SY-08 The means ledger: what is possible with hands, hearth, garden and still, dispensary and infirmary

HEALING after the FALL, research library, SY-08

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

This report gathers the "Means ledger" of every accepted report in the library (159 reports, from FO-01 to SY-10) into one table for the whole book. It asks, for each condition and task, what can be done at each rung of the ladder and with what outcome: hands (knowledge and a trained body, nothing else), hearth (fire, water, salt, sugar, soap, cloth, food), garden and still (grown plants, ethanol, measured preparations), village dispensary (a lay healer with salvaged stock, a scale and a record book), district infirmary (a sterile room, a pressure cooker, beds, a nurse or clinical officer, perhaps a microscope), and the hospital before the Fall as the reference line. It then reads the table the other way, asking where the lives are per hour of effort, what to build first on the next rung, and where the ladder ends. Its ground is the library itself. Every figure below comes from a library report, cited by ID, and the library's own sources stand behind those reports. Where the figure for a rung is the library's inference or mine, not a measurement, it is marked [VERIFY]. The related reports FO-11 (what a village can hold), OR-06 (the year shelf), OR-07 (the district infirmary) and SY-05 (lives per training hour) are the closest neighbours. SY-09 (the salvage list and the first year) and SY-11 (the book's structure) are being written alongside this one and are referred to as forthcoming.

Findings by section

1.1 The ladder, and how to read it honestly

The book's argument is that a village can climb. The ledger supports that argument, with three corrections that the library makes again and again.

First, the steepest steps are at the bottom. In report after report, the largest change in case fatality comes between hands and hearth, or between nothing and a trained lay person with one salvaged drug, not between dispensary and infirmary. Water is changed most by the hearth (THRIVING library, HY-02). Newborn survival is changed most by a clean cut, warmth and breastfeeding, and the help-babies-breathe drill halved first-day deaths in trials (THRIVING library, MA-05). Nursing holds most of its effect at the household rung (THRIVING library, NU-01). Rabies is decided by fifteen minutes of soap and water before any rung above it is reached (THRIVING library, IN-15). Heat and cold injury are hearth conditions (THRIVING library, HY-11).

Second, nothing manufactured below the hospital changes outcomes. No rung below the hospital can make antibiotics, insulin, injectable adrenaline, sterile intravenous fluid, safe anaesthetic gases or vaccines in useful quantity (THRIVING library, IN-06, CH-01, CH-13, NU-02, WO-10). Oxford in 1941, with a university laboratory, made enough penicillin for about one patient a month, while a village of 300 would need 8 to 12 million units a year (THRIVING library, IN-06). So the dispensary and infirmary rungs are not manufacturing rungs. They are rungs of skill, measure, sterility and stewardship over a stock that was salvaged and will run out. The forthcoming SY-09 deals with that stock. This report treats every dispensary figure as true only "while stock lasts".

Third, almost every outcome by rung is inferred, not measured. The library has strong trials for single steps (amoxicillin by breath count, village newborn antibiotics, oral rehydration in a camp, vitamin A in measles) and historical series for others (Trueta's closed plaster, Civil War amputation, the Joslin diabetes ledger). It has no trial of "a village with a still against a village without one". The cells of the table below are assembled from different populations, decades and climates. They show the shape of the ladder and the order of magnitude. They do not show what a given village will achieve. Every figure carries its grade in section 2.

A fourth correction belongs to the reader of a ladder. A ladder flatters its top rung. The district infirmary appears in every row of the table, and in most rows it shows the lowest case fatality below the hospital. But few districts will build one (THRIVING library, OR-07), it serves perhaps 30 major operations a year for 3,000 people, and its beds will stand mostly empty. Its value per person is real but small, and the table must be read with the denominator in view.

1.2 The ledger: what each rung can do, condition by condition

The tables give, for each condition, the outcome without help (or with hands alone), what each rung adds, and the hospital line before the Fall. Figures are case fatality unless stated. "Same" means the rung adds nothing measurable. Figures are drawn from the reports named in the last column, which also gives the grade of the strongest step (section 2 explains the grades).

Table 1. Infections

Condition	Hands	Hearth	Garden and still	Dispensary (while stock lasts)	District infirmary	Hospital before	Reports, grade
Severe watery diarrhoea and cholera	about 50% untreated	home oral rehydration, a few per cent [VERIFY: FO-02 inference]	adds nothing	ORS stock, nasogastric drip 20 mL/kg/h	intravenous fluid while it lasts, under 1%	under 1%	FO-02, HY-03, IN-01, IN-11, A
Child pneumonia	about 13.5%	warmth, feeding, breath count to recognise	no plant replaces amoxicillin	amoxicillin by breath count, 0.8%	injectables for severe cases, about 6.5%	adds little in the typical case	IN-03, IN-05, MA-07, A
Adult lobar pneumonia	20 to 40%, over half above 60 years	rest, fluids, no bleeding (bled 19.9% against 12.8% unbled)	adds nothing	amoxicillin	oxygen only if salvaged [VERIFY]	low	IN-03, FO-05, TR-13, B
Newborn sepsis	about 16.6%	clean cut, warmth, breastfeeding prevent	adds nothing	village antibiotics, 2.8%	about 3% with simplified regimens	lower	IN-01, IN-05, MA-05, A

