supplies.

Chapter 3

MANAGING THE PATIENTS

A hospital for war-wounded has to have the capacity to treat *large numbers of casualties* who require a specific and limited range of surgical operations. The aim is to give each individual appropriate care whether the wounded arrive one by one or in large numbers at once.

The management of war-wounded is based on well-established surgical principles (adequate primary wound excision followed by delayed closure). Likewise, nursing management relies on a framework of *standard hospital policies and procedures* within a *well-organized system* under strong *leadership*; this framework helps medical personnel with different backgrounds, training and experience to work together as a team in difficult or unfamiliar situations.

Such management does not require any special nursing techniques, but rather an *open-minded, flexible, professional attitude and plenty of common sense*.

A standardized approach to the management of patients ensures continuity of care and maintains quality when there is a rapid turnover of staff, whether personnel from aid agencies or inexperienced local employees.

STANDARD PROCEDURES ARE ESSENTIAL

3.1 THE HEAD NURSE: A KEY POSITION

The head nurse leads the hospital team. He or she should have the authority to implement the decisions made by the team and to ensure that hospital policies and standard procedures are followed. This person must be *experienced in the management of war-wounded* and have proven *leadership and management skills*. He or she provides the “memory” of the project, has an overview of all hospital activities and ensures continuity in every aspect of hospital and patient management. Other roles involve acting as a clinical adviser and a point of reference and support for everyone.

Because of this central role, the head nurse must be prepared to delegate administrative tasks.

Main responsibilities of the head nurse

Coordination and communication:

- coordinating - all hospital staff and departments
- organizing - regular meetings so that everyone receives the same information and has a chance to express his/her opinions
- providing a link with other organizations and health structures
- briefing new members of the hospital team about both the hospital and their own specific roles (for this purpose there should be a file containing essential information, policies, procedures and the emergency plan for the hospital)
- ensuring that visitors, and in particular journalists, receive correct information and respect both medical confidentiality and the patients' privacy
- noting important events and changes which lead to major policy decisions (for future reference and evaluation)
- clarifying overlapping responsibilities with the hospital administrator (see Chapter 1.3)
- developing an emergency plan for the hospital together with the hospital administrator

Clinical supervision:

- establishing and maintaining the standardized approach to patient management
- advising less experienced colleagues in the clinical management of patients
- being present on the wards
- keeping professional knowledge up to date and being receptive to new ideas which could improve patient care

**Management
of medical
and nursing staff:**

- anticipating and planning the number of medical and nursing staff needed
- interviewing and selecting new staff
- planning training together with the teaching nurse
- drawing up job descriptions
- maintaining duty rosters, planning annual leave and keeping note of all sick leave and other absence from duty
- discussion and evaluation of professional performance
- recognizing signs of stress in all members of staff

Keeping records:

- collecting information about the number and type of admissions, number of inpatients and length of stay in hospital on a daily, weekly or monthly basis (this indicates trends and helps with planning of staffing levels, ordering supplies and planing for the expansion or contraction of the hospital) this information may be sensitive in an area of armed conflict
- ensuring that all patients' files and X-rays are properly archived following the discharge of the patient and kept in a secure but accessible place in case of readmission or outpatient treatment
- medical files are confidential

3.2 ADMITTING THE PATIENT

A standardized and easily understandable system for admitting individual patients must be set up; this ensures that nothing is overlooked. The system should be flexible enough to cope with the admission of large numbers of wounded (see Chapter 3.5: An influx of wounded and triage).

If the hospital has the specific task of treating war-wounded, *admission criteria* may be needed. Other medical and surgical emergencies should go to other health facilities if they exist. In such a case, all patients should be seen at the hospital entrance by a member of the medical team. Admission criteria are always difficult to establish and maintain and should be flexible to allow for changes in the situation. Everyone should be aware of and adhere to the admission criteria. *Never refuse treatment for true medical or surgical emergencies*; they should be given first aid or emergency treatment and, where possible, referred to the appropriate facility.



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Fig. 7 The presence of other functioning hospitals in Kabul, Afghanistan, allowed the ICRC hospital to restrict admissions to war-wounded.

THE ADMISSION ROOM

The admission room is used for the *examination and initial treatment* of new patients, whether they arrive singly or in large numbers. It may also serve as an area for outpatient treatment or surgical consultations, but during an influx of wounded these activities should be suspended. A list of all empty beds in the hospital allows the nurse in charge of admissions to allocate a bed to each new patient. Thus the number of available beds and the whereabouts of each patient are always known. This becomes increasingly important when large numbers of people are admitted.

Consider

- | | |
|-------------------------|---|
| Where? Close to: | <ul style="list-style-type: none"> • the patients' entrance to the hospital • the operating theatre • the X-ray department • the laboratory • the intensive nursing ward • the triage area |
| How much space? | <ul style="list-style-type: none"> • enough space for 5-7 beds with plenty of space to work and move around each bed (the number of beds corresponds to the number of admissions at which triage is initiated, see Chapter 3.5) • storage space for equipment, medical supplies, blankets • office space/desk for nurses |
| Access: | <ul style="list-style-type: none"> • swing doors wide enough for stretchers and patient trolleys |
| Personnel: | <ul style="list-style-type: none"> • an experienced nurse in charge, assisted by staff specifically trained to receive severely injured patients • porters and cleaners • staff available 24 hours a day to receive patients |
| Facilities: | <ul style="list-style-type: none"> • good lighting, heating/ventilation and running water • lines/ropes for suspending intravenous fluids |

EQUIPMENT AND SUPPLIES FOR ADMITTING PATIENTS

Equipment in the admission room should be kept to *basic essentials* which are replenished immediately after use. Check equipment regularly to ensure that it is working properly and ready for use.

Examination beds should be no wider than a stretcher, have a firm, washable mattress and be of a suitable height (50-60cm) to allow easy assessment and treatment of the patient. Wooden blocks may be used to raise the foot of the bed. There should be enough space around each bed to manoeuvre stretchers and for medical staff to work. Wires or ropes at a height of 2 metres are better than stands for suspension of intravenous infusions.

Lock drugs and valuable equipment in cupboards. The keys must always be available.

Essential equipment and supplies for the admission room

General:

Stretchers
 Examination beds
 Blankets, sheets, pillows
 Portable examination lamp(s) (battery-operated if necessary)
 Flashlights (plus spare batteries)
 Suction machine (foot operated if necessary)
 Suction catheters (different sizes)
 Large scissors for removing patients' clothing or dressings
 Large plastic bags for patients' clothing (with labels)
 Small plastic bags for patients' valuables (with labels)
 Basins and cloths for washing patients
 Bedpans and urinals
 Cleaning equipment (mops, buckets, etc.)
 Containers for sharps disposal
 Rubbish bins (under each bed)
 Trolleys for dressing materials, preparing drugs, etc.
 Sphygmomanometers
 Stethoscopes
 Thermometers

For treatment:

Intravenous fluids (Ringer's lactate)	Compresses - sterile and clean
Plasma expander (macromolecules)	Bandages
Giving sets for intravenous fluids	Adhesive tape
Blood giving sets	Cotton wool
Intravenous cannulae (different sizes)	Splints
Syringes/tubes for collecting blood samples	Plaster of Paris
Syringes for drugs	Vaseline gauze
Needles	Triangular bandages
Nasogastric tubes (different sizes)	Surgical blades
Urine catheters (different sizes)	Antibiotics - intravenous and oral
Urine bags	Analgesics - intravenous/ intramuscular and oral
Artery forceps/tubing clamps	Tetanus Toxoid
Thoracic drains (different sizes)	Human antitetanus immunoglobulin
Chest drain bottles, tubing and Heimlich valves	Water for injection
Gloves - latex disposable and surgical sterile	Skin-cleaning disinfectant
Kidney dishes, forceps, disinfectant for dressings	

In addition, trays may be prepared with equipment ready for the following procedures:

- intubation and resuscitation
- insertion of urinary catheters and nasogastric tubes
- insertion of chest drains

Advance preparation of individual patient kits for initial treatment ensures that everything is at hand when needed.

Individual patient kit

A small washable plastic tray or basket containing:

- a selection of intravenous cannulae (2 of each size)
- adhesive tape pre-cut to suitable lengths
- tubes/syringes for blood samples
- tourniquet for venepuncture
- ringer's lactate 1,000ml
- giving set for intravenous fluids



Fig. 8 An individual patient kit (old X-ray film is ideal for fixing pre-cut lengths of adhesive tape).

ADMITTING THE INDIVIDUAL PATIENT


Examine and assess all patients on arrival in the admission room. Observe the patient's general condition, check **A**irway, **B**reathing and **C**irculation, and then make a systematic, thorough examination.

The *admission sheet* (see Fig. 9a and inside back cover) is a useful tool to ensure that all details of the patient's condition, history and initial treatment are documented. It covers essential investigations, treatment, operation and post-operative orders for the first 24 hours.

Fig. 9a The admission sheet used in ICRC hospitals.

to be completed by the person admitting the patient

admission number the same on all documents relating to the patient



NAME: *Khaja Mohammed*
COMING FROM: *Village A*

DATE: *5.7.96* TIME: *14⁰⁰*

TIME SINCE INJURY: *2 days*

GENERAL CONDITION:

PULSE: *90* BP: *110* RESP: *25* TEMP: *38°*

ANTIBIOTICS: *Penicillin Omega ✓* ~~PTS/ANATOXAL:~~

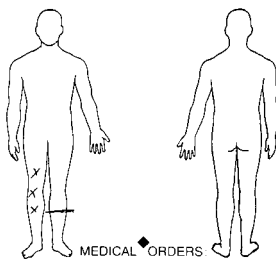
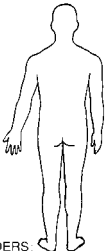
◆ MEDICAL ASSESSMENT

*Traumatic amputation @ foot
multiple small wounds @ leg*

Hb: *11.5*
Hct:
X match:

NUMBER: *1908*
MALE/FEMALE AGE: *68*

GSW: (M) SHELL: BOMB: BURNS: OTHER:

MEDICAL ◆ ORDERS

IV fluids: *1,000 ml Ringier lactate*
NPO from: *10 am*

TRIAGE: I- Immediate surgery II- No surgery III- Wait for surgery

◆ OPERATION NOTE

◆ POST OPERATIVE INSTRUCTIONS

Antibiotics:

to stop:
Position Physio / drains / traction

By mouth: Food / Fluids / Nil

Other:

Next in OT:

◆ PENETRATING WOUND SCORE ◆ ◆ OTHER INFORMATION

E	<input type="checkbox"/>	X	<input type="checkbox"/>	C	<input type="checkbox"/>	F	<input type="checkbox"/>	V	<input type="checkbox"/>	M	<input type="checkbox"/>
E	<input type="checkbox"/>	X	<input type="checkbox"/>	C	<input type="checkbox"/>	F	<input type="checkbox"/>	V	<input type="checkbox"/>	M	<input type="checkbox"/>

to be completed by the surgeon following initial surgery

to be completed by the surgeon if using the Red Cross wound classification (see Further reading: *The Red Cross wound classification*)

The following standardized, systematic admission procedure can be applied to any patient:

Examine the patient

First aid:

Check the airway.

Patients presenting with injuries to the head, face or neck may arrive fully conscious and should remain in the position in which they feel most comfortable - often sitting up or kneeling.

Check the breathing.

Control haemorrhage.

Look for wounds:

Turn the patient over and examine the back and both sides of the body.

Small penetrating wounds can easily be overlooked.

Assess the wounds:

Check all existing dressings.

Pressure dressings, those on traumatically amputated limbs or very large wounds may be left in place, as the extent of injury and the necessity for operation are evident.

If the patient's condition permits and there is no active bleeding, remove the dressings to allow a careful assessment of the wounds.

Assess level of consciousness in head injuries.

Feel for surgical emphysema in chest and neck injuries.

Note abdominal distension or tenderness in injuries of the abdomen, chest or buttocks.

Check for spinal cord injury: Ask the patient to move his/her toes.

Check distal pulses on injured limbs.

Check for tourniquets

on injured limbs:

The decision to remove a tourniquet or to leave it in place depends on the patient's condition, how long the tourniquet has been in place and its position. The removal of a tourniquet is often best done in the operating theatre under controlled conditions.

Note all obvious fractures or limb deformities.

**REMOVE ALL CLOTHING
AND EXAMINE THE WHOLE PATIENT**

Take a history

Identify : Record the patient's name, age, sex and any other relevant information (father's name, address or referral from another health structure).

Type of injury: Note the cause of the injury, whether by bullet, metallic fragments, or blast from bombs or mines,(patients do not always know what caused their injuries).

Time since injury: This is important because it influences surgical management. The longer the delay between injury and surgery, the greater risk of complications.

Ask the patient when he/she last ate or drank:

If this cannot be determined accurately, presume that it was just before the time of injury.

NOTE ALL INFORMATION ON THE ADMISSION SHEET

Initiate treatment**Establish intravenous access:**

Insert a large-bore intravenous cannula and start an infusion of Ringer's lactate (write the number of the first or subsequent units of infusion on the bottle with a marker pen).

Take blood for haematocrit/haemoglobin:

Carry out grouping and crossmatching if necessary.

Give benzylpenicillin 5 million units intravenously:

This may be given directly in the infusion - write the drug and dose on the infusion bottle (paediatric doses are calculated according to the age and weight of the patient).

Give tetanus toxoid:

Presume that the population is unvaccinated unless there is clear evidence to the contrary. Start a course of tetanus vaccination. Antitetanus human immunoglobulin (500 IU) may be given as prophylaxis to patients with penetrating injuries more than 24 hours old. Antitetanus human immunoglobulin 6,000 IU should be given as initial treatment if clinical signs of tetanus are present.

Give pain relief:

Following surgical assessment.

Re-dress wounds and splint fractures:

Following initial inspection, wounds are covered by bulky, dry gauze and bandages and any fractures are immobilised with splints prior to transfer of the patient to the X-ray department or operating theatre.

Consider X-rays:

Not all patients need X-ray examination. Common sense should be applied; if in doubt, wait for the surgical assessment. Patients with abdominal, chest or head injuries should be X-rayed.

Monitor vital signs:

Pulse, respiration, blood pressure and temperature.

Keep the patient nil by mouth prior to surgery.

NOTE ALL TREATMENT GIVEN AND INVESTIGATIONS ORDERED ON THE ADMISSION SHEET

Inform

The surgical team: The surgeon and anaesthetist should examine and assess the patient before surgery.

The head operating theatre nurse needs to plan the inclusion of any new patients on the operating list.

The ward: Allocate a bed and make sure that the nurses are prepared to receive the patient post-operatively.

**MONITOR AND REASSESS THE PATIENT'S
CONDITION REGULARLY**

All the above can be done by an experienced nurse. A surgeon's assessment is helpful before the patient goes to the operating theatre. In any event, sending patients who do not need surgery to the operating theatre should be avoided.

Wounded patients, especially those who have been injured by anti-personnel mines, usually arrive covered with mud, dust and other material. If the patient's condition allows, and if there is time before transfer to the operating theatre, he/she should be washed and be provided with clean clothing or sheets. Otherwise this can be done in the operating theatre itself.

Keep a patient's clothing and personal property in a labelled bag which is transferred to the ward with the patient. Valuable items (money, jewellery, etc.) are checked by two people, sealed in a small bag labelled with the patient's name and admission number and kept in a safe place until requested by the patient or returned to him/her on discharge.

PATIENTS' RECORDS AND DOCUMENTATION

Keep an *admission book* (see Fig. 9b) which contains important details on every patient admitted to the hospital, and thus constitutes a centralized record of hospital activities. The admission book may contain information which is considered to be of military significance (for example, the provenance and names of patients); the information it contains is sensitive and is therefore is *confidential*.

Each individual patient is given an *admission number*. This number should be noted on the admission sheet and used on all documents relating to that patient (X-ray forms and X-rays, laboratory requests and results, operation/anaesthetic notes, nursing notes and discharge card).

For each newly admitted patient, open an *individual file* in which all documents relating to the admission and subsequent treatment of the patient are kept and which accompanies the patient whenever he/she moves from one department or ward to another .

If a patient is *readmitted* at a later date, the original file can be found in the archives and the same number used.

PATIENT FLOW

The patients should be moved out of the admission room as soon as possible so that there is always space for new arrivals. As soon as the initial assessment and treatment are completed, transfer the patient directly to the operating theatre or a ward or to the intensive nursing unit to wait for surgery. Those with very minor injuries can be sent home.

Severely injured patients (especially those with abdominal, chest or head injuries) may be admitted to the intensive nursing unit for close observation before or after surgery (see Chapter 3.4: The intensive nursing ward).

Continuity of care is ensured if there is a formal hand over of documents and information each time the patient is transferred from one area to another.

DATE	TIME	PATIENT NUMBER	NAME	AGE	SEX	DISCHARGE / DEATH	DIAGNOSIS WITH AETIOLOGY	Time since injury	REMARKS	From
5/7	14 ⁰⁰	1908	Khoja Mohammed	68	M	1.8.96	M.L. Traumatic amp @ foot.	2 days		Village A
5/7	19 ³⁰	1909	Abdul Satar	18	M	10.9.96	G.S.W # @ femur	6 hours		Village B
6/7	8 ⁰⁰	1910	Abdul Rasul	60	M	20.7.96	gsw Chest	1 hour		City Centre
6/7	9 ¹⁵	1911	Shikiba	11	F	26.7.96	S.I. @ toe @ arm.	30 min		City Centre
6/7	"	1912	Suraya	2	F	26.7.96	S.I. both arms	30 min		"
6/7	"	1913	Saed Rahim	8	M	15.7.96	S.I. @ leg.	30 min		"
6/7	"	1914	Hanya	22	F	Did 7.7.96	S.I. Face + neck.	30 min		"
6/7	"	1915	Mariam	7	F	13.7.96	S.I. leg.	30 min		"
6/7	"	1916	Mohammed Jan	60	M	14.7.96	S.I. @ arm.	30 min		"
6/7	"	1917	Mohammed Rassem	52	M	13.7.96	S.I. Chest	30 min		"
6/7	9 ⁴⁵	1918	Fatima	5	F	11.7.96	S.I. Skull	15 min		"
6/7	"	1919	Regum	26	F	25.7.96	S.I. abdomen.	15 min		"

Fig. 9b Patients' details entered in the admission book. Note that the time since injury and the provenance of the patients has been added here as this information was of particular interest in the context.

3.3 MANAGING THE WARDS

THE NURSE IN CHARGE OF THE WARD

The nurse in charge of the surgical ward *may be the only person on the ward with previous nursing experience*; he or she is responsible for the daily management of the patients. This requires *teamwork* and is where *standard procedures and guidelines* are most useful. The nurse in charge may not often be involved with direct “hands-on” nursing except in a teaching capacity.

The responsibilities of the nurse in charge include:

- organization and clinical supervision of inexperienced staff with a practical approach to maintaining standards of care
- practical bedside teaching and reinforcement of what has been learnt in the classroom (see Chapter 5)
- organization of the ward routines, in particular:
 - ward rounds
 - operating lists
 - distribution of drugs
 - visiting times
 - collection of laboratory samples
 - discharge of patients
 - ordering and delivery of supplies
 - duty rosters

ORGANIZING THE WORKLOAD

Make the best use of experienced and inexperienced nurses by organizing them into small teams of nurses which are responsible for a selected group of patients. These teams should have a more experienced person as a team leader.

