# FO-11 Humanitarian medicine with little: what MSF, the ICRC and the WHO actually carry and do

HEALING after the FALL, research library, FO-11

Researched 10 October 2026 by Claude Opus agent for THRIVING after the FALL, Book Four. Library document, unverified.

### How to read this document

Humanitarian medicine is the closest tested answer to the book's question: what do a few thousand people need when the hospital, the pharmacy and the state have gone? The kits of MSF, the ICRC, WHO, UNHCR, UNICEF and UNFPA are forty years of distilled experience, and also political and commercial documents.

This report reads them for what they put first, what they assume, and which assumptions the Fall removes. Three assumptions run through every kit and manual:

- **Resupply.** Each kit is sized for a population over a fixed period, usually three months. None is designed to be the last box.
- **Trained staff.** Even "basic" modules assume a health worker who can read a dosing table.
- **Referral.** Every manual assumes the patient too sick for this level can be sent somewhere better.

The Fall breaks all three. Figures carry their source. My own arithmetic, and claims I could not confirm, carry [VERIFY]. Cross-references, for orientation only: ME-09, OR-06, OR-07, IN-05, FO-08, SY-09.

## 1. Findings by section

### 1.1 What the humanitarian system learnt to put first

The founding evidence is the camp mortality of the 1980s. Toole and Waldman (1990) found acute-phase death rates in refugee and displaced populations up to 60 times the expected rate, worst in Ethiopia in 1985 and Sudan in 1988 (abstract read). The excess fell most on children. The causes were common: measles, diarrhoea, respiratory infection and malaria, on a ground of malnutrition. The killers in a broken system are ordinary infections in hungry children, and the first response is public health.

MSF codified this as ten priorities in *Refugee Health* (MSF 1997) and still teaches them in this order (MSF 2011):

1. Initial assessment
2. Measles immunisation
3. Water and sanitation
4. Food and nutrition
5. Shelter and site planning
6. Health care in the emergency phase
7. Control of communicable diseases

8. Surveillance
9. Human resources and training
10. Coordination

Curative care is sixth. Measles vaccine is second, ahead of water, because measles killed malnourished children so fast. That vaccine needs 2 to 8°C and must be discarded 6 hours after reconstitution (WHO prequalification listing), so after the Fall the village inherits the risk the second priority was meant to remove.

UNHCR defines an emergency as a doubling of the baseline crude or under-five death rate, or, where the baseline is unknown, 1 death per 10,000 per day (crude) and 2 per 10,000 per day (under-fives), thresholds set in 1985 (UNHCR, mortality guidance). ALNAP notes that 1 per 10,000 per day is now about four times the sub-Saharan baseline, and regional thresholds of about 0.9 and 2.3 are used (ALNAP n.d.). For a district of 3,000, the old threshold is one death every three days, about 110 a year [VERIFY, my arithmetic].

### 1.2 The WHO Model List of Essential Medicines

The first Model List appeared in 1977. Secondary sources give its length as 186 or 208 medicines, and I could not settle which [VERIFY]. By 2002 at least 156 countries had national lists (Quick and colleagues 2002). Laing and colleagues (2003) called the concept a public-health success under pressure from the prices of new medicines (abstract read).

The 23rd list (2023) held 502 medicines for adults and 361 for children. The committee considered 85 applications and rejected 32, including GLP-1 agonists for obesity and some cancer immunotherapies, partly on cost. WHO says inclusion is "only on the basis of solid evidence for safety and efficacy" (WHO 2023). The 24th list followed in September 2025, after a committee meeting on 5 to 9 May 2025 that considered 59 applications (WHO 2025, ICCP 2025). Its total of 523 comes from a secondary source (Wikipedia) [VERIFY].

Its core section serves a basic health system, and its complementary section needs specialists or diagnostics.

**Its politics.** Persaud and colleagues (2019) compared national lists in 137 countries:

- 2,068 different medicines appeared across them.
- Lengths ran from 44 to 983 (median 310).
- The median list differed from the WHO list by 296 medicines.
- 60% of listed medicines appeared on 10% of lists or fewer.
- Disease burden explained only part of the variation.

The historian Jeremy Greene describes the concept as contested from the start by industry (known to me only from search summaries [VERIFY]). Cost decides what is excluded, and national politics decides what is copied.

**For the village**, the EML is the right salvage starting point, because its items fill every pharmacy. But it serves a working health system, and about half of it is irrelevant after the Fall (section 2).

### 1.3 The Interagency Emergency Health Kit (IEHK)

**History and purpose.** WHO assembled the first Emergency Health Kit in 1982, for 10,000 displaced people for three months, from what MSF, UNHCR and UNICEF had learnt in camps in Thailand and the Horn of Africa (Cullen, Taithe and Winters 2026). The current version is IEHK 2017 (WHO 2019). WHO calls it a life-saving kit for the first phase, "not a resupply kit". Reordering whole kits piles up unwanted items, so later orders should follow measured consumption (WHO 2019).

**Structure and staffing** (WHO 2019, Imres 2017):

- **Basic module:** ten units, each for 1,000 people for three months. It is for "health workers with limited training" and holds oral and topical medicines only.

- **Basic malaria module:** artemether-lumefantrine in four age-banded blisters, and 800 rapid tests per unit.
- **Supplementary module:** for 10,000 people for three months, for physicians or senior health workers, used only with basic modules. It holds injectables, controlled drugs, equipment and renewables.
- **Optional modules:** controlled substances, cold chain, post-exposure prophylaxis, documentation.

**Basic module contents** per 1,000 people for three months (WHO 2019):

| Item | Quantity | Main use |
|---|---|---|
| Amoxicillin 250 mg dispersible | 3,000 | Pneumonia, other bacterial infections |
| Paracetamol 500 mg / 100 mg dispersible | 2,000 / 1,000 | Pain, fever |
| Ibuprofen 200 mg | 4,000 | Pain, inflammation |
| Ferrous sulfate with folic acid | 2,000 | Anaemia, pregnancy |
| Zinc 20 mg dispersible | 1,000 | Diarrhoea in children |
| ORS sachets | 200 | Dehydration |
| Albendazole 400 mg | 200 | Worms |
| Omeprazole 20 mg | 100 | Ulcer, reflux |
| Tetracycline 1% eye ointment | 50 tubes | Eye infection, trachoma |
| Miconazole 2% cream | 20 tubes | Fungal skin infection |
| Benzyl benzoate 25% | 1 L | Scabies |
| Chlorhexidine 5% / povidone-iodine 10% | 1 L / 12 bottles | Antiseptic |

With dressings, gloves, soap and thermometers it weighs about 38 kg (WHO 2019) and costs about US$450 (UNICEF Supply Catalogue). An adult amoxicillin course (1 g three times daily for 5 days) is 60 tablets, and a 10 kg child's is about 18. So 3,000 tablets cover about 50 adult or 160 child courses per 1,000 people per quarter [VERIFY, my arithmetic].