Condition	Hands	Hearth	Garden and still	Dispensary (while stock lasts)	District infirmary	Hospital before	Reports, grade
Malaria in children	15 to 24% of children died where untreated	nets: treated nets cut child deaths 17%, untreated nets halve infection	Artemisia tea relapses in 2 of 3 (X), bark quinine varies	stocked artemisinin or quinine 10 mg/kg three times a day for 7 days, 85 to 95% cure	severe malaria from near 100% to 15 to 20%	lower	IN-09, IN-01, PH-04, A
Measles	2 to 12% under five	isolation, feeding	adds nothing	vitamin A two doses, deaths down 62% overall and about 80% under two	antibiotics for compli-cations	0.1 to 0.3%	IN-12, IN-01, A
Tuberculosis	70% dead within ten years	air, separate sleeping	food for contacts cut new cases about 40%	full course while stock lasts, over 90% cure	same, with smear microscopy if staffed and checked	over 90%	IN-10, OR-04, A
Sepsis, including after birth	untreated bacter-aemia two thirds to four fifths died	clean hands and birth prevent	handrub from the still prevents	puerperal sepsis about 25% fell to 8% in the sulphonamide era	septic shock still over 40%	over 40% in shock	IN-04, ME-03, B
Rabies after a bite	100% once symptoms begin	soap and water 15 minutes, the whole game	adds nothing	vaccine only if salvaged	same	100% after symptoms	IN-15, A
Typhus, plague, louse and flea disease	high, variable	delousing, boiling clothes	adds nothing	doxycycline or tetracycline while stock lasts	same	low	HY-06, B

Table 2. Mothers and newborns

Condition	Hands	Hearth	Garden and still	Dispensary	District infirmary	Hospital before	Reports, grade
Maternal death, all causes	about 870 per 100,000 births with no attendant	trained attendant and clean hands: Sweden reached 230 per 100,000 in 1900	adds little	misoprostol, antibiotics	caesarean, magnesium, transfusion	about 10 per 100,000 [VERIFY]	FO-01, FO-02, MA-01, B
Bleeding after birth	uterine massage, bimanual compression	same	no safe plant (ergot excluded)	misoprostol 600 micrograms by mouth roughly halves heavy bleeding	oxytocin (needs cold chain), tranexamic acid within 3 hours, blood	low	MA-02, B
Eclampsia	left side, recognition, transfer	same	adds nothing	intramuscular magnesium if stocked and if injection is allowed [OWNER]	magnesium sulphate halves fits, delivery	low	MA-04, A
Obstructed labour	death or fistula	adds nothing	adds nothing	adds nothing, transfer	caesarean, Malawi maternal death 1.3%, about 1 in 130	low	MA-03, OR-07, B
Newborn not breathing	drying, stimulation	warmth	adds nothing	bag and mask drill, first-day deaths about halved	same	low	MA-05, A
Newborn tetanus	dirty cut	clean blade, nothing on the cord (applied substances odds ratio 5.1)	adds nothing	same	same	rare	MA-05, B

Condition	Hands	Hearth	Garden and still	Dispensary	District infirmary	Hospital before	Reports, grade
Smallest preterm babies	skin to skin	warmth, feeding by cup	adds nothing	same	same, the smallest third does not move	ventilated care	MA-05, B

Table 3. Injury and surgery

Condition	Hands	Hearth	Garden and still	Dispensary	District infirmary	Hospital before	Reports, grade
Limb bleeding	tourniquet before shock: about 90% survive against about 10% after shock, improvised windlass fails about 1 in 3	same	adds nothing	commercial tourniquet if salvaged	surgery to control	low	FO-06, FO-09, WO-01, B
Open thigh fracture	50 to 80% died	clean wound, splint	still for wash	traction, about 15%	debridement, closed plaster: Trueta 6 deaths in 1,073 without antibiotics	low	FO-02, WO-05, WO-09, B
Contaminated wound	infection	boiled water wash	ethanol for skin	delayed primary closure day 4 to 7	debridement	low	WO-03, B
Leg fracture, bonesetting	gangrene from tight splints	padding	adds nothing	one-day course for bonesetters: gangrene amputa-tions 25 to 7	Perkins traction, 47 of 50 good	low	SY-01, WO-05, B

Condition	Hands	Hearth	Garden and still	Dispensary	District infirmary	Hospital before	Reports, grade
Amputation, thigh					thigh amputation 53.6% died in the Civil War, 24.3% for all amputations	low	WO-09, B
Burns	cool running water 20 minutes, about 13% fewer grafts	clean dressings	honey dressings	oral fluids for moderate burns	intravenous fluid for large burns	large burns and smoke injury still die	WO-04, B
Severe head injury	position, airway	same	adds nothing	transfer	burr holes by trained hands: 6.8% against 43.9% [VERIFY groups], untrained: 3 of 3 died	GCS 3 to 5 about 98% die without ventilation	WO-07, C
Strangulated hernia	reduction attempt only by trained hands	truss	adds nothing	early referral	emergency mortality 4 to 5.5%, elective 0.2 to 0.5%, net mesh equals commercial	low	CH-11, B
Appendicitis		rest, fluids	adds nothing	antibiotics: about 70% avoid surgery at one year	laparotomy by supervised non-physician, 4 to 8% mortality	low	WO-08, FO-02, B
Hip fracture in the old	60% die within a year, 83% of frail residents within a month	nursing	adds nothing	traction for fractures outside the capsule [OWNER]	fixation only with implants and theatre	low	CH-12, NU-04, B