Team leaders *plan the daily care* of the patients and make sure that specific medical orders are followed. This includes pre- and post-operative care, diet, physiotherapy, special care for patients confined to bed, fluid balance, and specific dressings (e.g., removal of sutures). All nurses should be able to give an accurate report on changes in the patients’ condition at the end of their shift.

Team leaders with experience may take over certain responsibilities from the nurse in charge of the ward, (e.g., preparation of medicines, informal doctors’ rounds).

Ward rounds

- When?**
- ideally in the morning before starting on the routine operating list
- Who?**
- everyone directly involved with patient care
 - surgeon, head nurse, nurse in charge of the ward, nurses responsible for direct patient care, physiotherapist, operating theatre nurse
- Why?**
- in the intensive nursing unit, include the anaesthetist
 - to exchange essential information with the patient about his/her condition and progress, operations planned, drugs ordered, physiotherapy treatment, diet
 - an ideal opportunity for informal teaching, everyone should be encouraged to contribute and ask questions
 - instructions must be documented and clearly understood

COMMUNICATE INSTRUCTIONS — WRITE DOWN ORDERS



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Fig. 10 Regular doctors' rounds of the surgical wards are an opportunity to exchange information and plan treatment and for informal teaching.



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Fig. 11 Important information about the daily care of the patient is easily accessible if it is written on a white board above the patient's bed (here is a reminder that the patient may be discharged). In a tent hospital it is more practical to hang charts and nursing information at the foot of the bed.

KEEPING PATIENTS' FILES

Document all information regarding the condition and management of each patient in their individual file.

Essential

The individual patient's file:

- contains all documents concerning the individual patient, laboratory results, etc.
- includes the admission sheet (a record of the initial assessment on admission, surgical procedure, postoperative orders for 24 hours after admission)
- medical orders given after the initial 24 hours
- is kept by the patient's bed

Nursing notes:

- describe the daily nursing care of the patient, treatments ordered and carried out, diet and any special care
- are kept centrally in the ward, where it is easier for the nurse in charge to plan the daily activities
- are updated regularly following ward rounds and surgical interventions
- must be kept in a way which makes them easy to transfer with the patient to another ward (this may have to be done quickly during an influx of wounded)

Record of drugs:

- a file detailing **drugs ordered** may be kept centrally on the ward where drugs are prepared
- a chart for recording **drugs given** is kept by each patient's bed

Chart:

- for recording patient's temperature, pulse, respiration and blood pressure plus any other essential information
- kept by the patient's bedside

When the patient is discharged, the admission book is updated with the date of discharge and the individual file is archived.

MEDICAL RECORDS SHOULD NEVER BE DESTROYED

3.4 NURSING THE PATIENT

Most war-wounded were young and fit before injury. Their recovery from surgery, therefore, is usually rapid and uncomplicated as long as there is a safe and clean environment, food and nursing care. The standardized treatment guidelines described on the following pages are the basis of this nursing care. In addition, there are some specific points relating to the treatment and care of patients with commonly seen injuries.

WARD AND PATIENT HYGIENE

Essential

- Daily cleaning:** Wards are swept clean prior to ward rounds and dressings, and again after the morning routines.
- Leftover food is removed promptly after meals.
- Teach patients relatives and visitors to help keep bed areas clean.
- Monthly cleaning:** Organize a regular monthly cleaning programme for each ward, with the walls, ceilings and all furniture being thoroughly washed.
- Cleaners:** Ward cleaning is more effective if the cleaning staff are motivated and understand the importance of their job.
- Rubbish:** Rubbish containers are covered to control flies and are emptied regularly during the day.
- Handwashing:** Handwashing facilities must be available and easily accessible for everyone to use.
- Running water for handwashing may not be available. Basins containing a dilute solution of an appropriate disinfectant provide an acceptable alternative. The disinfectant solution and hand towels must be changed at least once a day.
- Patients' hygiene:** Showers, baths and washing facilities for patients confined to bed must be available and conform to local customs.
- Provide a good supply of clean bedlinen, and proper facilities for emptying of bedpans and urinals.
- Discourage unhygienic behaviour (e.g., spitting).
- Staff hygiene:** The personal hygiene of all hospital staff must be of a high standard.
- All hospital staff need training in the basics of hygiene.
- Uniforms are washed and changed regularly.

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Fig. 12a The monthly major clean of the wards and operating theatre also provides a good opportunity for a regular maintenance check and to carry out small repairs.

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Fig. 12b Communal showers for patients may be acceptable in some cultures.

NUTRITION

If the patients do not eat well, their wounds will not heal. The nutritional needs of the majority of patients are adequately covered by the guidelines for protein/energy requirements and the balanced diet outlined in Figs. 13 and 14, most of the patients falling within the “mild” category. This forms the basis of regular meals prepared by the hospital kitchen.

However, patients who have undergone major surgery for serious wounds, those with extensive burns and those who develop complications may lose weight rapidly; and unless this is corrected, their recovery will be slower and more difficult.

The course of events

Trauma and surgery do modify nutritional physiology, the metabolism passing through three phases.

Phase 1 - the “ebb” phase:

- starts immediately after trauma or the onset of surgery, the main concern being to maintain blood volume (glycogen is used as an immediate source of energy)
- does not last longer than 6-18 hours, even after severe injury
- the patient **cannot use** high-energy feeding during this phase, so **give fluids, dilute enteral feeding solutions or a light diet**, as tolerated by the patient

Phase 2 - the “flow” phase:

- follows the “ebb” phase
- is characterized by an increase in energy requirements (met by use of the fat tissue and the protein of the skeletal muscle)
- may last for up to 5 days following minor or elective surgery, or for much longer (months) if there are complications
- whatever nutritional support is given, it can never match the loss of protein from the muscles; thus weight loss must occur, and is sometimes very fast
- at this stage, the patient **can use** high-energy feeding (this is also when it is most needed), and weight loss can be considerably reduced by adequate nutritional support
- if the patient can eat normal meals, **give a balanced diet calculated according to the guidelines for protein/energy requirements shown in Figs 13 and 14** (tube feeding may be necessary for patients unable to tolerate a normal diet)
- **the aim of nutritional support is to lessen the effect of catabolism and thus lessen weight loss**

Phase 3 - the

- “anabolic” phase:**
- begins when the wounds are closed and fractures or burns are healing
 - the degradation of protein from skeletal muscle is outweighed by the synthesis of new protein; thus the patient is able to regain weight
 - during this phase, the diet described in Fig.14 allows for fast nutritional recovery
 - **the aim of nutritional support is to promote the synthesis of new protein for wound healing and for the patient to regain lost weight**

The nutritional needs of patients following trauma and surgery can be classified according to the severity of their wounds and the extent of surgery. Fig. 13 gives guidelines for the nutritional needs of a 70 kg adult lying in bed with proper thermal comfort (cold or fever) and for children less than 12 years old under the same conditions. Children have a higher energy requirement per kilogramme per day than adults, and are less likely to tolerate bulk food.

Patients with minor wounds need little encouragement to eat as long as the content and frequency of the meals is compatible with local eating habits.

The patient who continues to lose weight despite the best high-energy feeding probably needs further surgical intervention and improved postoperative care.

Consider

Special diets: A range of special diets including high protein (15-20 % of caloric intake), high-calorie and soft or liquid diets for tube feeding should be available.

Intestinal worms: If these are known to be a problem, consider systematic deworming of all patients.

Vitamin and mineral supplements: If there has been severe weight loss, these may be given during the anabolic phase, according to recommended daily intake.

Intravenous feeding: This may be inappropriate in the context as it requires a high level of nursing expertise and laboratory monitoring, is expensive and can be dangerous if not properly supervised.

It may be safer and easier to give the patient adequate oral or IV fluids only for a few days, and not to be too concerned if the patient loses a few kilos, before starting enteral feeding by nasogastric tube or gastrostomy.

SEVERITY OF INJURY	TYPE OF INJURY/SURGERY	PROTEIN REQUIREMENTS		ENERGY REQUIREMENTS	
		Adults gm/day	Children (<12 years) gm/kg/day	Adults kcal/day	Children (<12 years) kcal/kg/day
NO TRAUMA/SURGERY	NONE	50	1	2,200	90
MILD (THIS COVERS THE MAJORITY OF PATIENTS)	MINOR OR ELECTIVE SURGERY, MINOR INFECTION	65	1.3	2,600	110
MODERATE	MAJOR INJURY AND SURGERY, SEVERE SEPSIS	100	2	3,300	140
SEVERE	MAJOR BURNS (>30% BODY SURFACE)	150	3	4,400	180

Fig. 13 Table of protein/energy requirements according to severity of injury.

Fig. 14 Table showing the composition of a balanced diet according to protein/energy requirements and severity of injury.

TYPE OF FOOD	MILD INJURY		MODERATE INJURY		SEVERE INJURY	
	GM/DAY	KCAL/DAY	GM/DAY	KCAL/DAY	GM/DAY	KCAL/DAY
BREAD	100	250	100	250	100	250
CEREALS	150	525	150	525	150	525
NUTS	100	650	150	975	200	1,300
MEAT	100	225	100	225	100	225
VEGETABLES	150	75	150	75	150	75
FRUITS	150	75	150	75	150	75
LEGUMES	100	340	100	340	100	340
MILK (LIQUID)	*500	340	*1,000	680	**1,500	1,500
OIL	20	180	20	180	20	180
SALT	10					
TOTAL KCAL¹		2,660		3,325		4,470

* Normal cow's milk ** High-energy milk for therapeutic feeding: 100 kcal/100 ml.

WOUND MANAGEMENT

The three basic principles of wound management practised in ICRC hospitals are:

- adequate surgical wound excision
- leaving the wound open under a secure dressing which is left undisturbed
- delayed wound closure (suture or skin graft)

Surgical management by these principles is *safe and effective*. It prevents *serious infective complications*, permits *early wound closure* and favours *rapid recovery*. It also limits the number of dressings required and provides a straightforward routine for nursing care.

Wound dressings

In the operating theatre: The dressing applied after surgery is a **single layer of dry gauze**, covered by a **bulky absorbent dressing** made of fluffed-up gauze (and cotton wool if necessary) and held in place by a **loose crepe bandage**. It is best applied by the surgeon.

This dressing should remain undisturbed until delayed closure.

With large limb wounds, the limb should be immobilized with a plaster of Paris backslab.

The **aim** of the dressing is to **absorb the blood and serum** which exudes from the raw surface of the wound.

On the ward: Leave the dressings **undisturbed** until the patient is taken back to the operating theatre for **delayed wound closure**.

During this period, if excessive blood or serum shows through the dressing, the outer dressing only should be removed and replaced with a bigger and bulkier dressing.

The gauze in contact with the wound surface is never disturbed.

Good signs: When left undisturbed on a clean wound, the **wound dressing is dry**, even if it appears to be soiled.

**THERE IS NO NEED TO LOOK ROUTINELY
AT THE WOUND BETWEEN INITIAL SURGERY
AND DELAYED CLOSURE**

The *general condition* of the patient indicates if there is a problem with the wound.

Indications of possible wound infection:

- raised temperature
- tachycardia
- excessive pain and tenderness around or proximal to the wound
- offensive (sickly, slightly pungent) smell
- excessive and continued discharge from the wound leaving the dressings wet

If these signs are present, the surgeon should decide whether the patient is to be *taken back to the operating theatre and anaesthetized* for inspection of the wound and re-operation.

**OBSERVE THE PATIENT
FOR GENERAL SIGNS OF INFECTION**

Following delayed suture or skin graft, there is no need to inspect the wound for five days at least; the patient is observed as before for signs of possible infection.

This dressing policy:

- reduces the risk of cross-infection
- avoids disturbing the healing process of the wound
- avoids unnecessary, painful procedures
- saves nursing time
- economizes limited material resources

Wounds which have been sutured before the patient reaches hospital should be assessed by the surgeon. These sutures must be removed, usually along with correct wound excision, in the operating theatre.

While most wounds can be managed successfully following the basic principles outlined above, there will always be some which do not follow this straightforward course. When several days have elapsed between injury and arrival in hospital, if the patient has a poor nutritional status or his/her wounds have become infected before initial surgery, an extended period of ward dressings may be needed before the wound is clean enough for closure or skin grafting.



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Fig. 15a A patient with a bullet wound of the left thigh with fractured femur five days after the initial wound excision and insertion of skeletal traction. The dressings have been taken down for the first time in the operating theatre with the patient under anaesthesia. Note that the original dressings are soiled but dry and that the wounds are clean. Delayed closure was carried out by suturing and skin grafting at this time.

Fig. 15b Five days after delayed primary closure the dressings have been opened for the first time. This has been done on the surgical ward. The wounds are clean and dry and need only a light, dry dressing which can remain in place until the sutures are removed (after a further 5-7 days).



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Dressing techniques and material should be standardized and kept as simple as possible. The technique of physically cleaning the wound is generally more effective than the use of a variety of antiseptic solutions which often need careful preparation and may produce allergies.

Sugar dressings

In infected cavity wounds with a large volume of exudate and in which the surgeon cannot excise any more dead tissue, apply sugar dressings daily:

- rinse the wound thoroughly with normal saline solution
- fill the cavity with sugar and cover with a dry dressing
- leave this in place for 24 hours

Repeat this every day; most wounds respond readily with rapid ingrowth of granulation tissue and a lessening of exudate.

POST-OPERATIVE NURSING

Nursing care of war-wounded in the immediate post-operative period involves *observation* until the patient has recovered from anaesthesia, routine basic monitoring, *correct positioning, pain relief and specific care of the wound, drains, catheters, etc.* This is no different from any other type of post-operative surgical care.

Ketamine anaesthesia is commonly used. In combination with a benzodiazepine, Ketamine is a safe and effective anaesthetic agent. It makes a normovolaemic patient hypertensive. Moving, talking and even shouting are not uncommon during recovery.

Spinal anaesthesia is often used for lower limb injuries. In recovery, patients should be nursed completely flat until sensation in the lower limbs returns and urine is passed.

Porters and inexperienced nursing staff should be trained to position post-operative patients on their sides, especially on stretchers or trolleys.

In ICRC hospitals, it has not always been found necessary to provide a special post-anaesthetic recovery area. Patients having had ketamine or spinal anaesthesia can be sent directly back to the surgical wards. Following general anaesthesia with intubation and muscle relaxation, a short recovery period in the operating theatre is needed before transfer to the intensive nursing ward.

THE INTENSIVE NURSING WARD

A special ward is needed for patients with serious multiple injuries, abdominal injuries, chest or head injuries, serious burns or hypovolaemia, and those recovering from general anaesthesia. *Close supervision and a higher level of nursing skills* are required.

The intensive nursing ward should be close to the admission room and operating theatre; it can be used for pre-operative resuscitation.

Ten per cent of patients require this intensive nursing care. Thus, if the bed capacity of the hospital has to be increased, additional beds must be provided for the intensive nursing unit.

Intensive nursing means more nurses per patient, including more experienced staff who are trained to look after the seriously ill. The equipment needed for an intensive nursing ward does not differ greatly from that used on the general surgical wards. *Ventilators and sophisticated monitoring equipment are not appropriate* unless they are used and supervised by trained professionals and can be properly maintained.

At least once a day, the surgeon and anaesthetist should see their patients on the intensive nursing ward and discuss management with the nurses and physiotherapist.

LIMB INJURIES

The majority of war-wounded have injuries of limbs. These may be small soft-tissue wounds, or may involve extensive tissue loss with fractures and vascular, tendon or nerve damage.

Surgical and nursing management of limb injuries centres on preventing infective complications and achieving skin closure together with the *restoration of as much limb function as possible*.

Admitting a patient with an injured limb

(in addition to the routine admission procedure - see pp. 46-50)

Check:

- for obvious deformities of the limbs
- for peripheral pulses
(the absence of pulses distal to the wound may indicate vascular injury and therefore the need for urgent surgery)
- the colour, warmth, movement and sensation of the limbs (compare the wounded limb with the undamaged limb)

Immobilize fractures:

- maintain the limb in a straight position if possible

Consider X-rays:

- X-rays may or may not be necessary (X-rays are important for the continuing care of the patient, but may not be needed for the initial assessment and surgery especially when there is a large influx of wounded)

Following assessment and initial surgery, instructions for post-operative management should be clearly written on the admission sheet by the surgeon. These include positioning of the limb, physiotherapy and any other special orders. The *colour, warmth, movement and distal pulses* of the wounded limb should be checked regularly.

Initial immobilization of fractures is best achieved by *plaster of Paris backslabs* or skeletal traction. Studies have shown that traction is the most appropriate method for immobilizing femur fractures, while external fixation should be reserved for lower tibia fractures.

Fractures of the humerus are best managed by a collar and cuff (a form of traction); this may be more comfortable used in conjunction with a plaster of Paris backslab.

Plaster of Paris (POP)

Backslabs may be used initially to immobilize fractures of limbs following excision of the wound. Complete POP cylinders may then be applied once the wound is closed.

Train staff to check warmth, colour, movement and sensation of limbs following application of POP.

Check the plaster daily to make sure that it is still in good condition (not weakened or broken).

Advantages:

- simple to apply (but this must be done correctly)
- allows for early mobilization of the patient
- promotes rapid callus formation

Disadvantages:

- limits access to the wound
- restricts mobilisation of the joints adjacent to the fracture

Traction

Simple traction for a fractured femur can be achieved by elevating the limb on a traction frame (see Figs. 16 a, b, c), on which the limb is well padded and supported, with the foot of the bed elevated to provide counter-traction.

Careful supervision and systematic daily checking ensures that correct position and alignment are maintained.

If skeletal traction is used, care should be taken to prevent the introduction of infection at the site of the Steinmann pin.

Skin traction is rarely used but may be appropriate where weights of 5 kg or less are applied. It is more suitable for children. Pressure on the skin and blisters can be avoided by careful application. Be aware of sensitivity to the traction strapping.

Physiotherapy with passive exercises should be started as soon as possible to prevent muscle wasting, foot drop, stiffening of joints.

A “monkey pole” should be fitted to the bed so that the patient can lift him/herself up without help.

Sandbags or plastic bottles of intravenous infusion can be used for weights.

Advantages:

- a simple and efficient way of immobilizing fractures, especially of the femur
- promotes rapid callus formation

Disadvantages:

- patient confined to bed for long periods with the associated problems of nursing management
- wound access is difficult, and patient hygiene especially important where large wounds are close to the perineum



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Fig. 16a A simple traction frame which is suitable for most lower limb fractures can be made locally from a variety of materials. The frame is bandaged to support the limb comfortably.



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Fig. 16b The fracture is supported by extra padding and the heel is free of compression.



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Fig. 16c The physiotherapist can remove the portion of the bandage supporting the lower part of the limb so that the patient can flex his knee.

External fixation

This may be used in compound or open fractures, and in fractures associated with major soft tissue wounds or vascular injuries (see Fig. 17).

Begin cleaning the pin sites one week after initial surgery . Clean and re-dress three times a week. Separate the wound dressing from the pin site dressings so that it is not disturbed while the pin sites are being cleaned.

Inform the surgeon if the pins appear to be loose or infected. They may need to be removed and replaced.

Remove the fixator in the operating theatre under light anaesthesia.