**Supplementary module highlights** per 10,000 for three months (WHO 2019, Imres 2017):

- **Anaesthesia and pain:** ketamine 50 mg/ml (25 vials), lidocaine 1% (50), and morphine injection (50) and tablets (200).
- **Emergencies:** adrenaline (50), hydrocortisone (50), diazepam injection (200), magnesium sulfate (30), calcium gluconate (10), naloxone (10).
- **Infection:** ceftriaxone 1 g (800), benzylpenicillin (250), benzathine penicillin (50), cefalexin (2,000), doxycycline (3,000), metronidazole (2,000).
- **Fluids:** Ringer's lactate 500 ml (200), glucose 5% (100).
- **Chronic and acute non-communicable disease:** soluble and NPH insulin (20 vials each), furosemide, hydrochlorothiazide, salbutamol and beclometasone inhalers (75 each).
- **Mental health and epilepsy:** carbamazepine, fluoxetine, haloperidol, biperiden.
- **Obstetric:** oxytocin (200), misoprostol 200 μg (60).
- **Water:** NaDCC 1.67 g tablets (1,200).

Equipment includes a 20.9-litre pressure-cooker steriliser with kerosene stove, three ceramic filters, a pulse oximeter, a glucometer, delivery and suture sets, and MUAC tapes. A full kit (ten basic units plus one supplementary) weighs about 1,150 kg in 63 boxes of 25 kg or less (WHO 2019).

**What 2017 changed** (WHO 2019) shows what the field learnt:

- Insulin, a glucometer, a pulse oximeter and acute non-communicable disease drugs were added, because wars in Syria and Iraq brought older patients.
- Carbamazepine replaced phenobarbital, a controlled drug held up at customs. Logistics, not pharmacology, decided.
- Fluoxetine replaced amitriptyline, dangerous in overdose, and artesunate injection replaced quinine tablets.

A 2024 revision merges basic medicines and renewables and splits the supplementary module into oral, injectable and mental health units, for use until 2030 (WHO, IEHK page). I could not read its contents.

**Assumptions about disease and staff.** The 2017 manual cites burden of disease, expert opinion and the EML, but publishes no morbidity table or consultation rate, and I could not find one [VERIFY]. Cullen, Taithe and Winters (2026), working from MSF and WHO archives, recover the original designers' assumptions:

- About half the population would be under 14.
- A referral system would take patients needing "more sophisticated treatment".
- About 500 of 10,000 might be ill at any one time.
- The kit served, in an MSF official's words, "a standard population in a relatively normal state of health in a tropical region".

In 1986 MSF asked for the shortest list, no duplicates and no syrups or drops. Weight and volume became the language of selection, at a cost. The kit carried chloroquine only as 150 mg tablets, though Francophone practice used 100 mg tablets for safer dosing of small children, and the authors write that "logistics won out over safety concerns". Kits promised within 48 hours took 14 to 30 days, and contents varied with warehouse stock (Cullen, Taithe and Winters 2026).

**The gap.** Tonelli and colleagues (2016) estimated, per 10,000 people per 90 days, 68 to 183 cases of severe hypoglycaemia, 26 to 71 of severe hyperglycaemia, 11 to 23 heart attacks and 9 to 32 strokes. An acute-only addition would cost about US$2,078, about 10% of the kit. For a district of 3,000, that is roughly 280 to 410 acute presentations a year in an older, medicated population [VERIFY, my arithmetic].

**Cold chain and resupply.** Only insulin and most oxytocin need refrigeration, shipped in a 20 kg cold box with a temperature logger (WHO 2019). Imres, a licensed supplier, holds 50 complete kits and ships with at least 12 months of shelf life (Imres 2017). The design cycle is three months, and nothing is meant to last beyond about a year.

### 1.4 MSF Clinical Guidelines and Essential Drugs

MSF's *Clinical Guidelines* and *Essential Drugs* manuals are free online, written for curative programmes with limited diagnostics. They assume a nurse or doctor, a short drug list and a referral hospital. They are the best single dose reference for this book.

**Child pneumonia** (MSF, Pneumonia in children under 5):

- **Fast breathing:** 60 or more per minute under 2 months, 50 or more at 2 to 11 months, and 40 or more at 12 months to 5 years. Subtract 5 for a severely malnourished child.
- **Severe signs:** chest indrawing, cyanosis or saturation below 90%, nasal flaring, grunting, stridor, altered consciousness, refusal to drink, age under 2 months, severe malnutrition.
- **Home treatment:** amoxicillin 30 mg/kg three times daily for 5 days, reviewed at 48 to 72 hours.
- **Severe pneumonia:** ceftriaxone 50 mg/kg, or ampicillin 50 mg/kg 6-hourly plus gentamicin 6 mg/kg daily, with oxygen to keep saturation at 90% or above.

WHO's 2014 guidance gives 80 mg/kg a day for 5 days (WHO 2014), usually split into two doses [VERIFY]. MSF's regimen is about 90 mg/kg a day in three doses. The book should choose one and say why. The IMCI chart booklet was blocked to me, so its thresholds are confirmed only through MSF and secondary reproductions [VERIFY]. For

older children and adults MSF gives amoxicillin 1 g three times daily for 5 days. It treats a breathing rate above 30 or a pulse above 125 as danger signs (MSF, Pneumonia over 5 and adults).

**Rehydration.** MSF reproduces WHO's three plans (MSF, Appendix 14):

- **Plan A:** ORS after each loose stool, 50 to 300 ml by weight (Protocol 2).
- **Plan B:** 75 ml/kg of ORS over 4 hours, then reassess.
- **Plan C:** intravenous Ringer's lactate, 100 ml/kg in total. Infants under 12 months get 30 ml/kg over 1 hour, then 70 ml/kg over 5 hours. Children aged 1 to 4 get the first 30 ml/kg over 30 minutes, then 70 ml/kg over 2.5 hours. From age 5, and adults, it is 30 minutes, then 3 hours.

Fluid overload shows as a rise in breathing rate of 10 or more, or in pulse of 20 or more. Where no drip can be placed, MSF uses nasogastric ORS, at 5 ml/kg/hour in one context. I could not confirm the often-quoted 20 ml/kg/hour for 6 hours [VERIFY]. The village cannot run Plan C. It can run A and B indefinitely if it can make ORS.

**Chlorine.** MSF's table for 0.05%, 0.2% and 2% solutions from NaDCC or HTH (calcium hypochlorite) is in Protocol 4 (MSF, Appendix 15). CDC's Ebola guidance uses 0.5% for surfaces (CDC, chlorine use, search summary). The gap between 0.2% and 0.5% is a real disagreement between agencies.

**Obsolete or dangerous drugs.** *Essential Drugs* lists as "potentially dangerous, obsolete or ineffective" (MSF, Essential Drugs) amodiaquine, oral artesunate alone, injectable quinine, oily chloramphenicol, metamizole, 10% potassium chloride, injectable salbutamol, equine tetanus antitoxin and gentian violet.

Gentian violet matters for salvage because it is cheap, keeps for ever and turns up in old stores. MSF dropped it over carcinogenicity in animals (MSF, gentian violet entry). Ghana's Food and Drugs Authority considered the human risk unproven (Ghana FDA, search summary). Grade D, with the cancer question flagged.

### 1.5 ICRC War Surgery and the field hospital

Giannou and Baldan's *War Surgery* (volume 1, 2010) distils ICRC hospital practice from Peshawar, Quetta, Kabul, Lokichokio, Kao-i-Dang, Monrovia and elsewhere. It is the most honest book in this library about limited means.

**Natural triage.** In ICRC hospitals from 1991 to 1993, mortality fell the later patients arrived:

| Time to hospital | Patients | Mortality |
|---|---|---|
| Under 6 hours | 3,114 | 5.5% |
| 6 to 24 hours | 3,588 | 3.9% |
| 24 to 72 hours | 1,668 | 2.8% |
| Over 72 hours | 2,430 | 2.3% |

Delay does not help. The worst wounded die on the way. Soviet forward teams, who brought 92% of wounded to surgery within 6 hours, saw sicker patients. After the Fall nearly every serious wound will arrive late, and the district will see survivors whose main threat is infection.