Condition	Hands	Hearth	Garden and still	Dispensary	District infirmary	Hospital before	Reports, grade
Cataract	blind	adds nothing	adds nothing	adds nothing	small-incision surgery, about 9 in 10 regain sight, couching excluded (X)	high	CH-08, B
Botulism	about 70%	adds nothing	adds nothing	adds nothing	relay hand ventilation: 3 patients for 6 days take about 36 person-shifts a day, under 5% with ventilation	under 5%	IN-16, ME-14, B

Table 4. Long illness, poisoning and other

Condition	Hands	Hearth	Garden and still	Dispensary	District infirmary	Hospital before	Reports, grade
Type 1 diabetes	Joslin: 824 of 1,000 dead within ten years	strict diet (Allen): 386	adds nothing	insulin while vials last: 61	same, vials only	61 and falling	CH-01, A
Type 2 diabetes		low-energy diet, remission about 46%	adds nothing	metformin while stock lasts	same	flat ladder	CH-01, A
Kidney failure needing dialysis	death in about 1 to 2 weeks	adds nothing	adds nothing	adds nothing	adds nothing	dialysis	FO-01, A
Anaphylaxis	position, airway	adds nothing	adds nothing	intramuscular adrenaline while it lasts	same	refractory cases still die	CH-13, A

Condition	Hands	Hearth	Garden and still	Dispensary	District infirmary	Hospital before	Reports, grade
Cold and heat injury	shelter, body heat	the rung: warmth, cold-water immersion for heat stroke	adds nothing	thermometer	same	low	HY-11, A
Methanol poisoning			the still's ethanol is the antidote, loading 0.6 g/kg	same	same plus dialysis absent	low	ME-03, B
Depression and anxiety	listening	adds nothing	adds nothing	lay counsellor, about 100 counselling hours a year per 300 people	supervision, the district unit	similar	MI-01, MI-02, A
Cancers		adds nothing	adds nothing	pain relief while stock lasts	excision cures some skin and breast cancers	mixed	CH-06, B
Common nursing care	turning, mouth care (pneumo-nia 19% to 11%), feeding	clean water, warmth	adds nothing	records	after salvaged fluid runs out, a district infirmary is a dispensary with more beds	low	NU-01, NU-02, NU-03, B

Three patterns stand out in these tables. Most rows are decided by the second and fourth columns: what the household knows, and whether one salvaged drug is in the hands of a trained person. The garden and still column is nearly empty for mortality. Its value lies elsewhere, in ethanol for skin and instruments, in measured tinctures for comfort and in the methanol antidote (THRIVING library, ME-03). And the infirmary column is decisive in a small number of rows (obstructed labour, open fractures, strangulated hernia, severe malaria, large burns, cataract) that are rare per head but carry most of the deaths that the village cannot touch.

1.3 Reading the table the other way: where the lives are

The question for a village is not which rung has the lowest case fatality, but which rung saves the most lives for the effort it costs. SY-05 did the arithmetic for a village of 300 and it is the backbone of this section (THRIVING library,

SY-05). A village of 300 can expect about 7 to 9 deaths a year in a tropical setting and 5 to 7 in a temperate one. Twenty skills, almost all of them at the hands and hearth rungs with a little salvaged stock, together avert about a third of tropical deaths and a fifth of temperate ones. The top of SY-05's ranking reads as follows.

Table 5. The best returns, village of 300 (from SY-05)

Rank	Skill	Rung	Deaths averted a year	Training hours per life saved
1	Breath count and amoxicillin for child pneumonia	dispensary, while stock lasts	about 0.75	about 8 to 13
2	Oral rehydration	hearth	about 0.85	about 8.5 to 20
3	Fever care and malaria treatment	dispensary	about 0.4	about 9.5
4	Vitamin A in measles	dispensary	about 0.18	about 9 to 27
5	Breastfeeding support	hands	about 0.15	about 12 to 22
6	Epidemic control	hands and hearth	about 0.12	about 17 to 20
7	Bed nets	hearth	about 0.25	about 14
11	Safe water	hearth	about 0.25	about 27 to 45
14	Clean birth	hands and hearth	small	about 31 to 74
19	Warmth and heat care	hearth	small	about 42 to 340
below line	Bleeding after birth	village 0.025, district about 0.25		about 96 to 200
below line	Tourniquet	hands		about 170
below line	Rabies wound washing	hands		about 320 to 1,600

The pairs of training-hour figures are the ranges SY-05 gives for its two settings or assumptions. The reader should take them as orders of magnitude [VERIFY against SY-05 table].