Begin physiotherapy as soon as possible. This includes active and passive joint movement as well as appropriate weight-bearing and mobilization with crutches. The patient will need support and encouragement to do this.

- Advantages:**
- gives good access to soft tissue wounds
 - allows early mobilisation of adjacent joints and of the patient out of bed are possible
- Disadvantages:**
- delays callus formation
 - pin sites may become infected
 - incorrect positioning of the pins causes stiff joints, muscle tethering with prolonged swelling, nerve palsies and pain

(See also Chapter 3.6: Physiotherapy for patients with limb injuries.)



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Fig. 17 External fixation has been used here for a patient with a tibial fracture associated with a large wound which required skin grafting. The use of external fixation allowed easy access to the wound for grafting and subsequent dressing changes (an additional advantage is that the limb is effectively immobilized while the graft is healing).

AMPUTATIONS

Amputations are frequently necessary for war wounds, especially injuries caused by *anti-personnel mines*. Mine victims often present with traumatic amputation of a limb with injuries of other limbs, perineum, buttocks, abdomen and genitals. Handling these weapons often causes extensive wounds to the hands and face, especially the eyes. All such wounds are contaminated with mud, clothing and other foreign material. Careful wound excision is particularly important.

The risk of *gas gangrene* is high, especially if treatment is delayed. The patient may arrive shocked and with obvious signs of established infection (discolouration, swelling and tenderness of the limb, surgical emphysema, a pungent, sickly smell, raised temperature, hypovolaemia and anaemia).

Admitting a patient with traumatic amputation of a limb (in addition to the routine admission procedure - see pp. 46-50)

- Check:**
- for other wounds on the body
 - for the presence of a field tourniquet
(if a tourniquet has been in place for a long time, this may determine the level at which the limb has to be amputated, wherever the site of the injury)

- Crossmatch blood:**
- patients injured by anti-personnel mines often need a lot of blood

Regularly monitor vital signs.



Fig. 18 An injury from stepping on an anti-personnel mine. The right foot has been traumatically amputated, and there are multiple wounds on the medial side of the left leg, all heavily contaminated with mud and debris. The injury is several days old. Note that sutures have been applied to the wound on the right leg, presumably in an attempt to control bleeding.

Following surgical assessment, *permission must be obtained* from the patient or his/her relatives for amputation of the limb and for the level at which the amputation is to be made. They may need time to consider this. If permission is refused, medical staff should accept the decision and the patient made as comfortable as possible.

The aim of surgery is to leave the patient with as long a stump as possible for future prosthetic fitting and rehabilitation. As with other wounds, the amputation should never be closed at the first operation. The same principles of delayed closure apply. Physiotherapy is very important to keep the joint proximal to the amputation mobile.

ABDOMINAL WOUNDS

Approximately 10% of war-wounded have abdominal injuries. When there is a long interval between injury and arrival in hospital, this proportion is smaller.

Many abdominal wounds are associated with wounds to the chest, perineum, buttocks and thighs. It is easy to miss a serious abdominal wound with penetrating trauma.

Prepare all patients with *penetrating abdominal wounds* for laparotomy.

Admitting a patient with an abdominal wound

(in addition to the routine admission procedure - see pp. 46-50)

Check: • for abdominal distension, tenderness, penetrating wounds

Regularly monitor vital signs

Intravenous access: • may require more than one intravenous line

Exteriorized bowel: • cover with large, wet compresses until the patient is transferred to the operating theatre (never try to push bowel back into the abdominal cavity)

Antibiotic therapy: • benzylpenicillin 5 million units IV
• metronidazole 500 mg IV
• gentamicin 240mg IV

X-Ray: • abdomen and chest (pelvis if necessary)

Crossmatch blood

Consider: • inserting a nasogastric tube and urine catheter (this is often best done when the patient is in the operating theatre)
• note the character of stomach contents, presence of blood in urine
• record quantities

After surgery, the patient should go to the intensive nursing ward for close supervision. Specific post-operative nursing management depends on the nature of the abdominal injuries.

CHEST WOUNDS

Between 5% and 10% of all wounded who reach hospital have chest wounds. These are often associated abdominal injuries, which cause additional complications.

Admitting a patient with a chest wound

(in addition to the routine admission procedure - see pp. 46-50)

Check:

- airway
- look for cyanosis
- look for and cover sucking chest wounds

Observe:

- pattern and type of respirations.
(do both sides of the chest expand equally?)

Feel for surgical emphysema

Regularly monitor vital signs

Ask the patient:

- to describe the pain, showing exactly where it is
(does pain restrict movement or breathing?)

X-Ray chest:

- the patient must be sitting up

Prepare:

- for insertion of thoracic drainage system
- a large calibre drain should be used
- make sure the drain is sutured in position and tubing clamps are available

Initial treatment may involve insertion of a chest drain only. Thoracotomy is rarely necessary.



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Fig. 19 A simple way of encouraging positive pressure breathing exercises. The patient blows into a tube inserted in a bottle filled with water.

The patient should go to the intensive nursing ward, be positioned sitting up in bed and be monitored with respect to respiration rate, other vital signs and, in particular, volume of drainage. Drains must be kept patent and “swinging”.

Serial X-rays (which should be numbered) indicate the position of the drains and the evolution of either pneumothorax or haemothorax.

Deep breathing exercises and coughing should be started as soon as possible and continued until after removal of the drains. Analgesia helps chest physiotherapy.

Heimlich one-way valves are useful only for immediate first aid or where there is a pneumothorax only. They are easily blocked with blood.

HEAD INJURIES

The *initial examination* of the patient is important, as it provides a *baseline* for all subsequent recordings and affects surgical management. The unconscious patient requires careful observation and nursing care with early attention to pressure areas.

Admitting a patient with a head injury

(in addition to the routine admission procedure - see pp. 46-50)

- Assess:** • level of consciousness (use Glasgow coma scale)
- Ensure:** • patency of airway (intubation may be necessary)
- Note:** • motor responses to pain
- Measure and document:** • size and reaction of the pupils to light, respiration, blood pressure, pulse and temperature
- Take:** • as full a history as possible (from accompanying relatives if necessary)
- X-Ray:** • head and cervical spine
- Insert a urine catheter:** • if necessary (this may also be done in the operating theatre)
- Start a fluid balance chart:** • fluids are usually restricted
- Antibiotic therapy:** • benzylpenicillin 5 million units IV
 • chloramphenicol 1 gm IV (in case of open head injuries)

Most open head injuries require surgery to prevent later infection. However, other injuries or the patient's poor general condition may preclude this. Recovery is often rapid.

After admission and initial assessment; nursing care follows the same line, whether the patient has had surgery or not.

Essential

Nurse the patient in the recovery position with the head of the bed slightly elevated.

Turn the patient every 2 hours, maintaining good position of the limbs.

Pay special attention to the patient's hygiene, with particular care of the skin and pressure areas.

Avoid sedation.

Continue to monitor and document every 30 minutes all vital and neurological signs. Report changes.

Consider inserting a nasogastric tube to keep the stomach empty or for feeding of the patient in the long term.

Commence gentle, passive movements of limbs and joints.

Avoid over-stimulation.

SKIN GRAFTS

Skin grafts are often needed to close large wounds. The success of a graft depends on two factors: first, the blood supply to the recipient site; second, immobility of the graft for at least four days.

Care of the recipient site (the wound)

Immobilize grafted limbs (with plaster of Paris backslabs or bulky dressings).

Elevate grafted limb.

Bed rest with the foot of the bed elevated is necessary for grafts to lower limbs.

Leave undisturbed for 5 days.

Day 5 post graft:

- First dressing**
- done with great care by experienced personnel (some surgeons prefer that this is done in the operating theatre)
 - clean with normal saline solution
 - cover with Vaseline gauze and protect with bulky dressings
 - sutures can be removed at this stage

Leave undisturbed for 5 more days.

Day 10 post graft:

- Second dressing**
- may be done on the surgical ward (the graft should be firmly adhered)
 - leave exposed or cover with a light dry dressing

Care of the donor site

The site is chosen by the surgeon.

The site is prepared the day before surgery (if the area is particularly hairy it may need to be shaved; otherwise it should be thoroughly washed and covered with a clean dressing overnight).

Donor sites are painful and can bleed briskly (especially in children).

Leave dressings applied in the operating theatre undisturbed for 10 days (see Fig. 20).

Day 10 post graft:

- First dressing**
- may be done on the surgical ward
 - carefully remove the dressings
 - the site may be left exposed if clean and dry (further dressing with Vaseline gauze may be necessary)



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Fig. 20 Ensure that donor site dressings are not removed too early by writing the date of the first dressing change on the tape that secures the bandage. The patient should routinely be observed for general signs of infection.

BURNS MANAGEMENT

Burn injuries are common in war. Explosions, ignition of combustible materials and fires in buildings are the usual causes.

Patients with severe burns tend to have many complications, a prolonged stay in hospital and multiple operations, and consume a great deal of material resources as well as surgical, nursing and physiotherapy time. In this context, caring for severely burned patients is one of the most difficult and disheartening nursing tasks.

Where hospital resources are limited and conditions are difficult, and in the absence of a specialized burns unit, patients with more than 50% burns have little chance of survival. The only realistic treatment of such patients is supportive, with generous analgesia, rather than active. Patients whose burns are small and superficial may be treated on an outpatient basis.

The treatment regimes described below do not correspond to modern burn therapy as practised in a specialized unit. They are appropriate when such specialized care is not available and may be the only option. There are four main objectives:

- to prevent death through shock and renal failure
- to prevent sepsis
- to achieve skin cover
- to prevent contractures

Admitting a patient with extensive burns (more than 10%)

Information essential for initial assessment:

- the exact **time** of injury
- the **cause** of the burn
- the **weight** of the patient
(this is crucial for fluid management)
- any **underlying disease**
(previous medical history)
- the percentage of **body surface** burned
(use Rule of 9, see Fig.21)
- the **depth** of burn
(superficial, partial thickness, full thickness)

Resuscitation:

Establish **intravenous access** with at least one wide-bore intravenous cannula.

Begin **rapid** intravenous infusion with Ringer's lactate. (see below - Fluid replacement).

Take blood for haematocrit and crossmatching.

Give **intravenous** pain relief.

Insert a urine catheter and a nasogastric tube.

Commence fluid balance - **document**.

Consider antibiotics.

Give tetanus prophylaxis.

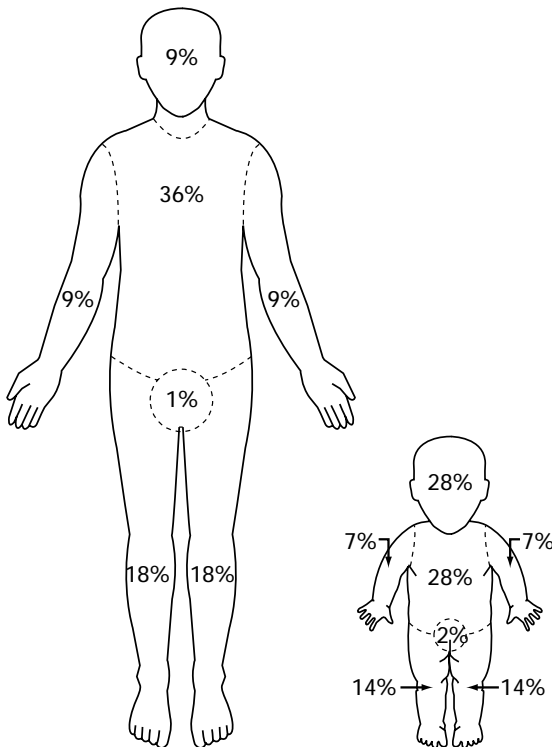
Regularly monitor vital signs.

Keep the patient warm.

Some burned patients may require urgent surgery (tracheostomy or escharotomy).

Fluid replacement:

- must take into consideration time since injury, depth and percentage of body surface burned, weight of the patient, degree of shock and urine output
- **the Parkland protocol** may be followed
(during the first 24 hours, basic daily fluids **plus** 4 ml Ringer's lactate x kg x % burn, half this amount given during the first 8 hours and the other half during the next 16 hours)



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Fig. 21 Calculate the percentage of body surface area burned by using the “rule of 9” for adults and the “rule of 7” for children. A useful guide is that the area of the patient’s hand is roughly equivalent to 1% of their body surface area.

Initial management of the burn wound

For the first hour and a half post-injury, the pouring of cold water onto a burn relieves pain and prevents superficial burns from becoming deep.

The operating theatre may be the most appropriate place for the initial cleaning or escharotomy and dressing of burns, which may have to be carried out under anaesthesia.

Clean the wound with normal saline solution, cover it with silver sulphadiazine 1% and apply sterile dry dressings.

Clean burns of the hands and feet and cover with silver sulphadiazine 1% in the same way, but instead of applying dry dressings, enclose the hands or feet in plastic bags secured with tape or bandages at the wrists or ankles (see Fig. 22).

This increases mobility, reduces pain and prevents contractures by enabling physiotherapy to start as soon as possible.



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Fig. 22 If burned hands or feet are treated by this method, the dressings need to be changed daily, mobility of the fingers and toes should be encouraged, and the limb should be elevated.

Nursing a patient with extensive burns

Make a **plan** for overall patient care.

Nurse the patient in a **warm, clean environment**, paying particular attention to patient hygiene and comfort.

Elevate burned limbs.

Nurse the patient in bed, keeping the bedclothes **away from the burned areas with a cradle**.

Pay scrupulous attention to **turning and positioning** the patient.

Consider **pain relief**, particularly prior to physiotherapy.

Diet - **prevent weight loss** which may be dramatic and ongoing. Give a high-protein, high-calorie diet in frequent small meals. Liquid food for feeding by nasogastric tube may be necessary.

Regularly monitor the patient's condition - **fluid balance, haematocrit, weekly weight**.

Active and passive **physiotherapy** begins as early as possible.

B = Bath
U = Use silver sulphadiazine
R = Remove dead tissue and eschar
N = Nutritional therapy
S = Skin graft

Burn wounds need cleaning and re-dressing daily or every second day (depending on medical orders). This may be done in the bathroom or under a shower.



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Fig. 23 This young girl with extensive burns to the legs has been given light (ketamine) anaesthesia. The anaesthetist is in attendance and the patient is being supported by her mother while the dressings are soaked off in the bath.

Continuing care of the wound

Pre-heat the bathroom.

Consider **pain relief or light anaesthesia** (see Fig. 23).

Place the patient in the **bath** to remove the dressings by soaking.

Shower and **gently wash the wounds** to remove silver sulphadiazine and slough.

Lift the patient onto a stretcher over the bath, **open blisters and remove all devitalized tissue**.

Dress the wounds with silver sulphadiazine 1% in a layer 0.5 cm thick. Avoid the eyes if the face is burned.

Cover with **loose gauze and bulky compresses**, bringing the dressing beyond the edges of the wound.

Wrap the whole area loosely with **elastic bandages**.

Hands or feet may be put in **plastic bags** secured with bandages.

Involve the **physiotherapist** at the time of bathing and re-dressing the patient. Pain relief needs to be given for physiotherapy and dressings; it is better for the patient if the two procedures are coordinated.

Splints may be applied to support limbs or joints (especially hands) in a good position, particularly at night.

This whole procedure is done as quickly as possible so that the patient does not become cold or exhausted. A balance may have to be struck between using a clean and thorough technique and working quickly.

Full thickness burns require *skin grafting*. This may need to be done in stages, but should start as soon as there is clean granulation tissue. (This is assuming that early tangential excision and grafting of the burns are not possible.)

Multiple operations complicate the overall management, as there will be blood loss at each operation and also serious implications for the nutritional status of the patient. Surgery needs to be carefully planned.

DRUGS AND ANTIBIOTIC POLICY

The range of drugs available must be standardized and prescribed and administered according to the guidelines. A *simple system* should be established for administering and recording drugs prescribed (see Figs. 24a, b, c). This is important in a hospital where some of the nursing staff have little experience.

Drugs should be kept in locked cupboards; to avoid keeping large quantities on the ward the stock should be regularly replenished from the hospital pharmacy.



Fig. 24a A simple and effective way of ensuring that the right patient gets the right drug at the right time. Regular drugs ordered are recorded in a file kept centrally on the ward where drugs are dispensed. Here, a separate tray is prepared for each drug round for one ward. Drugs ordered for each patient for that time are put into ice-cube trays which are numbered with the patients' bed numbers.

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Fig. 24b The nurse checks the bed number (at the foot of the bed) before giving drugs to the patient ...

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Fig. 24c ... and records that the drugs have been given on the patient's chart, also kept at the foot of the bed.

Standard antibiotic regimes in ICRC hospitals

(Doses given are for adults with a presumed weight of 70 kg. Paediatric doses should be calculated according to the age and weight of the child)

1. Patient with minor soft tissue wounds not requiring surgery (ambulatory patients):

- Oral Penicillin 500mg 6 hourly for 5 days

2. Patients with minor soft tissue wounds requiring surgery:

- Benzyl Penicillin 5 million units IV on admission followed by
- Oral penicillin 500mg 6-hourly for 5 days

3. Patients with compound fractures, amputations, major soft tissue wounds:

- Benzylpenicillin 5 million units IV on admission, repeated 6-hourly for 48 hours followed by
- Oral penicillin 500mg 6 hourly until Delayed Primary Closure (DPC) — total 5 days.
- If closure is performed with a split skin graft, continue oral penicillin 500mg 6 hourly for 5 more days.
- If debridement is performed instead of delayed primary closure, antibiotics are stopped unless there are signs of systemic infection or active local inflammation.

4. Patients with antipersonnel landmine injuries of limbs whatever the delay, compound fractures or major soft tissue wounds with a delay of more than 72 hours:

- Benzylpenicillin 5 million units IV on admission, repeated 6 hourly for 48 hours and Metronidazole 500mg IV repeated 8 hourly for 48 hours followed by
- Oral penicillin 500mg 6 hourly and Oral Metronidazole 500mg 8 hourly until DPC.

5. Patients with haemothorax:

- Ampicillin 1gm IV on admission, repeated 6 hourly followed by
- Amoxicillin 500mg (oral) 6 hourly continued until 48 hours after removal of chest tube.

6. Patients with penetrating cranio-cerebral wounds:

- Benzylpenicillin 5 million units IV on admission, repeated 6 hourly for at least 72 hours and Chloramphenicol 1gm IV on admission, repeated 8 hourly for at least 72 hours
- Continue IV or oral according to the condition of the patient for a total of 10 days.

7. Patients with abdominal wounds:

- Benzylpenicillin 5 million units IV on admission, During operation, depending on the findings, antibiotic regimes will be adjusted as follows:
- *Solid organs* (liver, spleen, kidney) and *isolated bladder*: Benzylpenicillin 5 million units IV, repeated 6 hourly for 3-5 days depending on drainage

- *Stomach, small intestines* Ampicillin 1gm IV repeated 6 hourly for 3-5 days and Metronidazole 500mg IV repeated 8 hourly for 3-5 days
- *Colon, rectum, anus* Ampicillin 1gm IV repeated 6 hourly for 3-5 days and Gentamycin 80mg IV repeated 8 hourly for 3-5 days and Metronidazole 500mg IV repeated 8 hourly for 3-5 days

Penicillin is used because the dangerous organisms *Streptococcus pyogenes*, *Clostridium welchii* and *Clostridium tetani* remain sensitive to it.