**Triage.** The 2002 ICRC categories are:

- **I:** immediate surgery
- **II:** surgery can wait
- **III:** walking wounded, no surgery
- **IV:** supportive care only

Category IV includes a Glasgow Coma Score below 8, quadriplegia, burns over 50%, and massive blood loss with no blood available. The first sort takes 30 seconds or less per patient, and everyone is re-examined. At Kisangani in

June 2000, only about 25% of 2,393 wounded needed hospital care. At Monrovia in 2003, of 2,567 triaged, 1,015 were admitted and 718 operated on (Giannou and Baldan 2010). Most wounded people need cleaning, dressing and watching. FO-08 covers triage under scarcity.

**Delayed primary closure.** The core rule is to excise dead tissue, leave the wound open and close it later:

- Closure comes 4 to 7 days after debridement, with an ICRC standard of 4 to 5 days.
- Closure is seldom possible after 8 days.
- A wound ready to close has a "good-bad smell" (ordinary exudate). An infected wound has a "bad-bad smell".
- Never close under tension. Avoid drains, or remove them within 24 hours (Giannou and Baldan 2010).

It is the most transferable rule of war surgery. I read it only in the ICRC text and found no second independent source for the day 4 to 7 window in this research [VERIFY].

**Antibiotics** (Giannou and Baldan 2010, annex):

| Wound | Regimen |
|---|---|
| Minor soft tissue | Penicillin V 500 mg by mouth four times daily for 5 days |
| Compound fracture, major soft tissue | Benzylpenicillin 5 million units IV four times daily for 48 hours, then penicillin V until closure |
| Arrival after 72 hours, landmine | Add metronidazole 500 mg three times daily |
| Head and eye | Add chloramphenicol 1 g three times daily for 10 days |

All patients get tetanus measures. Antibiotics support surgery and do not replace it.

**The field hospital.** ICRC hospitals run without ventilators, on ketamine anaesthesia. Post-operative mortality ran from 2.2% (Quetta) to 6.1% (Monrovia). Historical hospital mortality of the wounded fell from 16.7% in the Crimea and 14.1% in the American Civil War to 7.6% in the First World War and 2.5% in Vietnam (Giannou and Baldan 2010). The pre-antibiotic gap between the Crimea and 1918 is the district's realistic target, won largely by debridement, delayed closure, antisepsis and splinting [VERIFY, my reading].

**Sterilisation.** ICRC uses 134°C at 2.1 bar for 18 minutes, and notes that a pressure-cooker autoclave at 1.1 bar reaches 121°C (ICRC 2014). CDC gives 121°C for 30 minutes for wrapped items (CDC, steam sterilisation). Some guides give shorter times [VERIFY]. See Protocol 5.

### 1.6 IMCI and IMAI

**IMCI.** Integrated Management of Childhood Illness, from WHO and UNICEF in the 1990s, turned the camp lesson into a colour-coded chart for a worker with weeks of training: pink for urgent referral, yellow for treatment, green for home care.

The evidence is more modest than the reputation. Gera and colleagues (2016), in a Cochrane review, found two cluster trials with mortality data, with 65,570 participants. IMCI reduced all-cause deaths by about 15% (risk ratio 0.85, 95% CI 0.78 to 0.93) at low certainty, with little effect on stunting. The individual trials were not significant alone, for example Bangladesh at 0.87 (0.68 to 1.10). It works only when drugs are stocked and referral works.

Its components carry most of the effect:

- **ORS.** Munos, Fischer Walker and Black (2010) estimated that ORS could prevent 93% of diarrhoea deaths. Their pooled measured reduction was 69% (95% CI 51 to 80) from three studies, with low-quality evidence.

- **Pneumonia treatment.** Sazawal and Black (2003) pooled nine community trials of pneumonia case management. Total mortality in children under five fell by 24% (14 to 33) and pneumonia mortality by 36% (read via summary).

**IMAI.** The adult counterpart's District Clinician Manual (WHO 2011) is written for district hospitals without specialists, with a limited formulary and laboratory. Volume 1 covers triage and the first 24 hours. It is the closest WHO text to the book's district infirmary, though it still assumes a clinician, a few tests and oxygen.

### 1.7 UNHCR and Sphere standards

The Sphere Handbook 2018 was blocked to me. The UNHCR Emergency Handbook gives the operational standards.

**Utilisation** (UNHCR 2024). Expect 1 to 4 new consultations per person per year, with fewer than 50 per clinician per day. For 3,000 people that is 3,000 to 12,000 a year, about 10 to 35 on a working day. For a village of 300, it is one to four a day [VERIFY, my arithmetic].

**Staffing** (UNHCR 2026):

| Role | Standard |
|---|---|
| Medical doctor | 1 per fewer than 25,000 |
| Clinical officer, outpatient | 1 per fewer than 10,000 |
| Nurse, outpatient | 1 per fewer than 10,000 |
| Nurses, inpatient | 4 per ward |
| Skilled birth attendants | 23 per 10,000 (from Sphere) |
| Laboratory technician | 1 per fewer than 15,000 |
| Pharmacist | 1 per 50,000 to 100,000 |
| Community health workers | 1 to 2 per 1,000 (from Sphere) |

For a district of 3,000, these standards give 0.12 of a doctor, 0.3 of a nurse, about seven birth attendants and three to six community health workers [VERIFY, my arithmetic]. The humanitarian system does not expect a doctor at this scale. The book's model of one trained lay healer per village and one nurse-level healer per district matches the camp standard.

Sphere's older figure of 22 qualified health workers per 10,000 comes from a secondary source [VERIFY]. Facility and bed norms (one health unit per 10,000, and 10 or 18 beds per 10,000) conflict across secondary sources [VERIFY].

### 1.8 Emergency obstetric kits

The Inter-Agency Reproductive Health (IARH) kits, sixth edition 2019, serve the Minimum Initial Service Package (IAWG 2019). Kits 1 to 5 are for 10,000 people, 6 to 10 for 30,000 and 11 to 12 for 150,000, all for three months.

The calculations assume:

- a crude birth rate of 4%, which the manual calls an overestimate
- women aged 15 to 49 making up 25% of the population
- 20% of pregnancies ending in miscarriage or unsafe abortion
- tears in 15% of births
- caesarean section needed in 5%
- rape care sought by 2% of women

For a district of 3,000 that is about 120 births a year, with 18 tears and 6 caesareans needed. For the village of 300 it is 12 births, one a month [VERIFY, my arithmetic, and post-Fall fertility is unknown].

**Kit 2A** is 200 home clean delivery kits (soap, a 100 by 100 cm sheet, a blade, three cord ties, two cloths, two gloves), which the manual calls a last resort.

**Kit 6B** is basic emergency obstetric care for 30,000 people over three months. It holds:

- ampicillin (200), gentamicin (100) and clindamycin (125)
- oxytocin (100, kept at 2 to 8°C) and misoprostol 200 μg (60)
- magnesium sulfate (10) and hydralazine (60), with calcium gluconate (20) as antidote
- vitamin K, iron-folate, Ringer's lactate and urine protein strips

Kit 6A includes a pressure-cooker steriliser. Diazepam must be bought locally because of import rules. Kit 11B, at hospital level, holds ketamine (IAWG 2019).