Four lessons follow. First, the hands and hearth rungs give the largest gain in lives per effort, by a wide margin. Oral rehydration, breastfeeding, clean birth, water and warmth need no stock at all. Second, four of the top five skills depend on salvaged stock (amoxicillin, antimalarials, vitamin A, ORS sachets or at least a reliable salt measure). The dispensary rung, in the sense of a trained person holding a few drugs and a breath timer, is where the next largest gain lies, and it lasts only as long as the shelf (THRIVING library, SY-05, OR-06). Third, the deaths that come from the loss of drugs that cannot be stocked and from the loss of surgery amount to about 0.5 to 2 a year in a village of 300, and a lay healer can prevent almost none of them (THRIVING library, SY-05, FO-01). Fourth, a skill can rank low per hour and still belong in the book, because the person it saves is in front of you: the tourniquet and wound washing after a dog bite are the clearest cases.

Scaled to a district of 3,000 (ten villages), the same arithmetic gives a rough comparison of the rungs that the library does not state and I infer [VERIFY]. Hands, hearth and a stocked dispensary in each village might avert something like 20 to 30 deaths a year across the district. A district infirmary of ten beds, doing about 30 major operations, 1 to 7 caesareans and 100 to 150 other admissions a year (THRIVING library, OR-07), might avert perhaps 3 to 8 deaths a year, most of them mothers in obstructed labour or haemorrhage, young adults with open fractures or strangulated hernias, and children with severe malaria. At about half a working week per adult in the district every year to run it

(core staff of 11 to 13, 13 to 22 tonnes of wood, 250 to 1,000 litres of water a day), the infirmary costs far more per life than the village rungs. It is still worth building where the people exist, because its deaths are the ones nothing else can touch and because its existence holds the village rungs up: supervision, resupply, records and second readers flow down from it.

1.4 What to build first on the next rung

The prompt names five items: the still, the pressure cooker, the garden, the microscope and the sterile room. The library adds two that cost less and matter more: the measure (scale, measuring spoon, marked syringe, thermometer) and water treatment. Ranked by gain per effort, with my reasons, the order is as follows. The ranking is my inference from the ledgers [VERIFY].

Table 6. Next-rung items in order of building

Order	Item	What it moves	Cost in effort and material	First failure	Reports
1	The measure: a 5 mL spoon, a level salt scoop, a kitchen or pharmacy scale, a marked syringe, a thermometer	dose error of liquid medicines from about plus or minus 90% to about 10%, salt error in rehydration fluid, fever and drying temperatures	small, salvageable	lost or swapped spoons, a second strength on the shelf	ME-02, ME-04, HY-03
2	Water treatment at the hearth: boiling, settling, cloth filter, chlorine while it lasts	diarrhoea, cholera, typhoid	fuel, pots, a routine	fuel runs short, coverage below half the households	HY-02, HY-04, HY-05
3	The pressure cooker	sterile instruments, dressings and needles: 121 degrees C for 20 minutes unwrapped, 30 minutes wrapped	one salvaged cooker, a gauge or timer, fuel	seal fails, timing cut short, wrapped loads undercooked	WO-12

Order	Item	What it moves	Cost in effort and material	First failure	Reports
4	The still	ethanol for skin, hands and instruments, tinctures measured by strength, the methanol antidote. A village of 300 needs about 25 to 30 litres of absolute ethanol a year, from under 90 kg of grain	a still, grain, a hydrometer, a locked store	drink, theft, methanol from fruit mash, fire	ME-03
5	The garden	comfort remedies, some antiseptics, food for the sick. Few garden plants move mortality	70 to 700 square metres [VERIFY: the library disagrees], 300 to 350 hours a year	children and lookalikes, overharvest, a strong plant gathered as a weak one	OR-02, PH reports
6	The microscope	malaria and tuberculosis diagnosis, but unchecked slides are often wrong	a course of 4 to 5 weeks, a second reader, stains, slides	97% of positive malaria films were wrong in one unchecked service (Dar es Salaam), a paper microscope missed 44%	OR-04
7	The sterile room	caesarean, laparotomy, debridement, amputation, hernia repair	a building, ten beds, 11 to 13 core staff, years of training for a surgeon, ketamine while it lasts, blood donors	sterile fluid runs out, infection in the room, the founders leave or die	OR-07, WO-09, WO-10, NU-02

Three choices in this order need defending. The measure comes before the still because a still without a hydrometer and a scale makes strong poisons out of weak remedies (paregoric was 25 times stronger than its name suggested, THRIVING library, ME-02, ME-05). The pressure cooker comes before the still because instruments boiled for 20 minutes are disinfected but not sterile (THRIVING library, WO-12), and every injection, suture and delivery below the infirmary depends on it, while ethanol can be partly replaced by soap, boiled water and salvaged handrub. The garden comes late not because it is useless but because the library finds almost no garden remedy that changes case

fatality, and the garden's own harms (children, lookalikes, overdose) arrive in the first season (THRIVING library, OR-02, SY-10).

The microscope deserves its own warning. It is the item a village most wants and is least ready for. The library's evidence is that an unchecked microscope makes diagnosis worse than a fever rule, because it produces confident wrong answers (THRIVING library, OR-04). It belongs at the district, with a trained reader, a second reader who checks a share of slides, and a record of agreement. OR-01 puts microscopy and injections outside a 300-hour village course (THRIVING library, OR-01).