(Erythromycin, tetracycline or chloramphenicol may be substituted in case of allergy to penicillin)

Patients presenting with *multiple injuries* should be given as a minimum Benzylpenicillin 5 million IV on admission. Subsequent antibiotic therapy will be determined by the surgeon according to the nature of injuries.

Other routine drugs may include iron replacement therapy to complement a proper diet, anthelmintics and vitamins, depending on the environment.

PATIENTS' RELATIVES

In many countries, the patients' relatives expect to stay in the hospital as well. If they can be accommodated, this should be encouraged (but restricted to one relative per patient if possible), as it can provide the patients, especially children, with much-needed psychological support. In addition, relatives can help with tasks such as feeding and washing the patient, taking him/her to the toilet, physiotherapy and keeping the immediate ward area clean and tidy.

Relatives should be aware that they may be asked to leave the ward during doctors' rounds or while dressings are being done.

DISCHARGING THE PATIENT

Discharging a wounded patient from hospital in a country at war can be a complex matter which may require planning and discussion, especially if follow-up is needed.

Consider

Where?

- does the patient have accommodation?
- is there access to the patient's home?
- does he/she need family support?

When?

- wounds are completely healed?
- sutures are removed?
- external fixators are removed?

How ?

- is transport available?
- does the patient have money to pay for transport?
- does he or she have adequate clothes?

Can the patient return?

- for follow-up or if he/she has problems?
- is access to the hospital possible?
- how mobile is the patient?
- is follow-up possible in other health facilities?

On discharge from hospital, every patient is given a card on which the following information is detailed:

- name, age, sex
- admission number
- date of admission and discharge
- diagnosis
- brief summary of surgical treatment
- current treatment
- follow-up treatment planned

The card is used to retrieve files and to plan and document further treatment. The patient must understand that without this card correct follow-up treatment is impossible wherever he/she goes.

The date of discharge should also be recorded in the admission book.

If the hospital becomes overloaded because of the number of wounded arriving, some patients may have to be discharged early to make space. Patients can be discharged before wounds are completely healed if they can return to the hospital or another health facility as an outpatient for dressings or suture removal.

DEATHS

The disposal of dead bodies can be a problem. A standard procedure should be established.

Essential

Local customs and religious practices must be observed.

A suitable building for a mortuary is needed. Air-conditioning may be required.

A death certificate detailing the date, time and cause of death must be signed by a medical officer.

The patient's property and valuables are handed over to relatives.

The body must be correctly buried or cremated. The patient's relatives may make the arrangements, but in their absence the local community may be able to help.

The local authorities must be informed.

3.5 AN INFLUX OF WOUNDED AND TRIAGE

Any hospital treating war-wounded must be prepared to receive *large numbers of casualties*. A heavy influx of wounded arriving within a short space of time can quickly overwhelm the available resources. This chapter describes a system which must be set up in advance.

PREPARING FOR AN INFLUX OF WOUNDED

An influx of wounded can occur at any time and without any prior warning. It may be a *slow but steady increase* or a *sudden influx*. Both the hospital and staff must be well prepared. *Sound preparation* enables the hospital to continue to function and reduces stress and confusion among staff.

The *emergency plan* (see Fig. 25) should detail *when* and *how* the triage process is implemented and define the specific roles of each member of the hospital team and of each department. This plan should be an *extension of the normal hospital routines* and not a complete change in the system. Introducing many new procedures at such a time will only add to the confusion. The roles allocated to individual staff should remain as close as possible to their familiar daily work.

A system of *coordination and communication* with other health facilities receiving casualties may make it possible to transfer wounded from a hospital which is overwhelmed to another which has received comparatively few patients. Alternatively, other health facilities may be able to provide help in the form of additional personnel.

Extra hospital staff are needed; the plan should include how to contact those who are off duty. Bear in mind that an influx of wounded may occur at a time when hospital staff are having difficulty getting to work because it is too dangerous to go out in the streets.

TRIAGE

Triage is the process of *sorting the wounded* into categories according to the severity of their injuries and assigning *priorities for treatment* taking into account the resources available.

In ICRC hospitals, it is generally agreed that *triage is initiated when seven patients arrive simultaneously*. This low figure permits hospital staff to become familiar with the system, documentation and equipment. Dealing with a larger influx becomes an extension of this.

Civilian casualties are likely to arrive at the hospital without having received first aid and without the help of an ambulance service. In this case the less seriously injured arrive first; therefore, *the hospital is often where the first triage of the wounded is performed*. This contrasts with the military system whereby triage

PHASE	INFLUX OF WOUNDED (No. of patients)	HEAD NURSE (HN)	ADMISSION ROOM	OPERATING THEATRE and STERILIZATION (OT)	WARDS	ADMINISTRATION	LABORATORY X-RAY PHYSIO	KITCHEN LAUNDRY TAILOR	SECURITY and PORTERS	TRANSPORT
1	1-5	HN informed OT informed	Routine	Stop routine Inform wards	Routine	Routine	Routine	Routine	Routine	Routine
2	6-10	Initiate triage Inform wards, OT, administration	Request triage material and staff	Keep staff on duty Check supplies	Update bed situation: inform HN	”	”	”	Extra guards to patients' entrance	Stand-by ambulance
3	11-20	Call in on-call nurses Ensure that all staff have breaks	”	Extra staff and surgical team stand by	”	Keep pharmacy staff on duty	Physio staff stand by to help in wards	Prepare food and drinks for OT staff	Visitors leave Visiting hours suspended	”
4	21-30	Update bed situation Monitor OT situation	”	”	Assess need for staff Inform HN	Keep storekeeper on duty	Call in extra staff if needed	Laundry: priority is OT linen	”	Stand-by staff transport
5	31-40	Reassess Define needs for staff, beds, supplies	”	Check supplies Open reserve linen stocks	”	Monitor needs for staff	”	Open emergency food stocks	Call in or co-opt extra porters	”
6	41-50	Review again	”	”	”	Provide sleeping accommodation for staff on duty	”	Provide food and drinks for all staff on request	”	”

Fig. 25 Example of an emergency plan for an influx of wounded.

takes place near the battle lines to determine priorities for evacuation to hospital. Whatever the prior treatment or sorting, *triage must be carried out again when the patients reach hospital*; the patients' condition changes and the priorities in the hospital may be different. *All patients* arriving at the hospital during an influx of casualties go through the triage process.

The triage process has two components:

1. Clinical assessment to determine which patients take priority for limited surgical time and resources.
2. The organization and management involved in admitting large numbers of wounded to the hospital.

There is only *one person in charge of the triage process*. It is not important whether this is a doctor or a nurse. He or she must have *experience and understanding of war wounds*, an *overview* of all aspects of the functioning of the hospital and an *ability to make clear decisions* under stress.

The decisions made by the person in charge of triage must be respected. Such decisions are often difficult to make and there may be disagreement. This should not be discussed at the time but during evaluation after the event.

A surgeon can make an accurate surgical assessment of each patient, but might give preference to those cases corresponding to his or her own specialty. An anaesthetist may be able to leave the operating theatre to help with clinical assessment. Experience in ICRC's independent hospitals has shown that the *head nurse* should be in charge of triage as he or she also has an overview of all the hospital's resources.

RESPECT THE TRIAGE DECISION

TRIAGE CATEGORIES

Triage categories must be simple and must encompass all degrees of injury.

Triage categories used in ICRC hospitals

Category I - serious wounds – resuscitation and immediate surgery

Patients for whom urgent surgery is required and for whom there is a good chance of recovery. In practice many of these patients will have abdominal or thoracic injuries or wounds of peripheral blood vessels.

Category II - second priority wounds – can wait for surgery

Patients who require surgery, but not on an urgent basis. In practice this applies to the majority of casualties: most compound fractures and penetrating head injuries.

Category III - superficial wounds – ambulatory management

Patients who do not require hospitalisation and/or surgery because their wounds are so minor that they can be managed on an ambulatory basis. In practice this includes superficial wounds managed under local anaesthesia in the emergency room.

Category IV - severe wounds – supportive treatment

Those patients who are so severely injured that they are likely to die or have a very poor quality of survival. These include the moribund, or patients with multiple major wounds whose management could be considered wasteful of scarce resources, including operating time and blood.

The majority of patients will fall into *Category II*. This can be a very broad group. Most patients in *Category I* will have abdominal injuries needing laparotomy. Severely injured patients in *Category IV* are likely to have serious multiple wounds.

Ambulatory patients in *Category III* are frightened, in pain, and may be the most problematic to manage.

When evacuation time to the hospital is longer than 24 hours, few patients fall into *Category I*. Triage serves to ensure that patients are admitted systematically and nothing is overlooked.

THE TRIAGE AREA

The capacity of the admission room to process new admissions quickly becomes overwhelmed during an influx of wounded. Thus there must be a designated triage area; the admission room can be used for the most seriously wounded. As a simple rule, stretcher cases should go directly to the admission room while walking wounded can go to the triage area.

The triage area

Where?	A large area near the usual patients' entrance to the hospital
Close to:	<ul style="list-style-type: none"> • the routine admission room (this is already equipped for receiving severely injured patients) • the operating theatre • X-ray • laboratory/blood bank
Structure:	<ul style="list-style-type: none"> • a washable, stable (preferably concrete) floor • a roof for protection against rain, snow or sun
Facilities:	<ul style="list-style-type: none"> • running water • adequate light • lines of ropes strung at an appropriate height and hung with hooks for suspending intravenous infusions • benches for the "walking wounded" (to save space)

Complete sets of supplies for triage should be prepared and stored in boxes or trunks which can be carried easily to the triage area. They should always be accessible, and their contents should be checked regularly.

A large number of *stretchers* are needed at the hospital entrance during triage.

Essential equipment for the triage area

General:

Stretchers
 Blankets/sheets
 Flashlights
 Suction machine (foot-operated if necessary) with catheters
 Large scissors for removing patients' clothing
 Large plastic bags for patients' clothing (with labels)
 Small plastic bags for patients' valuables (with labels)
 Loud-hailer/megaphone

For treatment:

Intravenous fluids and plasma expander
 Giving sets for intravenous fluids
 Intravenous cannulae (different sizes)
 Syringes/tubes for collecting blood samples
 Syringes for drugs
 Needles
 Antibiotics

Documents:

Triage cards/admission sheets (pre-numbered)
 X-ray request forms
 Laboratory request forms
 Pens
 Skin marking pens
 Triage coordination sheet (for the person in charge)
 Operating theatre list

Analgesics
 Tetanus toxoid/human immunoglobulin (needs refrigeration)
 Gauze compresses
 Cotton wool
 Bandages
 Adhesive tape
 (a number of individual patient kits can be made up in advance see p. 45)

Fig. 26 The triage area of the ICRC hospital in Kabul during an influx of wounded. It is situated just outside the admission room. Note the intravenous infusions hanging from pre-positioned ropes and the triage cards hung around the patients' necks.



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Fig. 27 Crowds often gather at the hospital entrance during an influx of wounded. The narrow entry door helps restrict the number of people coming into the hospital.

MANAGING THE TRIAGE PROCESS

The person in charge of triage decides *when triage is implemented*, makes sure that all departments are informed according to the emergency plan and maintains an *overview* of the situation. The situation needs constant *reassessment* to determine the need for additional staff, supplies and ward areas. In addition, the person in charge of triage must be *aware of events outside the hospital*.

Other people may try to enter the hospital out of curiosity or concern; casualties may be brought in by friends or relatives; the population may be in a state of panic and consider the hospital a safe place. Minimizing the number of people entering the hospital reduces the confusion considerably.

There may be many people involved in admitting the patients and providing the initial treatment, but *the clinical assessment and allocation of a triage category must be done by the person in charge of triage*, who must see all the patients.

Essential

Remember, it is not possible to foresee:

- how many wounded will arrive
- how long the influx will continue
- when the next influx will happen

Designate a responsible member of the medical team to stay at the hospital entrance and issue triage cards to patients as they are let into the hospital.

Post additional guards at the hospital entrance to restrict entry.

Suspend the routine operating list and other routine activities until the situation is resolved.

Be prepared to use emergency stocks (medical supplies, food, equipment).

Restock all supplies regularly to be prepared for the next patients.

Be ready to open additional ward areas.

Be prepared to call in extra hospital staff.

Be prepared to organize the early discharge of patients currently in the hospital to make space.

Arrange for staff to take breaks, and make sure that food and drink are provided for them.

Untrained and unqualified people may arrive at the hospital offering to help. While this is not an ideal time to introduce untrained people to the hospital, it can be difficult to refuse. These “volunteers” may be able to carry stretchers, restock supplies, clean the triage area or perform other simple tasks.

Keep dead bodies in the mortuary until they are identified and handed over to relatives or to the local community for proper burial.

Keep a list of admitted or treated patients so that people who come looking for their relatives or friends can be informed.

The local authorities may require information about the number of admissions and deaths.

When the situation allows, the head nurse and the surgeon should reassess the patients and review priorities for the operating list.

If possible, rest periods should be planned for staff. A triage situation is tiring for everyone. Some find it difficult to accept that they need to rest; this must be insisted on. (This also applies to the person in charge of triage and the surgical teams.)

WELL-MANAGED TRIAGE = A WELL-MANAGED HOSPITAL

ADMITTING PATIENTS IN A TRIAGE SITUATION

On arrival at the hospital, each wounded person should be given a numbered *triage card* which is hung around the neck by string. The *triage number* corresponding to the number of the triage card is written on the patient's upper arm in Arabic numerals (e.g., 014 for the fourteenth patient admitted). Following *clinical assessment* the *triage category* may be marked on the forehead in Roman numerals (i.e. I, II, III or IV).

Brief clinical assessment

The patient's general condition is usually obvious. Routine measurement of pulse, blood pressure, and respiration rate is not always necessary.

Remove all clothing and examine the whole patient
(small penetrating wounds are often overlooked).

Assess level of consciousness in head injuries.

Feel for surgical emphysema in chest and neck injuries.

Note abdominal distension or tenderness in injuries of abdomen, chest or buttocks.

Check for paraplegia (ask the patient to move his/her toes).

Check distal pulses in limb injuries.

Initial treatment routines during triage in ICRC hospitals

First aid (ABC - Airway, Breathing, Circulation)

Examination and assessment

Triage category - allocated by the person in charge of triage

Dressing/compressive bandage

Blood taken for Hb/Hct, group, (crossmatch if necessary)

Intravenous infusion

Complete details on triage card

X-ray request

Pain relief

Tetanus therapy

Benzylpenicillin - first dose of intravenous therapy

Keep NPO (nil per os) prior to surgery

The surgical teams should begin to operate on Category I patients immediately. The number of casualties cannot be foreseen; waiting until all patients have arrived before deciding which should be taken first to the operating theatre only wastes time.

The person in charge of triage must keep in close contact with the operating theatre. The priorities of the operating list have to be constantly reassessed. Routine surgery is postponed.

DOCUMENTATION

The documentation used during triage should be essentially the same as that used during routine admission. The only difference is the modification of the admission sheet for use as a triage card.

Sets of documents should be prepared for individual patients, clearly numbered with a triage number from 001 to 100 and kept in a box in readiness (see Fig. 28). (Note: this *triage number* differs from the *admission number* which is taken from the admission book later on when there is more time.)

Each patient arriving at the hospital is given a set of documents, each clearly marked with the same *triage number*. These are:

- a triage card, for patient identification, written clinical assessment and treatment record
- an X-ray request form
- a laboratory request form, for requesting Hb/Hct and units of blood if necessary

The routine *admission sheet* may be used as a triage card (see Fig. 29).

To convert the admission sheet for use as a triage card, fold it along the line below “Triage”. Reinforce the cards with adhesive tape and make perforations along the edge for attaching string to hang around the patient’s neck. This has proved to be the most satisfactory way of making sure that the card does not become separated from the patient. Triage cards can very easily become damaged or rendered illegible by blood.

Information to be noted on the triage card

Triage number	Time of injury
Date and time (of admission to hospital)	Site of injury
Age (adult/child/infant) and sex	NPO (nil per os) since....
Type of injury	Medical assessment (brief)
	Triage category

All treatment given (antibiotics, tetanus toxoid, etc.) or investigation done (X-ray, blood grouping/crossmatching) must be marked on the triage card (see Fig. 29).

This covers all the essential documentation, the objective being to keep track of the patients in the short term. The full details (for the admission book, completing information on the admission sheet) can be completed later when there is more time.

The person in charge keeps a list where basic details on each patient are recorded (the triage coordination sheet, see Fig. 30); this helps keep track of the patients and gives an overview of the situation.

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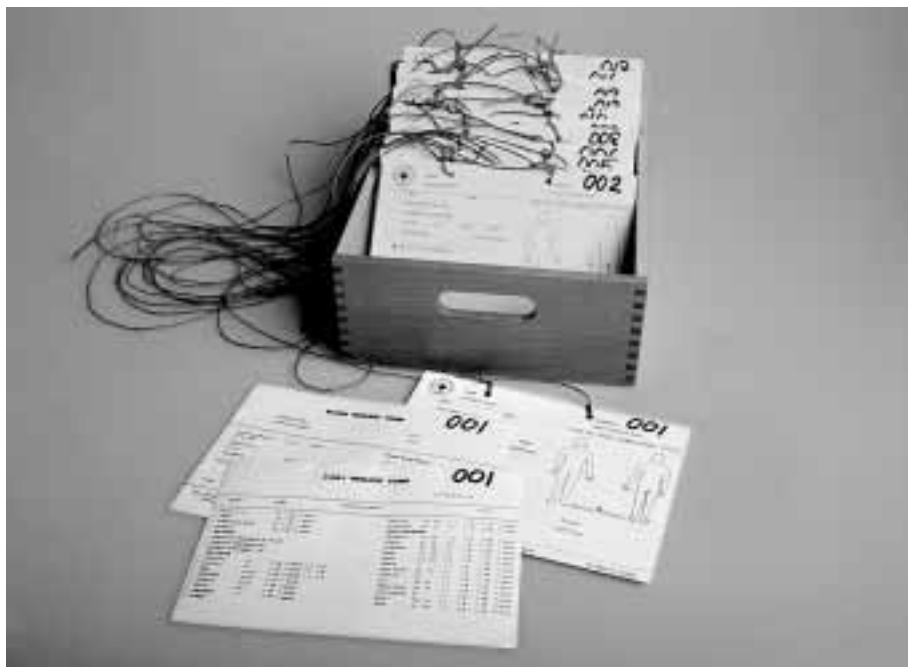



Fig. 28 Numbered sets of documents are prepared in advance.


ICRC

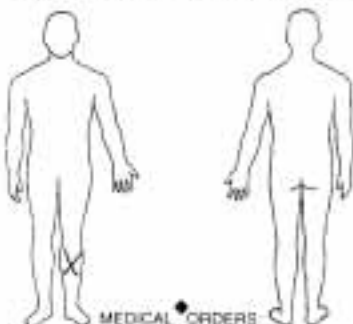

NAME: _____ NUMBER: **002**
 COMING FROM: **C23** MALE/FEMALE AGE: **Child**

DATE: **4.10** TIME: **0945** GSW: MI: SHELL: BOMB: BURNS: OTHER: _____
 TIME SINCE INJURY: **30min**

GENERAL CONDITION: _____
 PULSE: _____ BP: _____ RESP: _____ TEMP: _____
 ANTIBIOTICS: ATS/ANATOXAL:

◆ MEDICAL ASSESSMENT

Small wound (L) lower leg no #

MEDICAL ORDERS

IV fluids:
 NPO from: **0800**

TRIAGE: I Serious **II Secondary** III Superficial IV Supportive

Fig. 29 Only information essential for the identification and immediate treatment of the patient and the triage category is initially entered on the triage card. Other important details can be entered in the admission book later when there is more time (here the number of the bed allocated to the patient is also indicated - C23).