**Misoprostol.** IARH supplies extra misoprostol for the third stage of labour, for women and attendants, where oxytocin has no cold chain. It is to be used only where misoprostol was registered and attendants trained before the crisis (IAWG 2019). In rural Belgaum, India, Derman and colleagues (2006) randomised 1,620 women. Auxiliary nurse midwives gave 600 μg orally after the birth. Postpartum haemorrhage fell from 12.0% to 6.4% (relative risk 0.53) and severe haemorrhage from 1.2% to 0.2%. About 18 women were treated per haemorrhage prevented. The main side effects were shivering and fever (abstract and summary read).

**Oxytocin and heat.** Torloni and colleagues (2016) reviewed 559 oxytocin samples from 15 countries. The median failure rate on assay was 45.6%, and 57.5% in Africa (abstract read). The same review reports no loss at 4 to 8°C over 12 months, 3 to 7% loss at 21 to 25°C and 9 to 19% loss at 30°C.

The CHAMPION trial compared heat-stable carbetocin 100 μg with oxytocin 10 IU in 29,645 women (Widmer and colleagues 2018). Blood loss of 500 ml or more, or need for more drugs, was 14.5% against 14.4%, so carbetocin was non-inferior. Severe blood loss results were inconclusive. Both arms were refrigerated, and the trial had industry support (Ferring, MSD for Mothers). Carbetocin is worth salvaging, but misoprostol is the realistic shelf item.

### 1.9 Shelf life, heat and expiry

After the Fall the shelf will be past its labels within three years. The evidence is better than most people think, and less comforting than survivalist writing claims.

| Study | What was tested | Finding |
|---|---|---|
| SLEP, US military (Lyon and colleagues 2006, abstract) | 122 products, 3,005 lots in good storage | 88% of lots extended by at least a year, average 66 months, with high lot-to-lot variation |
| Cantrell and colleagues (2012, secondary) | 14 compounds, 28 to 40 years past expiry, unopened | 12 still at 90% or more of labelled content |
| Hogerzeil and colleagues (1992) | Kits shipped to the tropics, minus 3.5 to 42.4°C | Most stable. Ergometrine lost most: 3 of 80 samples down by more than 60%. Penicillins and tetracycline unaffected |
| Ballereau and colleagues (1997, summary) | Two years in Burkina Faso | Ampicillin, erythromycin, benzylpenicillin, furosemide injection and chloroquine lost over 10%. Do not keep these over a year in the tropics |

| Study | What was tested | Finding |
|---|---|---|
| Kaufmann and colleagues (2021, abstract) | Insulin cycling 25 to 37°C, simulating Dagahaley camp, Kenya | Potency kept for four weeks |

Insulin above about 40°C should not be used [VERIFY]. Degraded tetracycline caused reversible kidney damage, a Fanconi syndrome (Frimpter and colleagues 1963, secondary [VERIFY]), so tetracycline that has turned brown or sticky must be discarded. UNICEF gives unflavoured ORS a 36-month shelf life (flavoured 24) at below 30°C, with made-up solution used within 24 hours. Amoxicillin dispersible tablets keep 36 months in blisters (UNICEF Supply Catalogue).

The rule: dry tablets in sealed blisters, kept cool and dark, mostly outlast their label by years. Liquids, injectables, insulin, oxytocin, vaccines, and anything that has changed colour or smell, do not.

### 1.10 Donations, vendors and politics

Bosnia and Herzegovina received an estimated 27,800 to 34,800 tonnes of donated medicines between 1992 and 1996. Of these, 50% to 60% were inappropriate: expired, unlabelled, irrelevant or unusable (Berckmans and colleagues 1997, secondary). A secondary source reports that 65% of donations to Albania in 1999 had no expiry date or less than a year left [VERIFY]. WHO's donation guidelines set four core principles and twelve rules. Donated medicines should be on the recipient's essential list and have at least a year of shelf life on arrival (WHO 2010, donations).

On vendor interest, the evidence is indirect:

- Cullen, Taithe and Winters (2026) show the UNICEF, MSF and IDA warehouses becoming "market-leading suppliers", with contents varying with stock.
- The CHAMPION trial had industry support before its product entered WHO guidance.
- Phenobarbital left the IEHK because of customs (WHO 2019).

I found no evidence of a supplier lobbying for a specific IEHK item [VERIFY].

### 1.11 The frameworks side by side

| Framework | First spending | Staff assumed | Cold chain | Resupply | Cannot be improvised |
|---|---|---|---|---|---|
| MSF ten priorities | Assessment, measles vaccine, water, food | Mixed teams | Measles vaccine | Continuous | Vaccine |
| WHO EML | Burden, evidence, cost | Working health system | Vaccines, insulin, oxytocin | Normal supply | Most of it |
| IEHK basic | ORS, amoxicillin, paracetamol, antiseptics | Worker with limited training | None | 3 months | Antibiotics, antimalarials, tests |
| IEHK supplementary | Injectables, anaesthesia, emergencies | Doctor or senior nurse | Insulin, oxytocin | 3 months | Nearly all |
| MSF guidelines | Common killers | Nurse or doctor | Per drug | By consumption | Antibiotics, fluids |

| Framework | First spending | Staff assumed | Cold chain | Resupply | Cannot be improvised |
|---|---|---|---|---|---|
| ICRC war surgery | Triage, debridement, delayed closure | Surgeon, anaesthetist | Blood from local donors | Continuous | Ketamine, penicillin, blood bags |
| IMCI and IMAI | Danger signs, classify, treat, refer | Weeks-trained worker, district clinician | Vaccines | Normal supply | Antibiotics, antimalarials |
| UNHCR and Sphere | Mortality, coverage, workload | Doctors, nurses, community workers | Vaccines | Continuous | Staff |
| IARH kits | Clean birth, haemorrhage, eclampsia, sepsis | Women, attendants, midwives, surgeons | Oxytocin | 3 months | Uterotonics, magnesium, antibiotics, caesarean |

## 2. Make, salvage, stockpile or do without

Sorting the IEHK and core EML for the village gives four bins (my reading, graded in section 4).

**Make:**

- **Oral rehydration solution.** WHO formula per litre: sodium chloride 2.6 g, anhydrous glucose 13.5 g, potassium chloride 1.5 g, trisodium citrate dihydrate 2.9 g, for 245 mOsm/L (WHO and UNICEF 2002). Home salt-sugar versions are covered in FO-01 and IN-05.
- **Chlorine.** Diluted bleach, or hypochlorite from brine by electrolysis: the WATA device makes about 5 g/L from 25 g/L brine in two hours, given electricity (Akvopedia).
- **Alcohol handrub.** WHO formula at 80% ethanol (WHO 2010, handrub, Protocol 6).
- **The rest:** soap, dressings, splints, clean delivery kits, steam sterilisation, water filters, food and clean water.

**Salvage:**

- paracetamol, ibuprofen and aspirin
- amoxicillin, doxycycline, cefalexin, metronidazole and co-trimoxazole
- omeprazole, antifungal creams, povidone-iodine and chlorhexidine
- lidocaine, ORS sachets, zinc, albendazole and iron-folate
- thermometers, blood pressure cuffs, stethoscopes and scales
- surgical instruments, suture, gloves and pressure cookers

**Stockpile while possible:**

- misoprostol
- ketamine, benzylpenicillin and ceftriaxone powder (district only)
- magnesium sulfate, diazepam and adrenaline
- artemether-lumefantrine and malaria tests where needed
- tetracycline eye ointment and benzyl benzoate

**Do without:** insulin beyond its last vials, oxytocin without refrigeration, vaccines, antiretrovirals and TB drugs beyond stock, chemotherapy, blood products beyond direct transfusion (OR-07), and most cardiovascular drugs. These belong in the chapter on honest loss (SY-09).