The sterile room comes last and only at the district. The library is clear that the infirmary "must refuse more than it attempts" (THRIVING library, OR-07). Its may-attempt list is short: caesarean, manual removal of the placenta, laparotomy for ectopic pregnancy or a ruptured uterus, strangulated hernia, debridement, amputation, chest drain and abscess drainage. Its refusal list is longer: bowel resection [OWNER], surgery on infants beyond drainage, chest surgery beyond a drain, elective operations while stock is short, intubation without an anaesthetist, and operations on the dying.

1.5 Where the ladder ends

The ladder ends where an outcome depends on something no rung can make. The library names these conditions consistently, and the book should name them plainly.

Table 7. Conditions that do not move below the hospital

Condition	Why it does not move	What the rungs can still do	Reports
Type 1 diabetes	insulin cannot be made	strict diet buys time (Allen), comfort, the vial count	CH-01
Kidney failure needing dialysis	no dialysis	comfort, about 1 to 2 weeks	FO-01
Rabies after symptoms	no treatment exists anywhere	prevention by washing, comfort	IN-15
Septic shock	needs intravenous fluid, drugs and monitoring, and over 40% die even in hospital	early antibiotics before shock	IN-04
Severe head injury with deep coma	needs ventilation and neurosurgery	positioning, comfort	WO-07
Large burns and smoke injury	need intravenous fluid, ventilation, grafting	cooling, dressing small burns	WO-04
Refractory anaphylaxis	needs adrenaline infusion and airway	intramuscular adrenaline while it lasts	CH-13
The smallest third of preterm babies	need ventilation and intensive care	warmth, skin to skin, cup feeding for the rest	MA-05
Ventilated spinal injury	needs a ventilator for life	relay ventilation cannot be sustained	NU-09
Placenta accreta, clotting failure after birth	need blood products and hysterectomy	early transfer, misoprostol	MA-02, MA-03
Most cancers	need chemotherapy, radiotherapy, major surgery	excision of some skin and breast cancers at district, pain relief, comfort	CH-06

Condition	Why it does not move	What the rungs can still do	Reports
HIV and other infections beyond stock	need continuous drugs	prevention, nutrition, nursing	IN-14
Fungal eye infection	needs antifungal drops	protection, comfort	WO-16

For these conditions the book's honest offer is recognition, comfort and an accurate account of time. CH-06 and NU-06 treat comfort care as a skill in its own right, not as failure. The district infirmary moves almost none of these rows: its gains are concentrated in obstetrics, open injury and a few emergencies.

1.6 What each rung needs, and how it first fails

Each rung has a price in people, training, materials and records, and each has a typical first failure. The first failure is rarely the one the builders expect. It is usually a harm the new rung itself creates.

Table 8. The price and first failure of each rung

Rung	People	Training	Materials	Records	First failure to expect	Reports
Hands	every adult, one trained person per household	a few hours per skill, refreshed yearly	none	none	delay: the sign seen and not acted on	SY-05, SY-07, SY-10
Hearth	every household	an afternoon of demonstration, checked by watching	fuel, pots, salt, sugar, soap, cloth	none	the salt error in rehydration fluid (up to a quarter of mixes dangerous two years after teaching), lye swallowed by children in soap-making homes (87.5% of child caustic ingestions), carbon monoxide from indoor fires	HY-03, HY-05, NU-03

Rung	People	Training	Materials	Records	First failure to expect	Reports
Garden and still	one keeper per village, a second who knows the store	a season of apprenticeship, a hydrometer and a scale	70 to 700 square metres [VERIFY], a still, grain, jars, labels	a book of batches with strength and date	a concentrated poison issued as a weak remedy, drink and theft from the still, methanol from fruit mash, children in the garden	ME-02, ME-03, OR-02, PH-10
Village dispensary	one lay healer per 300, paid or fed, with a deputy	about 300 hours, refreshed every three months because skills decay	the salvaged shelf (about 140 kg for a year for 300 [VERIFY]), scale, spoons, timer, thermometer, a locked box	a register of every dose and every death	stock gone or stolen, a second strength confused with the first, the healer leaving unpaid and unsupervised (attrition up to 77% in some programmes)	OR-01, OR-06, OR-08, ME-09, FO-04
District infirmary	11 to 13 core staff for 3,000, a surgeon trained for years, a nurse, a second reader	3 to 5 years for a non-doctor surgeon, 4 to 5 weeks for a microscopist	a building, ten beds, pressure cooker, fuel 13 to 22 tonnes of wood a year, water 250 to 1,000 litres a day, ketamine while it lasts, blood donors	an operation book, a death review, a slide check	sterile fluid runs out, infection in the room, blood not there when needed (about half of the Malawi caesarean deaths were short of blood), the founders lost, no supervisor found	OR-07, WO-09, WO-10, NU-02, MI-02

Two observations follow. The cost of the dispensary is almost entirely people, not things: the 300-hour course, the quarterly refresher and the supervisor matter more than any item on the shelf (THRIVING library, OR-01, FO-04).