Date: 04.10.		Time triage started: 09.30		Time of arrival of last patient in series:		
Triage No.	Triage Category	Admission No.	Age & sex	Injuries	Bed No.	Notes
001	II	1914	adult F	S.I. face, neck ^{# skull} mandible	F6	observation mother @ 002 + 003
002	II	1913	child M	S.I. leg - no #	C23	
003	II	1915	child F	S.I. (R) leg - no #	C24	
004	II	1912	8 M	S.I. both arms	C26	
005	II	1916	60 M	S.I. (R) arm	E52	
006	IV	1911	adult F	S.I. ^{# skull, chest} multiple abdo	D3	observation - analgesic ✓
007	I	1917	52 M	S.I. chest	INU 3	X-ray ✓ OT ✓
008	II	1918	child F	S.I. (R) femur #	C32	
009	I	1919	25 F	S.I. abdomen	INU 4	OT ✓
010	III	-	40 F	S.I. (R) hand	-	Home
011	III	-	15 M	S.I. (L) arm	-	Home

Fig. 30 Example of a triage coordination sheet. The admission numbers have been filled in later to cross-check that all the patients have been accounted for, whether sent home or admitted.



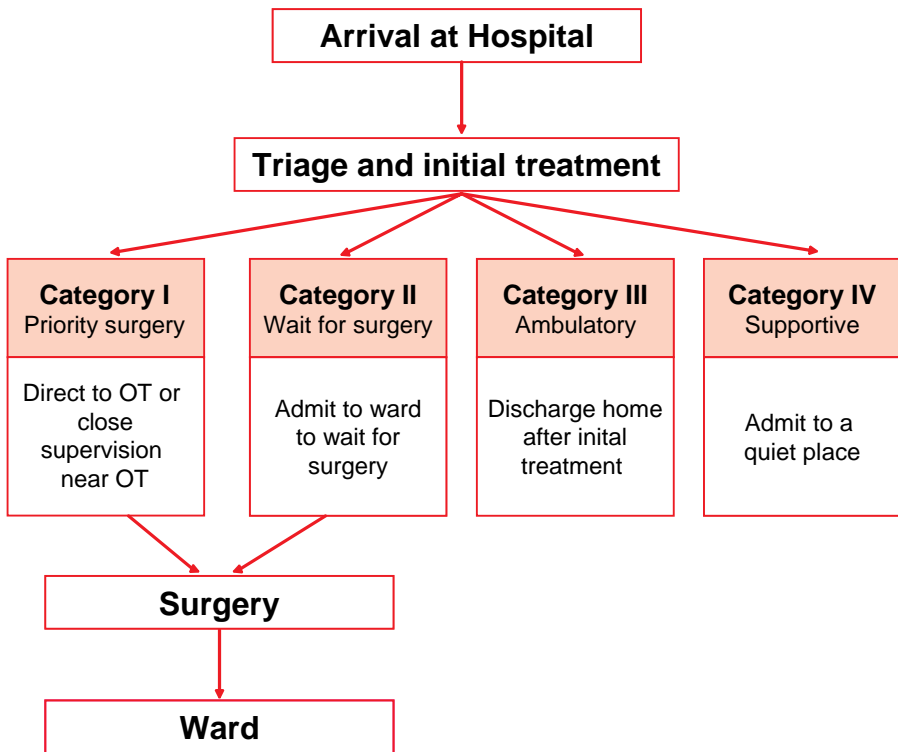
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Fig. 31 The nurse in charge of triage assesses the patient before allocating a *triage category* and entering the essential information on the *triage coordination sheet* (resting on the patient's legs). Note that the *triage number* has been written on the patient's upper arm.

PATIENT FLOW DURING TRIAGE

Patients already assessed should be moved out of the triage area as soon as possible to keep it clear for new arrivals. The person in charge of triage allocates a bed to each new admission, noting on the triage coordination sheet which patient goes to which bed. It is very easy to lose track of patients.

Fig. 32 Patient flow during triage. The main aim is to keep the admission room clear for new arrivals.



Category I patients: If not moved directly to the operating theatre, these patients should wait in an area near the operating theatre where resuscitation with intravenous fluids can continue under close supervision.

Category II patients: Move these patients to the wards as soon as possible after assessment to wait for surgery.

Initial treatment (intravenous fluids, antibiotics etc.) can be given at this stage if necessary.

The ward staff should check that nothing has been overlooked and complete initial treatment and documentation.

Category III patients: Send home patients with minor injuries not need surgery, following assessment, dressings and anti tetanus therapy.

Give them a course of antibiotics, analgesia, and instructions to return if they have problems.

Category IV patients: Move patients with very severe injuries to a quiet place where they can receive analgesia and be allowed to die with some dignity.

Relatives will need reassurance that the patients are receiving proper care.

ALL PATIENTS NEED SUPERVISION AND CONSTANT REASSESSMENT

EVALUATION

After each triage situation, an evaluation should be carried out so as to identify where, when and why there were problems. The discussions should focus on how to make the system work better the next time.

The whole team or certain individuals may have found the experience very stressful. An open, frank discussion about what happened and why decisions were made can be very beneficial, and even therapeutic.

3.6 SUPPORT SERVICES

PHYSIOTHERAPY

Physical rehabilitation of war-wounded is a vital part of their treatment. The physiotherapist plays a key role in the medical team, and should therefore be recruited at the outset to recruit and train additional staff for the physiotherapy team and to establish guidelines and standard procedures.

Most of the physiotherapist's work focuses on general mobilization of the patient and restoration of limb function. Breathing exercises and chest physiotherapy are important for all patients who have had a major operation. In all cases, physiotherapy must be integrated with surgical and nursing care. The physiotherapy service may also include the fitting of artificial limbs; however, this function is frequently performed by separate establishments.

In the hospital, a separate area should be set aside for physiotherapy. Inpatients can be treated away from the busy surgical wards and outpatients can return for long-term physiotherapy.

The following guidelines help to establish a common approach towards the rehabilitation of patients with injured limbs.

Physiotherapy for patients with limb injuries

There are three phases to the rehabilitation programme for patients limb injuries. These phases are not sequential and should overlap.

Phase 1 -

Wound healing:

Bed rest and immobilization of limbs are important. Movement of joints adjacent to the wound should be gentle and passive and not cause undue pain or distress (active physiotherapy which involves contraction of damaged muscle groups may aggravate the wound).

Phase 2 -

Mobilization of the patient:

This can begin immediately (or, with severely injured patients after some days). Mobilization helps to reduce the likelihood of pressure sores, wasting of muscles and bones, and thromboembolic problems. Patients being treated with skeletal traction should be given exercises to do in bed. Mobilization may begin with walking between parallel bars or using a walking frame, and later using crutches.

**Phase 3 -
Retrieval of
limb function:**

This should begin in earnest as soon as the wound is healed. The limiting factor may be the type of immobilization used for fractures.

Unaided walking starts with limited weight-bearing between parallel bars under direct supervision.

The patient may continue walking with crutches without weight-bearing and then progress to weight-bearing.

Progress between phases 2 and 3 is determined by the site and extent of the injury, the age of the patient, pain in the limb, the rate of callus formation, the degree of muscle wasting and the method of fracture immobilization.

The time necessary for patients with lower limb injuries to mobilize depends on the pain they experience and their confidence and motivation. Weight-bearing should begin as soon as possible with either parallel bars or crutches; this needs supervision initially. The long term use of axillary crutches may cause brachial plexus palsies; elbow crutches avoid this risk.

Walking parties and games provide additional motivation; such activities should be planned especially if they take the patient out of the hospital.



Fig. 33a Physiotherapy begins at an early stage at the patient's bed.



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Fig. 33b Later, the patient is encouraged to be mobile by moving to the physiotherapy room ...



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Fig. 33c ... and eventually to longer periods of walking.

LABORATORY/BLOOD BANK

The main function of the hospital laboratory is to provide haematocrit estimation or determine haemoglobin levels and to manage safely the collection, screening and use of blood for transfusion. Competent and experienced technicians with the proper equipment should also be able to perform other tests which help to diagnose underlying disease or infections which have an impact on the recovery of the patient. The most important of these are malaria smears and stool parasitology.

The laboratory should be able to function 24 hours a day, seven days a week for grouping and crossmatching of blood in emergencies. A stable and constant supply of electricity is needed for refrigeration and microscopy. Refrigerators for storing blood should have adjustable temperature controls and thermometers to make sure that blood for transfusion is kept at the correct temperature (4-6°C).

Records should be kept of the number of units of blood donated and transfused. The results of all tests, whether blood screening, stool parasitology or other routine procedures should be recorded; in all cases, medical confidentiality must be observed.

Consider

Blood is a valuable commodity that must not be wasted. It must only be used where the need is vital and for patients with a good chance of recovery.

Supplies of blood are limited.

The pool of potential donors may be small in conflict areas where population movements and food shortages occur at the same time as an increased demand for blood.

There may be some resistance to blood donation among the population for cultural and religious reasons.

Limits can be set on the amount of blood given to each patient.

In ICRC hospitals, the limit is usually 6 or 4 units for patients with haemoglobin concentration below 8.0 g/dl.

This is consistent with a policy of “doing the best for the most”, and ensures that some blood remains in the blood bank for emergencies.

On average, 45 units of blood are needed for every 100 admissions of war-wounded.

The shorter the evacuation time of casualties to the hospital, the greater the amount of blood needed (60 units per 100 patients if evacuation time to hospital is less than 6 hours).

Anti-personnel mine injuries require a lot of blood, (over 100 units per 100 admissions).

Some units may have to be discarded if they are not used within 21 days.

Important

If the pool of blood donors comes from a population where the incidence of HIV infection is high, there is a risk of transmitting HIV during the “window period” when antibodies are not detectable.

Responsibility for clinical aspects of blood transfusion lies with the anaesthetist. Using blood for resuscitation and perioperative transfusion can be wasteful when supplies are very limited because of the volume needed. Experience helps in judging which seriously injured patients have a reasonable chance of survival and so economizes the use of blood.

Essential tests for a blood bank

Grouping	Syphilis
Cross-matching	HIV
Hepatitis B and C	Malaria (if appropriate)

Blood can be collected from the local population and from patients’ relatives. Donors should give blood without remuneration and should be aware that the blood they give goes into the blood bank and is not necessarily used for their own relatives. Local regulations regarding the donation, collection and testing of blood should be observed and a policy established in advance regarding the management of donors found to be HIV-positive.

NEVER GIVE UNTESTED BLOOD

X-RAY

X-rays are an *aid to precise diagnosis*, especially in the case of chest wounds and complicated fractures, but *they are not indispensable* to the practice of sound surgery for war wounds.

The use of X-rays

Why?	<p>To determine:</p> <ul style="list-style-type: none"> • the presence and nature of fractures • air in the tissues • air or blood in the pleural cavity • the presence of metallic foreign bodies <p>X-Rays may not be necessary in all cases (e.g., if no fracture is indicated on clinical examination, or where there is obvious traumatic amputation of a limb).</p>
When?	<p>When time allows, X-Rays should be taken in the case of:</p> <ul style="list-style-type: none"> • all fractures • all patients who have penetrating abdominal injuries, even if there are no clinical symptoms • chest wounds • head injuries <p>Taking X-rays may not be possible during a large influx of casualties.</p> <p>Surgical time may be wasted if too many patients are waiting for X-rays.</p>
How?	<p>X-rays should be taken in 2 planes.</p> <p>Chest and abdominal X-rays should be taken with the patient upright if possible.</p>
Important:	<p>X-ray machines must be simple to operate, maintain and repair, and only a hand-developing technique should be used.</p> <p>Safety measures must be taken to protect the X-ray staff and patients.</p> <p>Train staff to be aware of the dangers arising from regular exposure.</p> <p>Protective screens, lead aprons and gloves must be used where appropriate.</p> <p>X-ray staff should wear dosimeters which are checked and calibrated regularly.</p> <p>An X-ray technician must be on duty or on call 24 hours a day, seven days a week.</p> <p>Technicians can be trained relatively quickly in basic techniques.</p> <p>X-ray technicians must keep records of the number of X-rays taken. Each film must be properly identified with the name of the patient, his/her admission number, X-ray number, the date, and the position of the patient and limbs.</p>

Chapter 4

THE OPERATING THEATRE

The daily work of the operating theatre comprises emergency surgery and follow-up or routine operations such as delayed closure. Nearly all operations for war-wounded can be performed using *basic equipment and supplies* in a *well-organized* operating theatre equipped for emergency surgery. The additional requirements arising from subsequent or routine surgery are covered by such an infrastructure. The limited range of surgical operations required allows for *simplification and standardization* of instruments, equipment and procedures.

The operating theatre does not work in isolation. *Good communication and co-operation* between all departments in the hospital is vital. *A flexible and common-sense* attitude helps staff to adjust to an unfamiliar, varied and often heavy workload.

One surgical team consisting of a surgeon, an anaesthetist, a scrub nurse and a circulating nurse should be able to perform an average of 10 operations in 24 hours (60 per week including a rest day, comprising approximately 30 new patient admissions and 30 follow-up operations).

The quantities given here in the lists of supplies assume that there are two surgical teams and two operating tables available.

Location, infrastructure and layout

Where?

Easy access to (on the same level as):

- the admission room
- the sterilization department
- the X-ray department
- the intensive nursing ward

Infrastructure:

- a solid, stable (preferably concrete) floor
- washable interior surfaces
- heating or air-conditioning, depending on the climate
- running water and basins for a “scrub up” area
- proper drainage for contaminated liquid waste
- a stable, continuous supply of electricity for lighting and refrigerators
- the entrance/exit doors allowing easy access for patients on stretchers or trolleys
- enough space to move patients without contaminating the area around the operating table
- screens on doors and windows to make the operating theatre fly-proof
- a waiting area outside for pre-operative patients
- storerooms for sterile drums, packs, instrument sets and surgical consumables, outside but easily accessible from the operating theatre
- changing rooms for male and female staff
- a rest room with toilet facilities

Layout:

It may be necessary to have more than one operating table in a theatre.

Enough space must be allowed around each table for anaesthetic machines, instrument trolleys, lamps and other essential equipment.

Recommended space for each table is 6m².

There should be shelves around the walls for the equipment needed for the daily operating list. (Drums, boxes, etc. should **not** be kept on the floor.)



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Fig. 34a With two tables per operating theatre, the surgeon can operate on one patient while the next patient is prepared on the second table, thus ensuring an uninterrupted flow of patients during times of heavy workload.



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Fig. 34b If necessary, both tables can be used simultaneously. Here, a laparotomy is being performed on one table and a thoracotomy on the other.

4.1 PERSONNEL

An experienced operating theatre nurse should be in charge of the operating theatre and sterilization departments. He or she must have *sound general experience of surgery* and the *management of an operating theatre* and functions as a supervisor and manager.

The head operating theatre nurse:

- ensures the smooth running and high standards of nursing in the OT
- must communicate with all other personnel and departments
- holds regular meetings with operating theatre staff
- establishes and organizes the daily routine
- trains inexperienced staff
- orders surgical material

The majority of staff need specific *training*. Following basic initial training by the teaching nurse (see Chapter 5: Teaching untrained personnel), teaching in the operating theatre should be kept *simple and practical* and be limited to the operations most frequently performed.

The operating theatre assistants:

- keep the operating theatre clean and tidy
- prepare and check the necessary equipment for the daily operating list, instruments and consumable items
- assist the surgeon as “scrub nurse”/assistants (in ICRC hospitals it is usual for the surgeon to be assisted by only one nurse who acts as instrument nurse and surgical assistant)
- assist the team performing the operations check instruments after use
- check instruments after use

There should be enough staff to provide *24-hour cover* for the operating theatre and sterilization department, either in shifts or with an on-call system. However, the majority of staff are needed during the normal working day.

The *minimum* number of additional staff on the duty roster *per operating table* is:

- 6 operating theatre assistants (to cover routine operating lists, emergencies out of routine operating hours, days off, holidays and other leave)
- 1 anaesthetic assistant
- 1 cleaner
- 2 porters

4.2 EQUIPMENT AND SURGICAL SUPPLIES

EQUIPMENT

Equipment should be of good quality and simple to use, clean, maintain and repair. Spare parts and basic tools must be available.

Equipment for an operating theatre with two tables

Essential:

Operating tables	2 with lithotomy poles and arm rests
Anaesthetic machines	2
Instrument trolleys	4
Suction machines	2 electric
Suction machines	2 foot-operated
Mobile operating lamps	4
Emergency lights	2 battery-operated
Flashlights	2
Waste buckets (large)	4 for discarded compresses
Dirty linen containers	4
Rubbish bins	2 for general rubbish
Stools	4
Refrigerator (lockable)	1 for anaesthetic drugs
Operating tourniquet	1
Wires or chains at an appropriate height for hanging intravenous infusions.	

Important:

Oxygen concentrator	1 this provides a good alternative if bottled gases are not available; it needs a stable electric current and regular maintenance
Diathermy machine	1 plus handles and points
Fluid warmer	1 thermostatically controlled
Mayo tables	2

SURGICAL SUPPLIES

A limited range of consumable supplies (sutures, drains, gloves, dressing material, etc.) should be kept in the operating theatre store in sufficient quantities for daily needs and emergency work (see Appendix 1 - List of consumable medical supplies needed for 100 hospital admissions of war-wounded).

Disposable surgical linen (drapes, gowns, masks, hats, etc.) may be the only option in the initial stages of setting up a hospital. However, these items are expensive and may be difficult to replace. A reusable alternative should be found locally. Material for drapes and gauze for compresses may be available from a local supplier and can be made up by the hospital's tailor workshop.

Non-disposable surgical linen

(requirements for an operating theatre with two tables)

Type	Size	Quantity
Large drapes	160 cm x 150 cm	50
Medium drapes	100 cm x 90 cm	50
Small drapes	100 cm x 50 cm	100
Rubber sheets (to cover instrument trolley)		100
Rubber sheets (to cover operating table)	200 cm x 100 cm	50
Surgical gowns		100
Hand towels		100
Lifting sheets (for patients)	200 cm x 100 cm	50
Soiled linen bags		20
Surgeons/nurses caps		40
Surgeons/nurses masks		40
Plastic/rubber aprons		6

The need to save time and material, an unpredictable workload, a fast turnover of patients and only basic sterilization facilities preclude the use of prepacked sets containing all the instruments, drapes and compresses needed for a single operation; such sets may not fit into the autoclaves.

The only realistic option may be to pack surgical linen, compresses, drains, suction tubing, etc., into separate metal drums where they are sterilised and stored, which can be used as required during the operating list. Obviously, each item must be removed from the drum using sterile forceps kept specifically for this purpose.