## 3. The book's first list: shelves for 300 and 3,000

**Principles from the sources:**

- Put prevention and fluids first.
- Keep few drugs, each covering many illnesses.
- Prefer dry oral forms in blisters.
- Keep injectables and controlled items at the district, as the IEHK splits basic from supplementary.
- Size by consumption, not by the box.

Village quantities scale the IEHK basic module to 300 people for a year (factor 1.2). District quantities scale the supplementary module to 3,000 for a year, about one module. All quantities are my inference and assume humanitarian disease patterns [VERIFY].

### 3.1 The village shelf (300 people, trained lay healer)

| Item | Treats | Keeps (sealed, cool) | Year for 300 | When it runs out |
|---|---|---|---|---|
| ORS sachets | Dehydration | 36 months, solution 24 hours (UNICEF) | 240, plus salts to make more | Made ORS, home solution |
| Zinc 20 mg | Child diarrhoea, 10 to 14 days | Years if dry [VERIFY] | 1,200 | Diet |
| Amoxicillin 250 mg dispersible | Pneumonia, ear, throat, some wounds | 36 months (UNICEF), likely longer [VERIFY] | 3,600 | Nothing equivalent. Fluids, warmth, prevention |
| Paracetamol 500 mg and 100 mg | Pain, fever | Years if dry [VERIFY] | 2,400 and 1,200 | Cooling, rest, plant analgesics graded in ME-09 |
| Ibuprofen 200 mg | Pain, inflammation | Years if dry [VERIFY] | 4,800 | As above |
| Iron with folic acid | Anaemia, pregnancy | Years [VERIFY] | 2,400 | Diet, deworming, malaria prevention |
| Albendazole 400 mg | Worms | Years [VERIFY] | 240 | Latrines, footwear, handwashing |
| Tetracycline eye ointment | Eye infection, trachoma | Discard if discoloured | 60 tubes | Face washing, clean water |
| Benzyl benzoate 25% | Scabies | Years [VERIFY] | 1.2 L | Boiling laundry |
| Miconazole cream | Fungal skin | Years [VERIFY] | 24 tubes | Drying, sunlight |
| Chlorhexidine, povidone-iodine | Antisepsis | Years sealed | 1.2 L, 14 bottles | Handrub, boiled water, soap, 0.05% chlorine |
| Gloves, soap, gauze | All | Gloves perish in heat [VERIFY] | 120 gloves, 12 soap | Boiled cloth, home soap |
| Thermometers, timer, MUAC tapes, scale | Diagnosis | Indefinite | 2 to 3 each | Counted pulse and breaths, marked string |
| Clean delivery kits | Birth | Indefinite | 12 to 15 | Home-made: soap, sheet, boiled blade, ties |

| Item | Treats | Keeps (sealed, cool) | Year for 300 | When it runs out |
|---|---|---|---|---|
| Misoprostol 200 µg | Haemorrhage after birth | Keep in blister, moisture-sensitive [VERIFY] | About 40 | Breastfeeding, uterine massage, transfer |
| Malaria tests, artemether-lumefantrine | Malaria, where present | Per label, likely longer [VERIFY] | By local burden | Nets, drainage. Not Artemisia tea (WHO 2019) |
| Chlorine (NaDCC, HTH, bleach) | Water, hands, surfaces | HTH weakens in heat [VERIFY] | For daily 0.05% and 0.2% | Electrolysis, boiling |

The village shelf weighs under 60 kg a year and fits a dry trunk [VERIFY, from 38 kg per IEHK basic unit].

### 3.2 The district shelf (3,000 people, nurse-level healer, ten beds)

The district holds ten village shelves in reserve, plus:

| Item | Treats | Keeps | Year for 3,000 | When it runs out |
|---|---|---|---|---|
| Ceftriaxone 1 g powder | Severe pneumonia, meningitis, sepsis | Powder better than solution [VERIFY] | About 800 to 1,000 | Benzylpenicillin, then supportive care |
| Benzylpenicillin, penicillin V | Wounds (ICRC), pneumonia | Loses strength in tropical heat within 2 years (Ballereau 1997) | 250 vials plus oral | Debridement and delayed closure alone |
| Metronidazole | Late wounds, abdominal and pelvic infection | Years if dry [VERIFY] | 2,000 | Drainage, wound care |
| Doxycycline | Many infections | Discard if discoloured [VERIFY] | 3,000 | Nothing equivalent |
| Ketamine | Anaesthesia for wound surgery, burns | Years unopened [VERIFY] | 25 to 30 vials | Local anaesthetic, or no surgery |
| Lidocaine 1% | Local anaesthesia | Years [VERIFY] | 50 | Cold, speed |
| Diazepam | Fits, tetanus | Light-sensitive [VERIFY] | 200 ampoules | Nothing equivalent |
| Magnesium sulfate, calcium gluconate | Eclampsia, and its antidote | Stable [VERIFY] | 30 and 10 to 20 | Diazepam |
| Misoprostol | Haemorrhage after birth and miscarriage | As above | 60 to 180 | None |
| Adrenaline | Anaphylaxis | Discard if pink or brown [VERIFY] | 50 | None |
| Hydrocortisone, prednisolone, salbutamol | Asthma, allergy | Tablets years, inhalers limited [VERIFY] | 50, 1,000, 75 | Upright, calm, steam |

| Item | Treats | Keeps | Year for 3,000 | When it runs out |
|---|---|---|---|---|
| Ringer's lactate | Severe dehydration, shock | Years sealed [VERIFY] | 200 bags | Nasogastric ORS. Never home-made IV fluid |
| Carbamazepine, haloperidol | Epilepsy, psychosis | Years [VERIFY] | 2,200 and 1,300 | Safety, company |
| Morphine, naloxone | Severe pain, dying, and overdose | Tablets years [VERIFY] | 250 and 10 | Palliative care chapter |
| Pressure-cooker steriliser | Sterile instruments | Indefinite | 1 to 2 | Boiling (disinfects only) |
| Surgical sets, suture | Wounds, births | Steel indefinite, suture perishes [VERIFY] | 2 sets | Boiled silk or cotton (OR-06) |
| Oximeter, glucometer | Measurement | Battery-limited | 1 each | Clinical signs |
| Ceramic filters, microscope | Water, malaria, worms | Filters 20,000 L each | 3 and 1 | Boiling, clinical diagnosis |

Insulin, vaccines and unrefrigerated oxytocin are not standing items. If salvaged, they are used, but the district cannot maintain them. The shelves leave out syrups, drops and suppositories (heavy and perishable, as MSF argued in 1986), duplicate molecules, MSF's obsolete list, and chronic medication beyond what is salvaged.