And the infirmary's first failure is its supply line. After the salvaged sterile fluid is used, "a district infirmary is a village dispensary with more beds" (THRIVING library, NU-02), because endotoxin-free fluid needs depyrogenation at about 250 degrees C and a clean process no district can run reliably. FO-11 judges one lay healer per village and one nurse per district to be the realistic staffing, not the ideal one (THRIVING library, FO-11).

1.7 The library's disagreements, carried

The library does not agree with itself on several points that touch the ladder directly. These are carried here as they stand. SY-10 and the forthcoming SY-12 hold the full list.

Table 9. Disagreements that change what a rung may do

Question	One side	Other side	Status
Should the village teach the tourniquet?	SY-01: refuse, it harms in lay hands	WO-01: teach, with a windlass and a time mark	[OWNER]
May anyone below the district give an injection?	SY-01: never	MA-04: intramuscular magnesium in eclampsia, CH-13: intramuscular adrenaline in anaphylaxis	[OWNER]
Foxglove in the garden	ME-07: one bed, one healer	PH-10: never gather, OR-03: only if the district can assay	[OWNER]
Opioid stop line by breathing rate	12 a minute	10 or 8 a minute	[OWNER]
Magnesium stop lines	breathing 16 a minute, urine 30 mL an hour	breathing 12, urine 25	to settle before print
Lidocaine ceiling	3 mg/kg, 200 mg	7 mg/kg (with adrenaline)	ME-09 to correct
Boiling water and instruments	10 minutes	20 minutes	the longer time is safer [VERIFY]
When to stop newborn resuscitation	10 minutes	20 minutes	to settle
Garden size for 300	about 70 square metres	about 700 square metres	[VERIFY]
Caesareans per 3,000 a year	FO-11: about 6	OR-07: 1 to 2 for absolute indications, 1 to 7 in all	carried
Appendicitis at the village	FO-02: surgery or death	WO-08: antibiotics first, about 70% avoid surgery	carried
Quinine in bark	IN-09: about 5%	PH-04: about 1% in wild bark	carried
Chlorhexidine on the cord	apply	nothing on the cord	to settle by setting
Salicylate age limit	12	16 or 18	to settle
Ephedra dose	one range	a range five times higher	to settle before print
Restraint of the violent patient	permitted with rules	not permitted	[OWNER]
Cholera at the hearth	FO-02: "a few per cent"	no measured series for home fluid alone	[VERIFY]

The pattern in the disagreements matters for the ladder. Almost all of them concern the same boundary: how much a person below the district may do with a sharp object, a strong plant or a strong drug. That boundary is the owner's

to set, village by village.

Evidence grades

Grades as defined for the library: A, trials or large consistent series in comparable settings. B, historical series or observational data with plausible confounding. C, case series, expert opinion or a single small study. D, tradition or analogy only. X, evidence against or harm shown.

Claim	Grade	Reports
Oral rehydration saves most deaths from watery diarrhoea	A	HY-03, IN-01, IN-11
Amoxicillin by breath count, given by lay workers, cuts child pneumonia deaths	A	IN-03, IN-05, MA-07
Village antibiotics cut newborn sepsis deaths	A	IN-05, MA-05
Vitamin A cuts measles deaths	A	IN-12
Bag and mask drill halves first-day deaths	A	MA-05
Misoprostol halves heavy bleeding after birth	A	MA-02
Magnesium halves eclamptic fits	A	MA-04
Insulin-era survival in type 1 diabetes cannot be reached without insulin	A	CH-01
Tourniquet before shock decides survival	B	FO-06, WO-01
Closed plaster and traction in open fractures without antibiotics	B	WO-05, WO-09
Supervised non-physician surgery at district	B	WO-09, WO-10, OR-07
Case fatality at the hearth rung for cholera	C	FO-02
Burr holes by trained non-specialists	C	WO-07
Lives averted by an infirmary per 3,000 (this report)	C, inference	OR-07, SY-05
Ranking of next-rung items (this report)	C, inference	ME-02, ME-03, WO-12, OR-04
Artemisia tea as malaria cure	X	IN-09
Couching for cataract	X	CH-08
Bleeding in pneumonia	X	FO-05, TR-13
Unchecked microscopy	X	OR-04

Means ledger

This report's own means ledger is the ledger of the ladder itself: what it takes to stand on each rung, for a village of 300 and a district of 3,000. Figures are from the reports named and are rounded.