Metal sterilizing drums

(requirements for an operating theatre with two tables)

Item	Size of drum	No. of drums
Drapes:		
Large	large	6
Medium	large	8
Small	large	8
Gowns	large	8
Hand towels	medium	4
Rubber sheets	medium	6
Mayo table covers	medium	2
Drains:		
Corrugated	small	3
Tube	small	3
Bandages:		
Elastic crepe	medium	4
Elastic gauze	small	2
Compresses:		
American (see Figs 36a and 36b)	large	6
Laparotomy	large	4
Large	large	8
Small	medium	6
Stump dressings (see Figs 37a, b and c)	medium	6
Other:		
Diathermy points (if used)	medium	3
Light handles	small	2
Nailbrushes	small	2
Gloves	medium	2

Drum sizes vary according to the manufacturer and the size of the autoclaves available. The sizes referred to here are as follows:

Large	34 cm diameter x 24 cm height
Medium	24 cm diameter x 24 cm height
Small	16 cm diameter x 15 cm height

Other items in packs wrapped for sterilization in one layer of linen and two layers of strong paper may be useful e.g.:

Linen pack for laparotomy

2 rubber sheets (1 for trolley,
1 for patient)
2 large drapes (for patient)
2 small drapes (for patient)
1 medium drape (for trolley)
1 Mayo table cover

Burns cleaning pack

1 large metal bowl (for sterile
normal saline)
2 soft nailbrushes
2 wooden spatulae
Gauze compresses (a large quantity)

4.3 THE STERILIZATION DEPARTMENT

This department should provide all the sterile supplies, including compresses, needed for the operating theatre, wards and other departments. It may also have to provide a sterilization service for other health structures such as first-aid posts. It is the responsibility of the head operating theatre nurse.

Essential staff include instrument washers and packers, autoclave operators and compress makers.

Consider

Location:

- adjacent to the operating theatre
- easily accessible from the wards

Layout:

A large room, where instruments and sterile supplies are washed, dried and packed.

A separate autoclave room (see below).

“Dirty” area:

Where instruments and equipment are returned from the wards and operating theatre for washing.

Two large sinks with running water for washing and rinsing instruments.

A drainage area for laying instruments out to dry.

“Clean” area:

Where instruments, surgical linen and sterile supplies are packed ready for sterilization.

Large tables for folding and packing linen and supplies.

Shelves around the walls for storing **clean** surgical linen and supplies.

A separate storage area with clearly labelled shelves for **sterilized** packs and drums.

A large table with high stools for making compresses (this should be a comfortable area to work in, as compress-making is an extremely boring task).

A hatch for issuing sterile equipment to the operating theatre and the wards (this avoids unnecessary coming and going through the department).



Fig. 35 The “clean” area of the sterilization department, where clean items awaiting sterilization and supplies of clean linen are stored. Note the large table for packing supplies and making compresses.

AUTOCLAVES

The types of autoclave used depend on the power supply to the hospital. In any case, they should be robust and easy to use and maintain.

Consider

For an operating theatre with two tables, there are two possibilities:

- either** at least two (150-litre) electric or gas-heated steam/pressure autoclaves
(these have a very high consumption of electricity and require specific wiring and maintenance)
- or** several smaller steam/pressure autoclaves (20- or 70-litres) which can be heated by naked flame using bottled gas, open fire or charcoal
(this may be a more viable alternative where the electricity supply is unreliable or fuel for generators is limited).

Fire precautions are essential.

The autoclave room should be separate from the main sterilization room for safety reasons.

It needs to be large enough accommodate 2 large electric or gas autoclaves and must be well ventilated to allow for steam dispersion. There should be a space of approximately 5 cm between the top of the external walls and the roof.

COMPRESSES

Good quality bulk gauze can be made up into compresses by the sterilization staff and the tailor workshop.

An adequate and regular supply of compresses must be assured. An emergency stock of clean compresses ready to be sterilized must be kept.

X-ray-detectable threads may not be available for compresses. If this is the case, there is no possibility of detecting retained compresses by X-ray.

Sizes of compresses to cover basic needs

Small	10 cm x 6 cm
Large	15 cm x 11 cm (also for wards)
Abdominal (laparotomy)	30 cm x 24 cm (with tapes sewn on)
American (see Figs 36a and b)	28 cm x 18 cm (absorbent cotton wool and gauze)
Stump dressings (see Figs 37a, b, c)	40 cm x 30 cm



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Fig. 36a An "American" compress being made.



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Fig. 36b A single layer of gauze is folded around a pad of cotton wool (28 x 18 cm). This provides a soft, bulky dressing which can absorb a lot of blood and exudate.



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Fig. 37a

Fig. 37b



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A “stump dressing” being applied to a left below-knee amputation. Small compresses have been placed next to the exposed tissue. Two stump dressings, made in the same way as “American” compresses but larger (35 x 20 cm) and leaving a long section of gauze at each end, are placed crosswise at the end of the stump. These are held in place with a bandage.

Fig. 37c

4.4 SURGICAL INSTRUMENTS

The instruments used for operating on war-wounded are the same as those needed for general surgical emergencies, with some additional instruments for treating bone wounds. The range of instruments is therefore limited, but they should be of good quality. If the surgical teams change frequently, as is the case with many aid agencies, the individual preferences of each surgeon cannot be catered for. Instrument sets should therefore be standardized (see Appendix 2). Standardization of instrument sets simplifies the work of the operating theatre and sterilization staff, ensures continuity in training and makes the best use of available resources.

Surgical instruments are subject to heavy wear and tear. This can be reduced by, for instance, *not* using a needle holder to extract a shell fragment from the wound or *not* using scissors to cut skin.

Instrument sets

The three

basic sets are:

- the **Wound set** - for basic wound excision
- the **Minor set** - finer instruments for paediatric and minor surgery
- the **Laparotomy set** - for abdominal surgery

These are combined with supplementary sets for specific operations.

Type of set	No. required (per 2 tables)
Basic sets:	
Wound set	15
Minor set	3
Laparotomy set	4
Supplementary sets:	
Amputation sets	4 use with Wound set
Bone set	1 (for bone grafts use with Laparotomy set)
Craniotomy set	1 use with Minor set
Eye set	1
Skin graft set	1
Suture set	10
Thorax set	1 use with Laparotomy set
Vascular set	1 use with Minor set
In addition:	
(if general surgical emergencies are covered)	
Caesarian section set	1 use with Laparotomy set
Gynaecology set	1 for dilatation and curettage

CARE OF SURGICAL INSTRUMENTS

Replacing instruments may be difficult because of the supply constraints resulting from the war. Careful cleaning and maintenance will prolong the useful life of an instrument.

SURGICAL INSTRUMENTS ARE EXPENSIVE

Sterilization staff need instruction on how to care for instruments.

Guidelines for the care of instruments

Place dirty instruments in cold water and remove all traces of blood and tissue with a stiff brush.

Clean in antiseptic solution, rinse in cold water and dry with clean towels. Pay particular attention to joints.

Check for damage. Scissors and needle holders are subject to particularly hard wear and need to be repaired or replaced frequently.

Oil all moving parts.

Pack in boxes for autoclaving. Instrument boxes can be wrapped in 2 sheets of paper which act as a dust cover.

Pack instruments in special, autoclavable instrument boxes. These should have holes in the lid which are covered by changeable filters.

Sterile supplies kept in metal drums should be checked weekly and resterilized. Likewise, unused instrument sets must be opened, checked, oiled and resterilized.



Fig. 38 Illustrated charts made by the staff themselves help them to learn the names of surgical instruments.

4.5 ORGANIZING THE OPERATING THEATRE

THE ROUTINE OPERATING LIST

Routine operations for follow-up surgery should be placed in the proper order on an operating list. Most of these operations relate to delayed wound closure, skin grafts or reconstructive procedures.

The operating list is best compiled during the regular rounds of the surgical wards. If possible, the head operating theatre nurse should follow these rounds to help in planning the list. The planned type and date of operation for each patient should be recorded in a diary.

Guidelines for patient order on the routine operating list

First:	Non-infected children (for example, bone grafts, skin grafts)
Second:	Non-infected adults
Third:	New, non-urgent patients for initial operation
Fourth:	Outpatients (day cases)
Fifth:	Infected patients

EMERGENCIES

The routine operating list or lists are frequently interrupted by emergency cases. A situation where all operating tables are occupied by long or complex routine cases should be avoided.

In a triage situation

The head operating theatre nurse is responsible for:

- notifying the wards that routine list cases are postponed
- close liaison with the person in charge of triage to compile new operating lists according to the number and type of new patients admitted, taking into account the triage categories
- keeping the person in charge of triage informed of the progress of the operating list
- recording the location of Category I patients
- making sure that enough equipment, supplies and staff are available for the extra workload
- organizing operating theatre staff to take breaks

KEEPING RECORDS

An *operating theatre book* is essential: it contains detailed records of the patients operated on and the surgical procedures performed. This is useful information for planning and ordering supplies. All information in the operating theatre book is considered to be *confidential*.

Information to be recorded in the operating theatre book

Consecutive patient number (OT number)	Aetiology
Patient name	Surgical procedure done
Age/sex	Surgeon
Patient's admission number	Type of anaesthesia given
Diagnosis	Anaesthetist

For ease of identification, *each patient's first operation* should be entered with a red pen and *subsequent operations* in blue/black.

For accurate record-keeping there are two or three numbers recorded in the operation book for each operation:

- the number that corresponds to the number of operations performed in the operation theatre (the consecutive OT number)
- the patient's admission number, which corresponds to the number written on the individual patient record

Recording the diagnosis/aetiology may only be necessary for the initial operation (see Fig. 39).

Other useful documents and checklists include:

- operation lists
- compress check for laparotomies
- weekly maintenance checks
- weekly oiling of instruments
- duty roster
- diary of ward rounds for compilation of operating lists

DATE	OPERATION NUMBER	NAME	AGE	SEX	PATIENT NUMBER	DIAGNOSIS / OT no.	REMARKS	OPERATION PROCEDURE	DIAGNOSTIC	ANALYSIS	SURVIVAL
6/7	3411	Salamat Khan	11	M	1843	2596		Skin graft @ arm	KC	K	GW
6/7	3412	Lal Mohammed	26	M	1876	3327		2pc @ leg.	KC	K	GW
6/7	3413	Mohammed Akbar	52	M	1917 007	S.I. chest, indurated		chest drain + wound excision	KC	K	GW
"	3414	Beptom		F	1919 009	S.I. abdomen		Laparotomy, gastrostomy	KC	FA	GW
"	3415	Shahid Khan	8	M	1913 002	S.I. @ leg		wound excision	AP	K	JV
"	3416	Mansoor	7	F	1915 003	S.I. @ leg		wound excision	AP	K	JV
"	3417	Jarvisia	2	F	1912 006	S.I. both arms		wound excision	AP	K	JV
"	3418	Shirkeba	11	F	1911 006	S.I. @ chest @ arm		wound excision	AP	K	JV
"	3419	Fahria	5	F	1918 008	S.I. skull		wound excision	KC	K	GW
"	3420	Mohammed Jan	60	M	1916 005	S.I. @ arm		wound excision	KC	K	GW

Fig. 39 The operating theatre book.

The first two patients are routine cases and their entries are written in black; note that in the "diagnosis" column the diagnosis is replaced by their "OT" number which corresponds to the operation number of their initial surgical intervention: this saves time.

Subsequent patients are new admissions (admitted during an influx of wounded); their entries are written in red so that they can be easily identified as new cases.

Note that the triage numbers are also written in the patient number column. This is because very often patients admitted during an influx are not allocated an admission number before being transferred to the operating theatre, but it is nevertheless essential to be able to identify each patient accurately.

CLEANING AND MAINTENANCE

The operating theatre must be kept clean and stocked for use at all times; all staff, including the cleaners, should understand the importance of this.

Daily cleaning and restocking of operating theatre

Before the start of operations in the morning

- Cleaners:
- using an appropriate disinfectant, mop all the floors of the operating theatre, corridors, changing rooms, sterilization department

- Operating theatre assistants:
- using an appropriate disinfectant, wipe down all equipment and surfaces in the operating theatre

Between each operation

- Cleaners:
- mop the floor with soap and water
 - clean the operating table with soap and water when necessary
 - change the rubber operating table sheet for each patient
 - empty rubbish bins and take dirty linen to the laundry when necessary

At the end of the operating list

- Cleaners:
- mop all floors with soap and water
 - clean all furniture with soap and water
 - take remaining dirty linen to the laundry
 - empty and wash rubbish bins
 - dispose of needles and blades according to hospital policy
 - clean scrub up area
 - wash operating theatre shoes

- Operating theatre assistants:
- restock the operating theatre with drums, instrument sets, sutures, lotions

**ALWAYS KEEP THE OPERATING THEATRE STOCKED
AND READY FOR USE**

Weekly cleaning and maintenance

Remove all furniture and equipment from the operating theatre and sterilization departments for thorough cleaning.

The walls, floor and ceilings must be scrubbed.

The hospital maintenance team must make weekly checks of all operating theatre equipment. A maintenance chart helps this process.

Chapter 5

TEACHING UNTRAINED PERSONNEL

Most people recruited to work in a surgical hospital in a conflict area have *neither training nor experience*. Once the key people are in place (see Chapter 1.3: Key people), others can be selected according to their previous education, training and language abilities and trained as appropriate for specific jobs. Training programmes should start as early as possible (see Fig. 1 Plan of action).

Training for non-medical roles can be done “on the job” (porters, security guards). Other staff who already have specific skills (secretaries, lab technicians) may only need help in adapting to a new working environment.

The majority of staff required for a surgical hospital are those needed to nurse the patients on the wards. Many of these have no experience of nursing and require specific training. A process should be set up to identify the people who are most suitable to be trained as “nurses”. Running short basic courses in *hygiene* and *first aid for war-wounded* help in picking out those who are motivated and suitable for work on the wards, and is also useful for spreading some knowledge of first aid among the community.

A *teaching nurse* should be recruited at an early stage and is responsible for planning and coordinating all training in the hospital. This person should know what is happening in the hospital but is not involved in management. She/he is also responsible for setting teaching objectives, evaluating teaching programmes and keeping records of what has been taught, by whom, and who has attended courses.

Trainees should be paid; however, specific cash incentives for attending lectures or courses should not be offered.

COMMUNICATION

The key to effective teaching is *good communication*. The *common language* used in the hospital may not be the mother tongue of either teacher or students. This creates a problem of communication at the most basic level; an *interpreter* for the teaching nurse is usually necessary but much valuable information is lost in

translation. If this interpreter has nursing experience he/she may eventually take over the role of the teaching nurse once the training programme is established.

Consider

Whatever language you are speaking, keep it **simple**.

Use simple language **consistently and repetitively**.

Identify **key words and phrases**, and use them to produce specific responses.

Teaching is based on the **vocabulary used every day** in the workplace.

“Actions speak louder than words.” Active teaching in groups and practical sessions on the wards are more effective than formal classroom sessions.

TEACHING BASIC SURGICAL NURSING

Inexperienced people can be trained to provide *basic but safe nursing care* as long as this is supervised. An appropriate teaching programme should make *large numbers* of untrained personnel effective in as *short a time as possible*. The aim is not to produce qualified nurses.

Important

The basics of hygiene and simple nursing practice are the priorities.

Procedures, techniques and vocabulary must be standardized and correspond to what is used in the hospital.

Goals must be achievable and standards attainable.

The objectives of the teaching programme should reflect the practical nature of the work.

The education, customs, culture and religion of the trainees may affect the programme.

The programme should not depend on one personality; teaching is a continuous process.

The programme should be flexible and simple enough to accommodate frequent changes in staff and needs.

**LIMIT TRAINING TO THE SPECIFIC NEEDS INVOLVED
IN NURSING PATIENTS IN THE HOSPITAL**

5.1 PLANNING A TRAINING PROGRAMME

The key people should plan the training programme as early as possible. This is not time wasted, even in the emergency phase of setting up a hospital. Agreement on what needs to be taught avoids the introduction of bad practices and ensures that nothing essential is overlooked. Standard nursing procedures, guidelines and treatment protocols must be agreed *before* the training programme starts.

All members of the hospital team must know the aims, objectives and methods of the training programme; they must also know what is expected of them in terms of teaching.

FIRST STEPS

Setting up a training programme may require careful negotiation with the national or local authorities. A visit to the local hospital, health centre or nursing school may give valuable information about local standards of nursing practice.

Important

- Find out:**
- What is the general **educational level** of the population?
 - What is the existing **system of health care**?
 - What are the Ministry of Health **regulations, guidelines and objectives** regarding training of health workers?
 - What is the **actual level of training and competence** of health workers?
 - What is the existing **system for training** hospital nurses or health workers?
 - What **qualifications** are obtained through this system?
 - Who is teaching** nurses in the existing system ?
 - What **teaching methods** and materials are in common use and locally available?

Formulate the aims and objectives of the programme

- by deciding:**
- How many** people need to be trained?
 - What **specific tasks** do the nursing staff need to be able to perform?
 - What **practical skills** need to be taught to enable them to perform these tasks?
 - What **background knowledge** and language skills do they need to perform these tasks?
 - What is the basic **acceptable standard** of care required in the hospital?
 - What is the **time frame** of the training programme (how urgent is the need)?

What is the level of **general education and previous experience** of the trainees (where is the starting point of the programme)?
 What **material resources** are needed (a teaching room/space, desks, blackboard)?
 What are the **long-term** implications of training (avoid raising false hopes among the trainees)?

SETTING AIMS AND OBJECTIVES

Well-defined *aims and objectives* are essential for the teacher to develop the programme and make clear to the trainees what it is they are being trained to do. Apart from specific teaching objectives there are others which are less tangible but also important. These include promoting teamwork, self-confidence and a sense of achievement and gradually increasing autonomy among previously untrained staff. The programme can be evaluated in terms of the extent to which specific objectives have been met.

For example

Aim and objectives for trainees who have little or no previous experience

Aim: To bring a group of 10 untrained staff to a level where they can work safely under supervision on the surgical wards in 10 days.

Objectives: At the end of the teaching programme, the trainees should be able to

- practise basic hygiene
- observe and report verbally on the patient's general condition
- observe and accurately record, temperature, pulse respiration and blood pressure
- perform simple dressings economically and in aseptic conditions
- meet the needs of a patient confined to bed
- give oral medicines safely and correctly according to prescription.

BEGIN WITH THE BASICS

Only when these are fully understood and practised is it time to move on to the next level.

Regular meetings with hospital staff provide feedback about the progress of the trainees and ensure that the training programme is effective and appropriate.

5.2 ORGANIZING TEACHING

Several basic training courses may be needed to provide enough staff for the wards. *Small groups* (up to ten people) are easier to teach and allows closer contact between teacher and trainees. It is also easier to introduce smaller groups of new trainees onto the wards. Courses can run consecutively until needs are met. Subsequently the teaching nurse continues *bedside clinical teaching* on the wards.

Areas requiring further training can be identified and individual trainees can be given special attention if necessary. Later, regular follow-up study days can be organized for small groups to discuss problems, extend knowledge and develop practical skills.

The Plan for training (see Fig. 40) outlines the three phases involved in bringing groups of new trainees onto the wards. An initial two-week period of classroom-based teaching (see Fig. 41) is followed by a two-week period of practical teaching during routine work on the wards under the close supervision of the teaching nurse. After this, the trainees are fully integrated into the duty roster and normal daily working routines under the close supervision of the experienced ward nurses. A month or two later, it is useful to plan an additional week in the classroom to give the trainees an opportunity to reinforce what they have learned so far, ask questions and review topics that they are finding difficult.