## 4. Evidence grades

| Practice or item | Grade | What the record shows | What modern science infers |
|---|---|---|---|
| ORS for diarrhoea | A | Mortality falls in field studies (Munos 2010) | Low-osmolarity formula cut unscheduled IV therapy by 33% (WHO and UNICEF 2002) |
| Community amoxicillin for child pneumonia | A to B | Child deaths fell (Sazawal and Black 2003) | Lay classification is the weak link |
| IMCI as a strategy | A, low certainty | All-cause mortality down 15% (Gera 2016) | Works through drugs and referral |
| Misoprostol by lay attendants after birth | A | Haemorrhage halved (Derman 2006) | Effective, shivering common |
| Heat-stable carbetocin | A | Non-inferior to oxytocin (Widmer 2018) | Useful if salvaged, not makeable |
| Delayed primary closure | B | Decades of ICRC series (Giannou and Baldan 2010) | Strong rationale, no RCT |
| ICRC penicillin regimen | B | Low ICRC post-operative mortality | Secondary to surgery |
| Triage by category | B | Kisangani, Monrovia | Saves scarce surgery |
| Chlorine 0.05% and 0.2% to 0.5% | B | Cholera and Ebola use | Strength differs by agency |

| Practice or item | Grade | What the record shows | What modern science infers |
|---|---|---|---|
| WHO alcohol handrub | A to B | Made locally in many countries | Effective at 80% ethanol |
| Steam sterilisation | A to B | A century of practice | Kills spores if cycles respected |
| Dry tablets past expiry | B | SLEP, Cantrell | Not liquids, injectables, insulin, oxytocin, vaccines |
| Gentian violet | D | Effective topically, animal carcinogen | Contested between agencies |
| *Artemisia annua* tea for malaria | X | WHO does not support (WHO 2019) | Low, variable dose, resistance risk |
| Bulk donations | X as practice | 50% to 60% inappropriate in Bosnia | Sort before use |

The only plant here is *Artemisia annua* L. (sweet wormwood, aerial parts), graded X as a malaria tea (WHO 2019). Its garden lookalike *Artemisia absinthium* L. (wormwood) contains neurotoxic thujone [VERIFY, not researched here].

## 5. Means ledger

The rungs: **Hands** (knowledge alone). **Hearth** (fire, water, salt, sugar, honey, vinegar, fat, cloth, needle, knife). **Garden and still** (plants, ethanol, beeswax, soap, scale, pressure cooker, forge). **Village** (dispensary for 300, trained lay healer, salvaged stock, microscope). **District** (infirmary for 3,000, nurse or doctor, sterile room, ten beds, lab bench). **Hospital** before the Fall, as reference.

| Task | Hands | Hearth | Garden and still | Village | District | Hospital |
|---|---|---|---|---|---|---|
| Dehydration | Signs, keep feeding | Salt-sugar solution, Plans A and B | WHO ORS by scale | Sachets, zinc | Nasogastric ORS, IV Ringer's | IV, electrolytes |
| Child pneumonia | Count breaths, danger signs | Warmth, fluids | Same | Amoxicillin by weight | Ceftriaxone, salvaged oxygen | Oxygen, X-ray, ventilation |
| Wound | Pressure, elevation | Boiled-water wash, clean cloth | Ethanol, honey (OR-06), sterile instruments | Wash, dress, delayed closure | Debridement under ketamine, penicillin | Full surgery, blood |
| Birth | Presence, warmth, breastfeeding | Clean delivery kit | Sterile blade, ties | Misoprostol after the baby | Magnesium, antibiotics, manual placenta | Caesarean, blood, ICU |
| Infection control | Handwashing | Soap, boiling | Handrub, chlorine | Chlorine solutions, steriliser | Full routine | Autoclaves, single-use items |

| Task | Hands | Hearth | Garden and still | Village | District | Hospital |
|---|---|---|---|---|---|---|
| Malaria | Nets, drain water | Same | Same | Tests, artemether-lumefantrine | Injectable artesunate | Full care |
| Epidemic watch | Count deaths | Same | Same | Birth, death, case registers | District death rate | Laboratory surveillance |

**What each rung changes.** Hands and hearth carry most of the camp mortality reduction, because Toole and Waldman's killers yield first to water, food and ORS. The village adds measurable survival through antibiotics and misoprostol. The district matters for trauma, obstetric and surgical cases: few people, very high stakes.

## 6. Harm test

**ORS.** Too strong a solution raises blood sodium, causing fits and brain damage in infants. Too weak a solution fails. Never give it to a child who cannot swallow. Swollen eyelids or fits mean stop and give breast milk or water [VERIFY, salt signs not cross-checked].

**Penicillins and amoxicillin.** Allergy, from rash to anaphylaxis. Ask about past reactions and keep adrenaline at the district. Misuse breeds resistance.

**Ketamine.** Too much, or too fast, stops breathing. It causes emergence hallucinations and is avoided in tetanus (Giannou and Baldan 2010). District only, with someone who can hold an airway.

**Misoprostol.** Given before the birth, it can rupture the womb [VERIFY, second source not read]. Derman's protocol gives it only after the baby. If bleeding continues, nothing on the village shelf stops it.

**Magnesium sulfate.** Overdose stops breathing and removes reflexes. Calcium gluconate must sit beside it.

**Chlorine.** A 2% solution burns skin and eyes. Mixed with acids or ammonia, chlorine releases toxic gas. Never mix NaDCC with HTH (MSF, Appendix 15).

**Handrub.** 80% ethanol has a flash point near 17.5°C. Make no more than 50 litres per batch, away from flame (WHO 2010, handrub). Methanol from a poor still blinds and kills [VERIFY, covered elsewhere].

**Steam sterilisation.** A blocked valve explodes a cooker, and early opening scalds. Short cycles leave spores, so tetanus or gas gangrene comes from a "sterile" instrument. Boiling is disinfection, not sterilisation.

**Expired medicines.** Degraded tetracycline damaged kidneys (Frimpter 1963). Liquids grow organisms, and punctured vials lose sterility. Brown adrenaline fails. Insulin above 40°C may be useless [VERIFY].

**Home-made IV fluid.** Non-sterile fluid into a vein causes sepsis and death. The book should give no recipe. Nasogastric ORS is the fallback (MSF, Appendix 14).

## 7. Red flags

1. **A child who cannot drink, vomits everything, has fits, or is lethargic or unconscious.** These are IMCI's general danger signs. Do anyway: warmth, sips of ORS or breast milk if the child can swallow, a first antibiotic dose, and carrying the child to the district. Stay with the mother.
2. **Fast breathing with indrawing, grunting or blue lips.** This is severe pneumonia. The district may help with ceftriaxone, and oxygen if salvaged.

3. **Severe dehydration in an infant who cannot drink.** Plan C needs IV fluids. Try nasogastric ORS if anyone can place a tube.
4. **Bleeding after birth that soaks a cloth in minutes despite massage and misoprostol.** Death can follow within hours. Massage, compress the womb, put the baby to the breast, raise the legs, and carry the woman.
5. **Fits in late pregnancy or after birth.** This is eclampsia. The district holds magnesium. The village lays her on her side and keeps her safe.
6. **A wound with a "bad-bad" smell, spreading redness, crackling under the skin, or fever.** The district reopens and excises it and gives penicillin and metronidazole. The village cannot.
7. **ICRC category IV:** a head wound with falling consciousness, burns over half the body, or massive blood loss with none to give. Even field hospitals give supportive care only. Honest comfort: pain relief, water, company and dignity.
8. **An insulin-dependent diabetic without insulin.** Death follows within days to weeks in type 1 diabetes. Honest planning belongs in SY-09.
9. **District deaths doubling, or exceeding one every three days in 3,000 people.** This is a humanitarian emergency (UNHCR). Shift effort from clinic to water, food and outbreak control.