Item	Rung	Quantity	Lasts or recurs	Can be made after the Fall?	Reports
Salt, sugar, clean water, a level measure	hearth	half a level 5 mL teaspoon of salt and six level teaspoons of sugar per litre	always	yes	HY-03
Fuel for boiling water	hearth	depends on climate and household	daily	yes	HY-02
Soap	hearth	household supply	weekly	yes, with lye danger	HY-05
Ethanol, absolute	still	25 to 30 litres a year for 300, under 90 kg grain	yearly	yes	ME-03
Pressure cooker	district, ideally village	one per dispensary [VERIFY]	years, seals fail	no, salvage	WO-12
Garden	garden	70 to 700 square metres [VERIFY], 300 to 350 hours a year	yearly	yes	OR-02
Year shelf for 300	dispensary	about 140 kg [VERIFY]	one to a few years	no	OR-06
Antibiotics for 300	dispensary	8 to 12 million units of penicillin equivalent a year	yearly	no	IN-06
Basic emergency kit for 1,000 people, 3 months	dispensary	about 38 kg	3 months	no	FO-11
Lay healer training	dispensary	about 300 hours, refresher every 3 months	yearly	yes	OR-01
Lay counselling	dispensary	about 100 hours a year per 300	yearly	yes, with supervision	MI-01, MI-02
Microscopist	district	4 to 5 weeks course and a second reader	yearly checks	yes, if a microscope is salvaged	OR-04
Non-doctor surgeon	district	3 to 5 years training	career	yes, slowly	WO-09
Infirmary fuel	district	13 to 22 tonnes of wood a year	yearly	yes	OR-07
Infirmary water	district	250 to 1,000 litres a day	daily	yes	OR-07

Item	Rung	Quantity	Lasts or recurs	Can be made after the Fall?	Reports
Infirmary staff	district	11 to 13 core, about half a working week per adult in the district per year	yearly	yes	OR-07
Ketamine	district	about 2 mg/kg intravenously per operation	while it lasts	no	WO-10
Sterile intravenous fluid	district	while it lasts	then gone	no, depyrogenation needs about 250 degrees C	NU-02
Relay hand ventilation	district	about 36 person-shifts a day for 3 patients over 6 days	per outbreak	yes, people	ME-14

Harm test

The ladder's harms follow SY-10's families: delay, wrong measure, wrong patient, wrong plant, closed space, contamination and the remedy as poison (THRIVING library, SY-10). Each rung brings its own.

Rung	Characteristic harm	Family	Guard
Hands	false confidence delays transfer, a tourniquet left on too long	delay	red-flag list, time written on the limb
Hearth	salt error in rehydration fluid, lye ingestion, carbon monoxide	wrong measure, closed space	level measure checked by watching, lye locked away, fires vented
Garden and still	strong plant given as weak one, lookalikes, concentrated tinctures, drink, methanol	wrong plant, remedy as poison	labels with strength and date, a hydrometer, no fruit mash for medicine, locked still
Dispensary	wrong strength, wrong patient, stock theft, needles reused	wrong measure, contamination	one strength per drug, register, pressure cooker, count checked by a second person
Infirmary	infection in the room, operations attempted beyond skill, blood not ready	contamination, delay	refusal list, death review, donors listed before operating

The deepest harm the ladder can do is to promise. A village told that it can build an infirmary may spend its labour

on a building and lose its rehydration and newborn care. The table is clear that this trade would cost lives [VERIFY, inference].

Red flags

SY-07's six patterns are the signs that a patient needs a rung the village does not have (THRIVING library, SY-07): the brain (confusion, fits, unequal pupils, stiff neck), circulation (cold limbs, fast weak pulse, bleeding not stopping), breathing (fast breathing for age, indrawing, blue lips), intake (cannot drink or keep fluid down, no urine), hidden bleeding (pale, fainting, swollen belly in pregnancy or after injury) and spreading infection (red streak, rising fever with a wound, a newborn who will not feed). On the ladder, each red flag is an instruction to climb at once: to the dispensary if the answer is a stocked drug, to the infirmary if it is surgery, blood or fluid. When the higher rung does not exist, SY-07's rule applies: do what the rung you stand on can do, keep the patient warm, fed and clean, and keep the record.

The case against

The strongest case against this ledger comes from the library itself.

SY-01 argues that lay medicine kills, and that manuals do not reliably prevent it (THRIVING library, SY-01). Its evidence is that amateurs given a skill and a tool use both beyond their competence, and that the tourniquet, the injection and the strong plant are where they do it. If SY-01 is right, every rung above the hearth adds harm as well as benefit, and the net gain of a rung is smaller than the case fatality columns suggest. The ledger answers only in part: the trials in Table 5 measured net effect, harms included, but they were run with supervision, resupply and records that a village after the Fall may not have.

SY-02 argues that herbalism, on the systematic reviews, changes almost no hard outcome (THRIVING library, SY-02). The ledger agrees, and that is why the garden column is nearly empty. The critic's sharper point is that the garden's harms are real and immediate while its benefits are comfort, and that a book which places the garden on a ladder implies a climb that is not there. The answer in this report is to place the garden fifth in building order and to say plainly that it is a comfort rung, not a survival rung.

SY-03 carries McKeown's argument that most of the fall in mortality before the antibiotic era came from food, water and housing, not from medicine (THRIVING library, SY-03). Read one way, McKeown strengthens the ledger: the hearth matters most. Read another, it undermines it: if food and water are the levers, then the dispensary and infirmary are minor, and the book's ladder should be a ladder of sanitation and farming, with medicine as a footnote. The library does not settle this, and the ledger cannot, because its outcome figures are by condition, not by population.

IN-06 sets the ceiling. Nothing that cures infection at scale can be made below the hospital (THRIVING library, IN-06). So the ladder above the hearth is a ladder of stewardship over a falling stock, and its gains decay with the shelf. A reader who takes the dispensary column as permanent has misread the table. The forthcoming SY-09 must say how long each column lasts.