WHAT TO TEACH?

What do the trainees actually need to know in order to do the work that needs to be done ?

The basic objectives should be kept in mind. What is taught in the classroom must have *direct relevance* to what is really done throughout the hospital. Some trainees may already be familiar with practical skills such as bandaging, but lack the basic education to record measurements of blood pressure or temperature. Other related subjects (tropical diseases, nutrition) may be included at a later stage if relevant, necessary or appropriate.

Basic anatomy and physiology must be taught, but think carefully about their relevance to the actual daily work. For example: if the trainees do not need to know the anatomy and physiology of the eyes, ears or pancreas to be able to carry out their work, *it is a waste of time to teach it.*

The sample timetable (see Fig. 41) sets out an initial 10-day period of classroom-based teaching which indicates the *basic subjects to be taught*. This is followed up by two weeks' close supervision on the wards by the teaching nurse and experienced ward nurses. The course can be adapted to the specific needs of the patients, the trainees and the activities of the hospital.

PLAN FOR TRAINING

— to integrate 30 new «nurses» on to the wards over 3 months

WEEK

WEEK	GROUP 1 (10 TRAINEES)	GROUP 2 (10 TRAINEES)	GROUP 3 (10 TRAINEES)	
1	Formal Teaching classroom based (see Fig. 41)			
2				
3	Practical teaching with the Teaching Nurse during the normal work on the wards			
4				
5	Routine work on the wards supervised and taught by the experienced ward nurses	Formal Teaching classroom based (see Fig. 41)		
6				
7		Practical teaching with the Teaching Nurse during the normal work on the wards		
8				
9				Formal Teaching classroom based (see Fig. 41)
10				
11				Practical teaching with the Teaching Nurse during the normal work on the wards
12				
13		Review and development classroom based		
14				
15				Routine work on the wards supervised and taught by the experienced ward nurses
16				
17				
18				
19			Routine work on the wards supervised and taught by the experienced ward nurses	
20				
21				Review and development classroom based

Fig. 40 Example of a plan for an initial basic training programme.

Week 1					
Session	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
1	Welcome <ul style="list-style-type: none"> • tour of the hospital 	Breathing <ul style="list-style-type: none"> • Blood • Circulation of blood 	Bones <ul style="list-style-type: none"> • Muscles • Nerves 	Wounds and wound healing	Anaesthesia
2	Administration <ul style="list-style-type: none"> • contracts • salaries 	Observing the patient <ul style="list-style-type: none"> • looking • listening • touching • smelling 	Observing the patient <ul style="list-style-type: none"> • temperature • pulse • respiration • blood pressure 	Surgery for war wounds	Pre- and post-operative care
3	Objectives of the course <ul style="list-style-type: none"> • working in a surgical hospital for war-wounded 	Visit to the wards <ul style="list-style-type: none"> • talking to the patients 	Practical session: <ul style="list-style-type: none"> • temperature • pulse • respiration • blood pressure 	Pain <ul style="list-style-type: none"> • observing pain • responding to a patient in pain 	Visit to the wards to observe post-operative care
	BREAK	BREAK	BREAK	BREAK	BREAK
4	Hygiene <ul style="list-style-type: none"> • at home • hospital staff • patients 	Food and diet <ul style="list-style-type: none"> • the digestive system 	The skin	Fractures <ul style="list-style-type: none"> • plaster of Paris • traction • external fixation 	Intravenous infusions
5	What is a nurse?	Introduction to the laboratory	Physiotherapy <ul style="list-style-type: none"> • lifting patients • moving patients 	Visit patients on the ward with fractures	Fluid input and output
6		Visit to the laboratory	Visit to the kitchen	Visit to the X-ray department	Review of Week 1

Week 2					
Session	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
1	Medicines used in the hospital	Dressings <ul style="list-style-type: none"> • handling sterile material • handling dirty material 	A day on the wards <ul style="list-style-type: none"> • each trainee must choose a patient to present the following day 	Presentation of patients from previous day <ul style="list-style-type: none"> • discussion 	Final written test (multiple choice)
2	Practical session <ul style="list-style-type: none"> • how to give medicines • how to record medicines given 	Dressings <ul style="list-style-type: none"> • practical session in the classroom 	<ul style="list-style-type: none"> • teaching nurse working together with the trainees 		BREAK
3	Patients' charts and records	Meeting with the head nurse			Special care <ul style="list-style-type: none"> • colostomies • catheters and drains • nasogastric tubes
	BREAK	BREAK	BREAK	BREAK	BREAK
4	Practical session <ul style="list-style-type: none"> • records and charts • temperature • pulse and respiration • blood pressure • fluid balance 	Daily care of the patient on the ward <ul style="list-style-type: none"> • ward routines 	Ward work continued	Revision <ul style="list-style-type: none"> • questions • subjects to be reviewed 	Allocation of trainees to working areas
5	Visit to the operating theatre	Care of the patient in bed			
6	Visit to the sterilization department	Visit to the laundry			

Fig. 41 Example of a two-week basic nursing course.

This sample two-week course includes the essential elements for basic surgical nursing. The content is based on the following assumptions:

- that the people selected for training have a basic education (are literate and numerate)
- that the teacher and trainees can communicate in a common language (using an interpreter if necessary)
- that there is an urgent need to provide people to work on the wards
- that the key people are already in place and the hospital is functioning at a low level (20-30 patients cared for by the experienced nursing staff)

None of the topics are explored in any depth, the aim being simply to familiarize the trainees with the terminology they will need to use and the *environment* in which they will function. The *real learning process* will take place on the wards once they start work.

Five elements of a basic teaching programme

Anatomy and physiology

Covers the essentials of:

- breathing, blood and circulation
- the skeleton, muscles and nerves
- the skin
- the digestive system including food, diet and elimination
- fluid input and output

Basic practical skills for surgical nursing

Basic ward, patient and personal hygiene.

Observing the patient by looking, touching, talking, listening and smelling. Recognizing what is normal and reacting to the abnormal.

Recognizing and responding to a patient in pain.

Practical skills for observing temperature, pulse, respiration and blood pressure and responding to abnormal findings.

Handling clean, sterile or contaminated equipment.

Applying a dressing.

Looking after an intravenous infusion.

The care of a patient confined to bed.

Pre- and post-operative care.

Basic knowledge of the medicines in common use and how medicines are given (the advisability of training unqualified staff to give medicines is questionable; in reality there may be no choice).

Wounds and how they are treated

(directly related to the types of wounds commonly seen in the hospital)

Wounds and how wounds heal.

The basic principles of the treatment of wounds caused by weapons of war.

Fractures, and how to care for patients in plaster of Paris, traction or external fixation.

The care of patients with burns.

An introduction to working on the wards

(to familiarise the trainees with their working environment and routines)

Visits to the wards to observe and participate in the care of patients.

Introduction to ward routines.

A period (a day or half-day) spent on the wards working together with the more experienced nurses and reporting back about their experiences.

Recording and reporting information

Recording temperature, pulse, respiration and blood pressure.

Reading and understanding prescriptions, recording medicines given.

Understanding and recording nursing orders and care given.

Reporting verbally to the nurse or doctor in charge.

THE NEXT STEPS

More complicated practical skills such as giving injections and inserting urinary catheters are later teaching objectives.

The teaching of specialized subjects such as working in the operating theatre, admission room or intensive nursing unit is included as a *next step* for trainees who are identified as suitable for these special areas. The additional practical training in these areas is given once the selected trainees start to work.

HOW TO TEACH?

A combination of formal and informal teaching, both in the classroom and on the wards, helps to keep the attention of the trainees and establishes a link between what they are learning and what they will do later.

Consider

Keep the content of the programme **simple** and straightforward.

Focus the programme on ensuring that the **essentials** are well understood.

Keep the programme **practical**. Everything which is taught has a practical application, with the emphasis on learning by doing.

Teach using the same **simple vocabulary** that is in general use throughout the hospital.

Teach **standard procedures** which are used throughout the hospital.

Most trainees expect a certain amount of formal teaching; in some cultures, classroom teaching is the only form considered valid.

Formal classroom teaching

Advantages:

- makes it possible to teach a large group
- allows trainees concentrate on the subject without being under pressure from the daily workload
- gives an opportunity to practise new skills away from the workplace (trainees can take each others' temperature, blood pressure, etc.)
- may be the best way to teach theoretical subjects (for example, anatomy and physiology)

Disadvantages:

- requires a great deal of preparation by the teacher
- requires space and time away from the workplace
- can be difficult to translate into practical application
- how much the trainees learn depends largely on the teaching skills of the teacher

Written handouts of lectures or teaching sessions are usually welcomed by the trainees. They can be taken home for further study and built up into a file for reference.

However effective formal teaching is, most of the teaching in the hospital takes place *informally* during normal daily work. The most effective way of learning is *at the patient's bedside*.

Informal ward teaching

Advantages:

- directly related to the practical daily work
- allows individual teaching to address individual needs
- can be done by everyone involved in direct patient care

Disadvantages:

- can only be used for one or two trainees at a time
- takes time during the busy working day

Inexperienced staff *learn mostly by example*, copying the behaviour of their colleagues. Bad practices are picked up as easily as good practices. Hospital staff should know they *are teaching* their less experienced colleagues simply by working with them and should behave accordingly. Standardization of nursing procedures reduces confusion.

MAKING THE BEST USE OF RESOURCES

Allocate one room for teaching. This should be in a quiet place, away from the working area of the hospital. The teaching room may also serve as a *resource centre and library* for all medical staff.

Medical and nursing team members should be encouraged to take part in the training programme. The *range of skills within the team* are many and varied and can be used to advantage. Specialists should be encouraged to teach their own subjects however; they must know what to teach and should *follow guidelines* set by the teaching nurse.

Integrating the whole hospital team in the teaching programme promotes teamwork and ensures that standard procedures are followed by everyone.

Subjects which may be taught by specialists

- | | |
|-------------------------------|--|
| Physiotherapist: | <ul style="list-style-type: none">• positioning, lifting and mobilizing patients• basic exercises for patients with limb injuries or paralysed patients |
| Laboratory technician: | <ul style="list-style-type: none">• introduction to the laboratory and blood bank• taking blood samples for haematocrit or malaria smear |
| X-ray technician: | <ul style="list-style-type: none">• introduction to the X-ray department |
| Administrator: | <ul style="list-style-type: none">• explanation of contracts, salary scales, disciplinary procedures, etc. |
| Nurses/head nurse: | <ul style="list-style-type: none">• explanation of the different roles of hospital staff and what they expect from the trainees |
| Surgeons/doctors: | <ul style="list-style-type: none">• specialized surgical/medical topics• what they expect from the nurses |



Fig. 42 Informal practical teaching at the patient's bedside is most effective.

EVALUATING THE PROGRAMME

Are the trainees able to do the job they have been trained for? Are the *objectives* being met? If not, are they the right objectives? Have standards been set too high? Are the teaching methods effective? Evaluation is an *integral part* of any teaching programme. The progress of the trainees, the success of the programme and the methods used should all be assessed. This is a *continuous process* as long as training programmes are running.

Remember that there is a difference between evaluating the success of the teaching programme and evaluating the impact of the teaching on the quality of the work. The programme may need to be *changed, developed or improved* depending on the needs of the patients, the motivation, skills and needs of the trainees, and the development of the work within the hospital.

Methods of evaluation include:

- working together with the trainees; the nurses in charge of the wards and the trainees themselves will also give regular and valuable feedback
- written tests; these may indicate what the trainees have learned from the formal classroom sessions (they should not be taken as the definitive measure of their practical performance)

Trainees may need a written or oral test as a formality; and this also provides an early opportunity to discharge those who are unsuitable.

Issuing a certificate to trainees who successfully complete a programme of training can cause problems. What is the certificate for? How will it be used or, more importantly, misused? Are you authorized to give out certificates? Will it raise false hopes of getting future employment?

At the end of such a modest training programme the trainees may have only learned enough to mask their ignorance; understanding comes with experience.

APPENDICES

APPENDIX 1

LIST OF CONSUMABLE MEDICAL SUPPLIES NEEDED FOR 100 HOSPITAL ADMISSIONS OF WAR-WOUNDED

The following list of consumable surgical supplies covers the needs for the initial treatment, the range of surgical interventions and the post-operative nursing management (including follow-up outpatient care) of wounded patients as described in the preceding chapters.

The figures are based on the consumption of supplies in ICRC hospitals and are **approximate**.

Quantities will vary according to the individual workload of each hospital, the type of patients admitted, the nature of weapons used in the conflict and the location of the hospital. For example, mine injuries require a lot of blood and dressing material, burns require a lot of intravenous fluids and special dressings, and the proportion of injured children or obstetric emergencies may be higher than indicated here.

This list is best used as a **guide** for estimating the **initial quantity** and type of supplies required for the anticipated workload. Once this and the type and pattern of admissions is established, surgical supplies should be adapted to the individual needs of the hospital. In the same way, the quantities given here are only for the running stock; **emergency stocks are not included**.

The quantities are based on the “decimal point theory”, i.e., is the need for any item 10, 100 or 1,000? rather than is it 37 or 38? Be aware that any mistakes in quantity estimation will be magnified in the same way.

The actual quantities ordered for setting up the hospital may depend on how items are packed by the manufacturer. For example, it is not recommended to break open sealed packages of 1,000 tablets to remove 500.

Items have been categorized as “**essential**”, “**important**” and “**nice to have**”. Luxury items are not included in the list. This classification depends on the standard of health care which existed before the war, and the qualifications and experience of the medical staff.

Key

ess = essential item

imp = important item

nth = “nice to have” item

C = liable to customs restrictions on export/import

✈ = air transport restrictions

❄ = need for a cold chain (2-8° C, not to be frozen)

💧 = not to be frozen (has implications for storage)

⚠ = danger of misuse

Drugs and pharmaceuticals

Item	Unit	Quantity	Category
Adrenaline 1 mg/ml	amp	10	ess
Antacid (chewing tabs)	tab	1,000	ess
Ampicillin 500 mg	vial	200	ess
Amoxicillin 250 mg	caps	1,300	ess
Chloramphenicol 250 mg	caps	500	ess
Chloramphenicol eye drops 0.5%	btl	12	ess
Chloramphenicol 1 gm	vial	110	ess
Cotrimoxazole 480 mg	tab	700	ess
Cotrimoxazole syrup 240 mg/5ml in 50 ml	btl	10	ess
Dexamethasone 4 mg/ml	amp	6	ess ♣☞
Diazepam 10 mg	amp	200	ess C
Diazepam 5 mg	tab	600	ess C
Digoxin 0.5 mg	amp	10	ess
Disinfectant for instruments and surfaces - concentrated or tablets to make up to	litre	2,500	ess
Ferrous sulphate 200 mg + folic acid 0.25 mg	tab	2,000	ess
Furosemide 20 mg	amp	20	ess
Gentamicin 80 mg/2ml	amp	200	ess ☞
Hyoscine butylbromide 20 mg	amp	10	ess
Hyoscine butylbromide 10 mg	tab	250	ess
Lidocaine gel 2% 15 gm	tube	15	ess
Lubricating jelly 50 gm	tube	10	ess
Metoclopramide 10 mg	amp	60	ess
Metronidazole 500 mg/100 ml	vial	140	ess
Metronidazole 200 mg	tab	1,300	ess
Oral rehydration salts - WHO formula for 1 litre	bag	50	ess
Paracetamol 500 mg	tab	2,000	ess ☞
Paracetamol paediatric 100 mg tabs	tab	1,000	ess
Penicillin V 500 mg	tab	6,000	ess
Penicillin G, 5 mega	vial	600	ess
Pentazocine 30 mg	amp	800	ess C☞
Pentazocine 25 mg	tab	1,400	ess C☞
Potassium chloride 15% 10 ml	amp	80	ess ♣
Povidone iodine soln. 10% aqueous	litre	120	ess

Povidone iodine scrub 7.5%	litre	100	ess
Silver sulphadiazine 1% 500 gm	jar	70	ess
Tetanus vaccine 0.5 ml	amp	220	ess ☼
Tetanus immunoglobulin 250 IU	amp	160	ess ☼
Tetracycline eye oint. 1% 5 gm	tube	15	ess
Water for injection 5 ml	amp	1,300	ess
Acetylsalicylic acid 300 mg	tab	360	imp ☼
Aminophylline 250 mg/ml	amp	2	imp ♠
Chlorpromazine 25 mg	tab	15	imp ☼
Chlorpromazine 50 mg	amp	7	imp ☼
Cloxacillin 250 mg	vial	220	imp
Cloxacillin 250 mg	caps	1,000	imp
Diclofenac 25 mg	tab	1,000	imp
Furosemide 40 mg	tab	5	imp
Heparin 5,000 IU/5 ml	vial	3	imp ☼
Hydrocortisone 100 mg	vial	10	imp
Metaclopramide 10 mg	tab	130	imp
Paraffin - liquid	litre	10	imp
Salbutamol 2 mg	tab	70	imp
Corticosteroid ointment	tube	40	nth
Cough syrup 120 ml	btl	300	nth ☼
Nitrofurantoin 100 mg	tab	10	nth
Urografin 76% 20 ml	amp	3	nth

Anaesthetic and related drugs

Item	Unit	Quantity	Category
Atropine 0.5 mg/ml	amp	200	ess
Bupivacaine 0.5%	amp	15	ess
Ketamine 500 mg/10 ml	vial	100	ess C
Lidocaine heavy 5% 2ml	vial	10	ess
Lidocaine with adrenalin 2% 50 ml	vial	5	ess
Lidocaine 1% 50 ml	vial	10	ess
Morphine 10mg/ml	amp	30	ess C☒
Naloxone 0.4 mg/ml	amp	2	ess ♠
Neostigmine 0.5 mg/ml	amp	50	ess
Pancuronium 10 mg	amp	20	ess ☼
Suxamethonium 1% 10 ml (preferably 100 mg dry substance)	vial	30	ess ☼
Thiopentone 500 mg	vial	20	ess C
Ephedrine 50 mg/ml	amp	15	imp C
Calcium gluconate 10% 10 ml	amp	10	nth
Halothane 250 ml	btl	2	nth →

Infusions

Item	Unit	Quantity	Category
Dextrose 5% 1000 ml	btl	300	ess
Ringer's lactate 1000 ml	btl	800	ess
Macromolecules 500 ml	btl	70	ess
Sodium chloride 0.9% 1000 ml (includes quantity for burns dressings)	btl	700	ess
Mannitol 20% 500 ml	btl	3	imp ♠

Anaesthetic material

Item	Unit	Quantity	Category
Endotracheal tubes - disposable:			
Uncuffed:			
Nos. 4 and 4.5	pcs	2	ess
No. 5	pcs	3	ess
Cuffed:			
No. 5	pcs	3	ess
No. 6	pcs	3	ess
No. 7	pcs	4	ess
No. 8	pcs	14	ess
No. 9	pcs	4	ess
Suction catheter CH 10,14,18, each size	pcs	100	ess
Oropharyngeal airways			
Nos. 2,3,4, each size	pcs	5	ess
Tracheostomy tubes - disposable			
cuffed, sizes 6,7,7.5,8,9, each size	pcs	2	ess
Spinal needles - disposable G 22	pcs	5	ess ☠
Spinal needles - disposable G 25	pcs	30	ess ☠
Soda lime 1 kg	can	3	imp