## 8. The case against

**Against copying the kits.** The editors of MSF's own *Medical Innovations in Humanitarian Situations* argue that humanitarian medicine accepted low standards too readily. It excused poor care by citing poverty, international recommendations or cost (Bradol and Vidal 2011, online summaries only). Cullen, Taithe and Winters (2026) show the kit as a wish to standardise and control care from Geneva and Copenhagen, resented in the field. They call the result "innovation traps": once a compromise is boxed and agreed, unpacking it is politically hard. A village copying the IEHK inherits choices made for a warehouse.

**Against the EML as neutral.** National lists diverge widely and not mainly by disease burden (Persaud 2019). Laing and colleagues (2003) note the list's drift towards costly medicines. A list built to protect a ministry's budget is not a list for a village with no budget. The village's list should be narrower in some ways and broader in others, weighted to what keeps or can be made.

**Against kits as evidence.** Kit contents are consensus, not trial-proven bundles. The best-tested package, IMCI, shows a 15% mortality reduction at low certainty, partly through referral the Fall removes (Gera 2016).

**Against the romance of the hospital.** Natural triage means that without fast evacuation, sophisticated surgery helps fewer people than it seems (Giannou and Baldan 2010). Most of the fall in camp mortality came from water, food, measles vaccine and ORS (Toole and Waldman 1990). A district that builds a theatre while the latrines fail copies the wrong part of the system.

**Against the romance of the herbal.** No plant in the humanitarian record replaces amoxicillin for pneumonia or misoprostol for haemorrhage, and the best-known attempt, *Artemisia annua* tea, failed (WHO 2019).

**Against salvage optimism.** SLEP tested drugs in good military storage. Tropical heat degrades key items within a year or two (Hogerzeil 1992, Ballereau 1997). Bosnia shows that bulk salvage is mostly rubbish (Berckmans 1997).

**Where the critics may be wrong.** The kits work, and have been revised against field experience for forty years. For a community with no pharmacist, a short list chosen by experts is safer than an improvised one.

## 9. Ten-line summary of robust findings

1. In broken systems most deaths are from common infections in hungry children, so water, food and vaccination come before clinics.

2. The IEHK basic unit (1,000 people, three months) is about fourteen oral and topical medicines, 38 kg, for workers with limited training.
3. Every kit assumes resupply in about three months, trained staff and a referral hospital. The Fall removes all three.
4. ORS, chlorine, handrub, soap, dressings and steam sterilisation can be made. Antibiotics, anaesthetics, uterotonics and anticonvulsants cannot.
5. ORS and community amoxicillin have the strongest evidence for saving children.
6. Misoprostol after birth, given by lay attendants, halved haemorrhage in a randomised trial and needs no fridge.
7. Delayed primary closure at day 4 to 7 is the most transferable rule of war surgery.
8. Dry tablets in blisters mostly outlast their labels. Liquids, injectables, oxytocin, insulin and vaccines do not.
9. Humanitarian staffing gives a district of 3,000 no doctor, so one lay healer per village and one nurse per district is realistic.
10. Kits and lists reflect logistics, cost and politics as well as evidence, so the book's shelf is chosen for keeping, safety and makeability.

## 10. Open questions

- What morbidity and consultation assumptions lie behind IEHK 2017 and 2024 quantities? I could not find them.
- What exactly do Sphere 2018's facility, bed and staffing norms say? The text was blocked to me.
- How long do amoxicillin, misoprostol and doxycycline keep in a hot village store?
- Does heat-stable carbetocin keep for years at tropical temperatures?
- Is gentian violet a reasonable last-resort antiseptic? Agencies disagree.
- How far did vendors shape kit contents? The history is suggestive, not proven.
- Will a post-Fall district's disease burden resemble the kit's young, tropical model, or an ageing temperate one?

## 11. Sources to read in full

1. WHO (2019). *IEHK 2017* manual.
2. Giannou and Baldan (2010). *War Surgery*, volume 1, ICRC.
3. MSF. *Clinical Guidelines* and *Essential Drugs*, online editions.
4. IAWG (2019). *Inter-Agency Reproductive Health Kits*, 6th edition.
5. WHO (2011). *IMAI District Clinician Manual*, volumes 1 and 2.
6. Cullen, Taithe and Winters (2026). "Unpacking the Emergency Health Kit".
7. Persaud and colleagues (2019). Essential medicines lists in 137 countries.
8. UNHCR. *Emergency Handbook*, health pages.
9. MSF (1997). *Refugee Health*.

## At the bedside after the Fall

**The household.** The minimum version is MSF's first priorities in miniature: clean water, a latrine and food, plus two skills: ORS by Plans A and B, and counting a child's breaths. It needs salt, sugar, a litre measure, a way to count a minute, soap and clean cloth. The first failure to expect is a mother who stops feeding a child with diarrhoea, or mixes the solution too salty.

**The village of 300.** It needs one trained lay healer, the village shelf (one trunk), and three registers: births, deaths, and cases by symptom. Water, latrines, chlorine and soap run on a village rota, not on the healer. The skills are:

- danger signs and fast breathing
- ORS Plans A and B

- amoxicillin by weight
- clean birth and misoprostol after the baby
- washing and dressing wounds without closing them
- mixing 0.05% and 0.2% chlorine
- running a pressure-cooker steriliser
- sorting people into "now, later, home, comfort"

The first failure to expect is running out of amoxicillin within a year because it was given for every cough, and then the healer losing authority when the box is empty.

**The district of 3,000.** It needs a nurse-level healer, ten beds, a sterile room, the district shelf with locked ketamine, ICRC triage, and a mortality watch. The skills are:

- debridement and delayed closure
- ketamine anaesthesia with airway support
- managing eclampsia and haemorrhage
- nasogastric or IV rehydration
- scheduled handrub and chlorine production
- auditing salvaged stock

The first failure to expect is spending scarce labour on category IV patients while category I and II patients die of infection. The second is a "sterile" instrument from a shortened cycle.

## Protocols

### Protocol 1. Auditing a salvaged kit or pharmacy

1. Work in a dry, shaded room with gloves, a notebook and a pen.
2. Sort everything into four piles: identified and in date, identified and expired, unidentified, and damaged.
3. Set the unidentified pile aside. If name, strength and form cannot be read, do not use it.
4. Discard damaged items: broken seals, swollen or leaking vials, brown liquids, brown or sticky tetracycline, pink or brown adrenaline, crumbling tablets, odd smells.
5. From the expired pile, keep dry tablets in intact blisters or sealed bottles, and mark them "expired, keep". Discard expired liquids, eye drops, punctured injectables, insulin, oxytocin and vaccines.
6. Check items against the shelf lists. Record name, strength, quantity, expiry and location.
7. Remove anything on MSF's obsolete list (section 1.4).
8. Store cool, dark and dry, off the floor, in sealed containers with desiccant if available.
9. Recount every three months, the IEHK cycle.

### Protocol 2. Rehydration, Plans A and B (MSF Appendix 14, after WHO)

**Plan A (no dehydration):**

1. Keep breastfeeding and feeding.
2. After each loose stool give ORS: under 5 kg, 50 ml. 5 to under 10 kg, 100 ml. 10 to 20 kg, 200 ml. Over 20 kg, 300 ml.
3. Give it by spoon or sips. After vomiting, wait 10 minutes and continue more slowly.
4. For children, give zinc daily for 10 to 14 days if stocked.
5. Return at once if the child cannot drink, worsens, has blood in the stool, or develops fever.