Dressing material, splints, plaster of paris

Item	Unit	Quantity	Category
Adhesive tape 5 cm x 5 m	roll	60	ess
Adhesive tape 2.5 cm x 5 m	roll	200	ess
Cotton wool 1 kg	roll	130	ess
Elastic adhesive tape 7.5 cm	pcs	10	ess
Elastic bandages 7.5,10,15 cm each size	pcs	1,000	ess
Elastic gauze bandages 7.5,10 cm each size	pcs	1,500	ess
Gauze rolls 1 m x 100 m	pcs	10	ess
Plaster of Paris 10,15, 20 cm (total quantity)	roll	600	ess
Tubular gauze bandage			
10 cm x 20 m, 15 cm x 20 m (total quantity)	roll	40	ess
Vaseline gauze (sterile) 10x10 cm	pcs	120	ess
Gauze compresses 10 x 10, 10 x 20 cm			
(total quantity)	pcs	6,000	nth

Gloves

Item	Unit	Quantity	Category
Gloves, latex, non-sterile, large	pcs	2,000	ess
Gloves, surgical, sterile, sizes: 6.5, 7, 7.5, 8, 8.5 (total quantity)	pairs	950	ess
Talcum powder 400 gm	can	1	ess

Injection material

Item	Unit	Quantity	Category
Butterfly needles G 21	pcs	50	ess
Butterfly needles G 25	pcs	50	ess
Infusion sets - adult	pcs	400	ess
Infusion sets - paediatric	pcs	10	ess
IV needles, disposable G18, 20, 22 (total quantity)	pcs	1,000	ess
IV cannulae G14,16,18,20,22 (total quantity)	pcs	500	ess
Syringes, disposable 10 ml	pcs	900	ess
Syringes, disposable 5 ml	pcs	700	ess
Syringes, disposable 2 ml	pcs	1,200	ess
Syringes, disposable 50 ml (catheter tip)	pcs	70	ess
Stopcock, 3-way	pcs	20	nth

Surgical material

Item	Unit	Quantity	Category
Autoclave tape	roll	4	ess
Blades, surgical No. 10	pcs	200	ess
Blades, surgical No. 11	pcs	300	ess
Blades, surgical No. 15	pcs	100	ess
Blades, surgical No. 20	pcs	300	ess
Blades, dermatome	pcs	30	ess
Blades, shaving/razor	pcs	70	ess
Colostomy bags, disposable 45 mm	pcs	640	ess

Drains, tube (preferably soft silicone) 10 m	roll	1	ess
Gigli saw wire 50 cm	pcs	10	ess
Foley catheters with balloon sizes CH 10, 14,16, each size	pcs	40	ess
Sterilization paper 1 m x 1 m	sheet	500	ess
Stomach tube CH 8,12,14,16,18,20	pcs	30	ess
Thoracic catheters with trocar CH 16, 24 ,32 each size	pcs	10	ess
Urine bags, 2-litre with tap	pcs	520	ess
Drainage sheets, corrugated	pcs	2	imp
Suction drainage sets, large	pcs	5	imp
Suction drainage sets, small	pcs	10	imp
Thoracic catheters without trocar CH 36	pcs	2	imp
Face masks disposable (medium)	pcs	100	nth

X-Ray material

Item	Unit	Quantity	Category
X-ray film 18 x 24 cm	pcs	20	imp
X-ray film 24 x 30 cm	pcs	140	imp
X-ray film 30 x 40 cm	pcs	110	imp
X-ray film 35 x 43 cm	pcs	210	imp
Developer fluid 1 litre	btl	30	imp
Fixer fluid 1 litre	btl	30	imp

Blood bank supplies

All the following items (in addition to basic laboratory equipment and supplies) are essential if blood transfusion is given. Blood must be tested.

Item	Unit	Quantity
Blood bags 450 ml	pcs	100
Blood transfusion sets	pcs	100
Serum anti A/B/AB/D 10 ml (each)	btl	3
Hepatitis B/C tests	test	100
HIV tests	test	100
Syphilis tests	test	100

Malaria test reagents and equipment (slides, stain, etc.)
Capillary tubes for haematocrit estimation

Sutures

Suture	Size	Length	Needle Size/Type	Quantity
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Skin closure:

Prolene	0	1.00 m	40 mm cutting	54
Prolene	2/0	1.00 m	40 mm cutting	216
Prolene	3/0	0.45 m	25 mm cutting	72

Vascular:

Prolene	5/0	0.75 m	13 mm 2 needles	12
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Peritoneum/muscle/anastamosis:

Vicryl	1	0.90 m	40 mm round-bodied	36
Vicryl	0	0.75 m	40mm round-bodied	36
Vicryl	2/0	0.75 m	30mm round-bodied	72
Vicryl	3/0	0.75 m	25mm round-bodied	72

Liver:

Chromic catgut	1	0.75 m	63 mm hepatic blunt needle	12
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Ligatures:

Vicryl	0	1.5 m		12
Vicryl	2/0	1.5 m		72
Vicryl	3/0	1.5 m		12

All the above may be replaced by silk or catgut.

APPENDIX 2

SURGICAL INSTRUMENT SETS

BASIC SETS

Wound set - 15 sets (pack in large kidney dish)

Instrument	No. required
Sponge holders	2
Towel clips	2
Scalpel handle (No. 4)	1
Dressing forceps (plain)	1
Tissue forceps (toothed)	1
Scissors (Mayo)	1
Scissors (Metzenbaum)	1
Artery forceps	10
Allis tissue forceps	2
Curette (double-ended)	1
Needleholder (medium)	1
Kocher forceps (straight)	2
Retractor (Langenbeck)	2
Retractor (self-retaining)	1
Bone nibbler	1

Minor set - 3 sets (also use as a paediatric set or tracheotomy set)

Instrument	No. required
Sponge holders	2
Towel clips	6
Scalpel handle (No. 3)	1
Adson forceps (plain)	1
Adson forceps (toothed)	1
Dressing forceps (plain)	1
Tissue forceps (toothed)	1
Scissors (Mayo)	1
Scissors (Metzenbaum)	1
Scissors (Metzenbaum - short)	1
Mosquito haemostats (straight)	5
Mosquito haemostats (curved)	10
Artery forceps	5
Allis tissue forceps	2
Babcock tissue forceps	2
Needleholder (small)	1
Needleholder (medium)	1
Nerve hook	1
Retractors (double-ended)	2

Laparotomy set - 4 sets

Instrument	No. required	Instrument	No. required
Sponge holders	2	Allis tissue forceps	2
Towel clips	6	Babcock tissue forceps	2
Scalpel handle (No. 3)	1	Kocher forceps	2
Scalpel handle (No. 4)	1	Needleholders (short)	2
Dressing forceps (medium)	1	Needleholders (medium)	2
Dressing forceps (long)	1	Needleholders (long)	2
Tissue forceps (medium)	1	Retractor (Doyen)	1
Tissue forceps (long)	1	Retractors (sharp)	2
Scissors (Mayo)	1	Retractors (Langenbeck)	2
Scissors (Metzenbaum - medium)	1	Retractors (double-ended)	2
Scissors (Metzenbaum - long)	1	Retractor (self-retaining, large)	1
Artery forceps (short)	10	Intestinal clamps	
Artery forceps (medium)	5	(Doyen - straight)	2
Artery forceps (long, straight)	2	Intestinal clamps	
Sucker (Yankauer)	1	(Doyen - curved)	2
Artery forceps (long, curved)	2	Sucker (Poole)	1

SUPPLEMENTARY SETS

Amputation - 4 sets
(use with Wound set)

Instrument	No. required
Periosteal elevator	1
Bone file	1
Bone nibbler	1
Bone cutter	1
Gigli saws	2
Sucker (Poole)	1
Gigli saw handles	2

Caesarian section set - 1 set
(use with Laparotomy set)

Instrument	No. required
Green Armytage forceps	2

Craniotomy set - 1 set
(use with Minor set)

Instrument	No. required
Scalpel handle (No. 4)	1
Scissors (Potts)	1
Needleholder (medium)	1
Kocher forceps	2
Periosteal elevator	1
Dissectors	2
Gigli saw guide	1
Brace and connector plus burrs	1 set
Cannula for syringe	1
Bone punch	1

Bone set - 1 set
(for bone grafts use with
Laparotomy set)

Instrument	No. required
Bone levers	2
Periosteal elevator	1
Curette (double-ended)	1
Osteotomes	2
Chisels	2
Gouges	2
Hammer	1
Bone hook	1
File	1
Bone nibbler (long)	1
Bone nibbler (short)	1
Bone cutter (long)	1
Bone cutter (short)	1
Bone holders	2

Eye set - 1 set

Instrument	No. required
Spud or knife	1
Dressing forceps (fine)	1
Tissue forceps (fine)	1
Micro forceps (plain)	1
Micro forceps (toothed)	1
Micro forceps (angled)	1
Retractor (adjustable)	1
Retractor (self-retaining)	1
Retractor (lid)	1
Scissors (enucleation)	1
Scissors (iris)	1
Scissors (curved)	1
Scissors (corneal) left	1
right	1
Hook (muscle)	1
Hooks (skin)	2
Chalazion forceps	1
Needleholders	2

SUPPLEMENTARY SETS (continued)

Gynaecology set - 1 set

(for dilatation and curettage)

Instrument	No. required
Sponge holders	2
Towel clips	5
Tenaculum forceps	2
Dilators (Hegar)	1 set
Uterine curettes (blunt)	2
Uterine curettes (sharp)	2
Ovum forceps	1
Dressing forceps	1
Uterine sound	1
Vaginal speculum	1

Suture sets - 10 sets

(pack in kidney dish)

Instrument	No. required
Towel clips	4
Scalpel handle (No. 3)	1
Dressing forceps	1
Tissue forceps	1
Scissors (Mayo)	1
Artery forceps	2
Kocher forceps	1
Needleholder	1

Vascular set - 1 set

(use with Minor set)

Instrument	No. required
Scalpel handle (No. 7)	1
Adson forceps (plain)	1
DeBakey dissecting forceps	1
Scissors (metzenbaum - medium)	1
Scissors (Potts)	1
Artery forceps (small, curved)	5
Artery forceps (medium, curved)	5

Skin graft set - 3 sets

(pack in kidney dish)

Instrument	No. required
Sponge holders	2
Towel clips	5
Scalpel handle (No. 3)	1
Adson forceps (plain)	2
Adson forceps (toothed)	2
Needleholder (fine)	1
Metal plates (or wooden boards, small)	2
Skin graft knife and blade (this should be packed separately; it needs special care)	1

Thorax set - 1 set

(use with laparotomy set)

Instrument	No. required
Artery forceps (long, straight)	5
Artery forceps (long, curved)	5
Allis tissue forceps (long)	2
Babcock tissue forceps (long)	2
Periosteal elevator	1
Rib raspatories (left)	1
(right)	1
Rib cutter	1
Sternum cutter	1
Rib retractor (self-retaining)	1
Lung retractor	1
Rib approximator	1

Instrument	No. required
Needleholder (medium)	1
Retractors (Langenbeck)	2
Retractors (small self-retaining)	2
Suckers (fine with stilette)	2
Vascular clamps (various sizes)	7
Vascular clamps (bulldog, various sizes)	6

ADDITIONAL SETS AND EXTRA INSTRUMENTS

Instruments	No. of sets/items
Urethral sounds	1 set
Tooth extraction forceps	1 set
Maxillary wiring	1 set
External fixation (large)	2 sets
External fixation (small)	1 set
Hand drills	3
Bone instruments (chisels, gouges, etc.)	2 sets
Bone cutters and nibblers	2 sets
General (scissors, needleholders, forceps, scalpel handles)	4 sets
Volkman currettes (sharp spoons)	4
Retractors (Langenbeck, self-retaining)	4 sets
Steinmann pins (various sizes)	10 (each size)
Stirrups for traction (small, medium, large)	10 (each size)
Chest drain bottles and connecting tubes	20
Plaster of Paris removal instruments	1 set
PLUS: (wrapped in paper and sterilized)	
Kidney dishes	30
Gallipots	30
Ward dressing sets (2 dressing forceps, 5 compresses in kidney dish)	50
Cheatles forceps and jars	10

APPENDIX 3
BASIC ANAESTHETIC EQUIPMENT
(FOR EACH TABLE)

Item	Size	No. required
Laryngoscope handle		1
Blades for laryngoscope	55 mm	1
	90 mm	1
	110 mm	1
Spare bulbs for laryngoscope		3
Spare batteries for laryngoscope		4
Sphygmomanometers	adult cuff	2
Sphygmomanometer	child cuff	1
Stethoscopes		2
Tourniquets for venepuncture		2
Face masks - anaesthetic -	0	2
	1	2
	2	2
	3	2
	5	2
Harness for face mask		1
Mouth gag (Ferguson)	adult	1
Suckers (Yankauer, with fixed nozzle)		3
Rebreathing bags and circuits (complete sets, with tubing, connectors and valves)	adult	2
	child	2
Catheter mounts		2
Tracheal adapters		2
Tracheal connectors		2
Endotracheal introducer (malleable)	adult	1
	child	1
Introducing forceps (Magill)	adult	1
	child	1
Artery forceps (non-toothed)	small	3
Pressure bag for infusions		1

APPENDIX 4

ABBREVIATIONS

In most hospitals, the use of abbreviations for medical terms, drug prescriptions and medical and nursing orders helps medical staff write notes and orders quickly. The same abbreviations must be used by all hospital staff. This may seem obvious, but in a situation where medical personnel come from many different backgrounds, they will be accustomed to different abbreviation systems.

Here is a list of abbreviations commonly used in independent ICRC hospitals.

GSW	Gunshot Wound	BP	Blood Pressure
SI	Shelling Injury	T	Temperature
MI	Mine Injury	P	Pulse
AKA	Above Knee Amputation	R	Respiration
BKA	Below Knee Amputation	IV	Intravenous
#	Fracture	IM	Intramuscular
L/A	Local Anaesthetic	NPO	(Nil Per Os) Nothing by mouth
G/A	General Anaesthetic	BID	twice a day
DPC	Delayed Primary Closure	TID	3 times a day
ROS	Removal Of Sutures	QID	4 times a day
ROD	Removal Of Drain	PRN	when required
POP	Plaster Of Paris	ml	millilitre
SSG	Split Skin Graft	mg	milligramme
(R)	Right	gm	gramme
(L)	Left	kg	kilogramme
Hb	Haemoglobin	cm	centimetre
Hct	Haematocrit	D/C	Discharge

FURTHER READING

(The following list of books might also form the basis of the hospital's medical reference library.)

WOUND MANAGEMENT

Coupland, R.M., *The Red Cross wound classification*, ICRC, 1991

Coupland, R.M., *Amputation for war wounds*, ICRC, 1992

Coupland, R.M., *War wounds of limbs: Surgical management*, Butterworth/Heinemann, 1993

Dufour, D.(ed.), *Surgery for victims of war*, ICRC, 1988

Gray, R., *War wounds: Basic surgical management*, ICRC, 1994

King, M.(ed.), *Primary Surgery*, Vol. 2, "Trauma", Oxford University Press, 1990

Rowley, D.I., *War wounds with fractures: A guide to surgical management*, ICRC, 1996

Surgery at the district hospital: Obstetrics, gynaecology, orthopaedics, traumatology, World Health Organization, 1991

ANAESTHESIA

Dobson, M.B., *Anaesthesia at the district hospital*, World Health Organization, 1988

King, M.(ed.), *Primary anaesthesia*, Oxford University Press, 1994

LABORATORY

Health laboratory facilities in emergency and disaster situations, World Health Organization, Regional Office for the Eastern Mediterranean, 1994

X-RAY

World Health Organization basic radiological system: Manual of radiographic technique, World Health Organization, 1985

World Health Organization basic radiological system: Manual of darkroom technique, World Health Organization, 1985

TRAINING

Guilbert, J.-J., *Educational handbook for health personnel*, World Health Organization, Offset Publication No. 35, 1987

Werner, D., Power, B., *Helping health workers learn*, Macmillan, 1984

Werner, D., Power, B., *Where there is no doctor*, Macmillan, 1985

NUTRITION

Silk, D.B.A., *Nutritional support in hospital practice*, Blackwell Scientific Publication, 1983

INTERNATIONAL HUMANITARIAN LAW

Baccino-Astrada, A., *Manual on the rights and duties of medical personnel in armed conflict*, ICRC/League of Red Cross and Red Crescent Societies, 1982

OTHER

Perrin, P., *War and public health: Handbook on war and public health*, ICRC, 1996

Clinical guidelines: Diagnostic and treatment manual, Médecins sans frontières, 1993

Essential drugs: Practical guidelines, Médecins sans frontières, 1993

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The International Committee of the Red Cross (ICRC) is an impartial, neutral and independent organization whose exclusively humanitarian mission is to protect the lives and dignity of victims of war and internal violence and to provide them with assistance. It directs and coordinates the international relief activities conducted by the Movement in situations of conflict. It also endeavours to prevent suffering by promoting and strengthening humanitarian law and universal humanitarian principles. Established in 1863, the ICRC is at the origin of the International Red Cross and Red Crescent Movement.

NAME:
COMING FROM:

NUMBER:
MALE/FEMALE AGE:

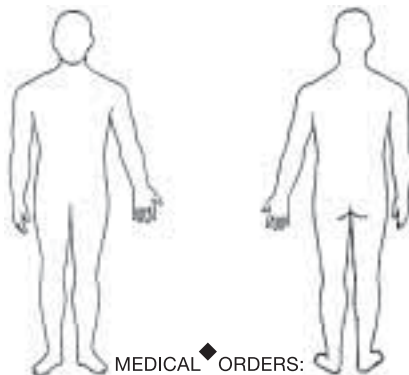
DATE: TIME: GSW: MI: SHELL: BOMB: BURNS: OTHER:

TIME SINCE INJURY:

GENERAL CONDITION:

PULSE: BP: RESP: TEMP:

ANTIBIOTICS: ATS/ANATOXAL:



◆ MEDICAL ASSESSMENT

Hb:

IV fluids:

Hct:

NPO from:

X match:

TRIAGE: I- Immediate surgery II- No surgery III- Wait for surgery

◆ OPERATION NOTE

◆ POST OPERATIVE INSTRUCTIONS

Antibiotics:

to stop:
Position Physio / drains / traction

By mouth: Food / Fluids / Nil

Other:

Next in OT:

◆ PENETRATING WOUND SCORE ◆

E	<input type="checkbox"/>	X	<input type="checkbox"/>	C	<input type="checkbox"/>	F	<input type="checkbox"/>	V	<input type="checkbox"/>	M	<input type="checkbox"/>
E	<input type="checkbox"/>	X	<input type="checkbox"/>	C	<input type="checkbox"/>	F	<input type="checkbox"/>	V	<input type="checkbox"/>	M	<input type="checkbox"/>

◆ OTHER INFORMATION



This book is intended for anyone who is faced with the task of setting up or running a hospital which admits war-wounded. It is a practical guide based on the experience of four nurses who have managed independent hospitals set up by the International Committee of the Red Cross. It addresses specific problems associated with setting up a hospital in a difficult and potentially dangerous environment. It provides a framework for the administration of such a hospital. It also describes a system for managing the patients from admission to discharge and includes guidelines on how to manage an influx of wounded. These guidelines represent a realistic and achievable standard of care whatever the circumstances.



ICRC