**Plan B (some dehydration):**

1. Give 75 ml/kg over 4 hours. For a 10 kg child, that is 750 ml, about a cupful every 20 minutes.

2. Reassess at 4 hours. With no signs left, go to Plan A. With some signs, repeat Plan B. With severe signs, go to the district.
3. Stop and reassess if breathing rises by 10 or more per minute, the pulse by 20 or more per minute, or the eyelids swell.

**Making WHO ORS with a scale:**

1. To 1 litre of boiled, cooled water, add sodium chloride 2.6 g, anhydrous glucose 13.5 g, potassium chloride 1.5 g and trisodium citrate dihydrate 2.9 g (20.5 g in total).
2. Dissolve fully. Use within 24 hours.
3. Weigh to within 0.1 g where possible [VERIFY, tolerance my inference]. Never add extra salt.

**Protocol 3. The child with cough (MSF, after IMCI)**

1. Calm the child. With the chest bare, count breaths for a full 60 seconds.
2. Fast breathing is 60 or more under 2 months, 50 or more at 2 to 11 months, and 40 or more at 1 to 5 years. Subtract 5 if the child is severely malnourished.
3. Look for danger signs: indrawing, grunting, flaring, stridor, blue lips, inability to drink, lethargy, fits. Any one, or fast breathing under 2 months, is severe pneumonia. Give a first antibiotic dose and go to the district.
4. With fast breathing and no danger signs, give amoxicillin 30 mg/kg three times daily for 5 days (MSF). The WHO alternative is 40 mg/kg twice daily [VERIFY]. For a 10 kg child, that is about one and a quarter 250 mg tablets per dose [VERIFY, rounding mine].
5. Review at 48 to 72 hours. If the child is worse, refer. If better, finish the course.
6. With no fast breathing and no danger signs, give no antibiotic. Give fluids, food and watch.
7. Record name, age, weight, breathing rate, decision and dose.

**Protocol 4. Chlorine solutions (MSF Appendix 15)**

1. Read the product strength: NaDCC 55%, HTH 65 to 70%, or liquid bleach of 2.6% to 5%.
2. Use one labelled bucket per strength. Work in fresh air, with gloves and eye protection for the strong solutions.
3. Mix to these strengths:

| Strength | Use | NaDCC per 20 L | HTH per 20 L | From bleach |
|---|---|---|---|---|
| 0.05% | Hands, laundry | 18 g | 15 g | Not given in source |
| 0.2% | Floors, surfaces, beds | 72 g | 60 g | 2.6% bleach 1 in 12, 3.5% bleach 1 in 16, 4% bleach 1 in 19 |
| 2% | Excreta, corpses, never skin | 720 g | 600 g | Not given in source |
| 1% stock | For dilution | 18 g per L | 15 g per L | Not given in source |

4. For any other strength: grams per litre = (desired % ÷ product %) × 1,000. For example, 0.05% from 55% NaDCC is 0.9 g per litre.
5. Make fresh daily. Never mix NaDCC with HTH, or chlorine with acids or ammonia.
6. For blood and body-fluid spills, CDC's 0.5% may be preferred [VERIFY, my recommendation].

**Protocol 5. Steam sterilisation in a pressure cooker (ICRC 2014, CDC)**

1. Scrub instruments free of blood and tissue with soap and water, then rinse and dry. Steam does not sterilise dirt.

2. Open hinged instruments. Wrap them loosely in cloth. Do not pack tight.
3. Put water below the rack to the maker's level.
4. Heat until steam flows freely from the vent, to drive out air [VERIFY, duration], then close the valve.
5. At pressure (about 1.1 bar, 121°C), hold for 30 minutes for wrapped loads (CDC). Domestic cookers cannot reach the ICRC 134°C cycle. At altitude, hold longer [VERIFY].
6. Turn off the heat. Let the pressure fall by itself. Never force the valve.
7. Open the lid a crack and leave the load about 5 minutes to dry (ICRC 2014).
8. Store packs dry and closed. Resterilise any pack that gets wet [VERIFY, storage time].
9. Check the vent and safety valve before every cycle.

**Protocol 6. Alcohol handrub from the still (WHO formulation I)**

1. Work outdoors or well ventilated, away from flame. 80% ethanol ignites near 17.5°C.
2. For 1 litre, combine:
   - 833.3 ml of 96% ethanol
   - 41.7 ml of 3% hydrogen peroxide
   - 14.5 ml of 98% glycerol
   - boiled, cooled water to 1,000 ml
3. Mix in a clean, closed, labelled container.
4. Hold for 72 hours before use [VERIFY, quarantine period not re-read].
5. Check with an alcoholmeter if one exists. The target is 80% by volume [VERIFY, lower limit].
6. Make no more than 50 litres per batch (WHO). In Uganda, a 20-litre batch took about an hour.

**Protocol 7. The contaminated wound (ICRC)**

The village does steps 1 to 3 and sends the patient on. The district does the rest.

1. Stop bleeding with direct pressure.
2. Wash with plenty of boiled, cooled water.
3. Dress with clean, bulky gauze or boiled cloth. Do not close the wound.
4. At the district, under ketamine or local anaesthetic, cut away dead and dirty tissue and remove foreign matter. Leave the wound open and splint any fracture.
5. Give penicillin by the ICRC regimen (section 1.5). Add metronidazole if the wound is over 72 hours old. Give tetanus measures if available.
6. Leave the dressing alone unless it smells "bad-bad", soaks through, or fever appears.
7. At day 4 to 5, close a clean, healthy wound without tension. If it is not clean, excise again and recheck in 2 to 3 days.
8. After about day 8, do not close. Let the wound heal from the bottom up.

**Protocol 8. Third stage of labour with misoprostol**

1. Give misoprostol only after the baby is born and you are sure there is no second baby [VERIFY].
2. Give 600 µg (three 200 µg tablets) by mouth with water (Derman 2006). A second source for this dose was not read [VERIFY].
3. Put the baby to the breast at once.
4. Wait for the placenta. Do not pull hard on the cord.
5. Afterwards, feel the womb through the belly. It should be hard like a fist. If soft, massage firmly.
6. Expect shivering and fever. Keep her warm and give fluids.
7. Bleeding that soaks a cloth in minutes, or a weak, fast pulse, is a red flag. Massage, compress, raise the legs, and send her to the district.

8. Record the times of birth and tablets, the estimated blood loss and the outcome.

## Numbers to carry

1. **Fast breathing:** 60 under 2 months, 50 at 2 to 11 months, 40 at 1 to 5 years.
2. **ORS Plan B:** 75 ml/kg over 4 hours. **WHO ORS** per litre: salt 2.6 g, glucose 13.5 g, potassium chloride 1.5 g, citrate 2.9 g.
3. **Amoxicillin:** child 30 mg/kg three times daily for 5 days (MSF), adult 1 g three times daily for 5 days.
4. **Chlorine:** 0.05% hands, 0.2% to 0.5% surfaces, 2% excreta. Grams per litre = (desired % ÷ product %) × 1,000.
5. **Steam:** 121°C (about 1.1 bar) for 30 minutes wrapped, or 134°C (2.1 bar) for 18 minutes.
6. **Handrub:** 80% ethanol, no more than 50 litres per batch, no flame.
7. **Delayed primary closure:** day 4 to 7, best day 4 to 5, seldom after day 8.
8. **Misoprostol:** 600 µg by mouth after the baby, never before.
9. **Emergency:** 1 death per 10,000 per day, or double the usual rate. For 3,000 people, one death every three days.
10. **IEHK basic unit:** 1,000 people, three months, 38 kg. A village of 300 needs about 1.2 a year.

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