OR-07 is the case against the top rung. The infirmary is expensive, rarely used per head and fragile (THRIVING library, OR-07). A ladder that shows it in every row flatters it. This report has tried to correct that by putting the lives per effort beside the case fatality, but the tables still give the infirmary a column of its own, and a reader may take that as advice to build one. It is advice only where 3,000 people can spare half a working week each, every year.

Finally, the critics of manuals in the Werner and King tradition would say that a ladder of rungs is the wrong picture altogether: that what matters is the person, her standing in the village and her supervision, not the equipment. The library's evidence on attrition and skill decay supports them (THRIVING library, OR-01, OR-08). The ladder is a list of things, and the things are the easier half.

10-line summary

1. The ledger gathers all 159 library reports into one table: for each condition, what hands, hearth, garden and still, dispensary and district infirmary can do.
2. The steepest steps are at the bottom: clean hands, oral rehydration, warmth, breastfeeding, a clean cut and one salvaged drug in trained hands.
3. Nothing that cures infection, replaces insulin or makes sterile fluid can be manufactured below the hospital, so upper rungs last only as long as the stock.
4. In a village of 300, twenty mostly hearth-level skills avert about a third of tropical deaths and a fifth of temperate ones (SY-05).
5. Lost drugs and surgery cost a village about 0.5 to 2 deaths a year, almost none preventable by a lay healer.
6. Build in this order: the measure, water treatment, the pressure cooker, the still, the garden, the microscope, the sterile room [VERIFY, inference].
7. The garden is a comfort rung, not a survival rung. The microscope without a second reader makes diagnosis worse.
8. A district infirmary saves the deaths nothing else can touch, but few and at high cost, and it must refuse more than it attempts.
9. Where the ladder ends: type 1 diabetes, dialysis, rabies after symptoms, septic shock, deep coma, large burns, the smallest preterm babies, most cancers.
10. Outcomes by rung are assembled, not measured, and the library disagrees on the boundary of what a lay person may do with a blade, a needle or a strong plant [OWNER].

Open questions

- How long does each dispensary row last on a realistic shelf? This depends on the forthcoming SY-09.
- What is the case fatality of cholera with home rehydration alone, without any skilled help? The library has an inference, not a series [VERIFY].
- What is the measured effect of a still or a pressure cooker on infection rates in a village? No study was found in the library.
- Can a district train and keep a non-doctor surgeon without an outside school? WO-09's three to five years assume teachers who may not exist.
- Which districts can supply blood donors reliably enough to make caesarean safe? OR-07 and MA-03 point to blood as the limit.
- Does the gain from the village rungs hold without supervision from above? The trials all had it.
- Should the book give the infirmary a full chapter, or a short chapter that sends the reader back down the ladder? This is for the forthcoming SY-11 [OWNER].

Sources to read in full

The library reports that carry the most weight in this ledger, in the order to read them: SY-05 (lives per training hour), OR-07 (the district infirmary), IN-06 (why antibiotics cannot be made), FO-11 (what a village can hold), OR-06 (the year shelf), NU-02 (what happens after sterile fluid runs out), ME-03 (the still), WO-12 (sterilising), OR-04 (microscopy), SY-07 (red flags), SY-10 (harms and disagreements), SY-01 to SY-03 (the cases against). Outside the library, the primary trials behind Table 5 should be read in full before any figure is printed: Bang and colleagues on pneumonia and newborn care in Gadchiroli, the AFRINEST trials, Mahalanabis on oral rehydration in the 1971 refugee camps, and the Joslin diabetes series.

At the bedside after the Fall

Household. Minimum viable version: one adult per household who can mix rehydration fluid with a level measure, count a child's breathing for a full minute, keep a newborn warm and fed, cool a burn for 20 minutes, wash a bite for 15 minutes and know the six red-flag patterns. What it needs to start: a measuring spoon, salt, sugar, soap, a pot with a lid, a clock or a counted minute. First failure to expect: the salt error, and the household that waits a day too long.

Village of 300. Minimum viable version: one lay healer and a deputy, 300 hours of training, a locked shelf with amoxicillin, ORS, an antimalarial where needed, vitamin A, misoprostol, a scale, a marked syringe, a thermometer, a timer, and a register. A pressure cooker for needles and instruments. A still only once a hydrometer and a locked store exist. A small garden for comfort remedies, away from children. What it needs to start: the healer fed or paid by agreement [OWNER], a supervisor visiting every three months, the salvaged shelf. First failure to expect: the stock runs out or is stolen, or the healer leaves.

District of 3,000. Minimum viable version: a room that can be kept clean, a pressure cooker, ten beds, a nurse or clinical officer, a non-doctor surgeon if one can be trained, a list of blood donors, a microscope only with a second reader, an operation book and a monthly death review. A written list of what the infirmary will attempt and what it will refuse. What it needs to start: about half a working week a year from every adult in the district, 13 to 22 tonnes of wood, water on site, the salvaged sterile fluid and ketamine. First failure to expect: the sterile fluid runs out, or infection spreads in the room, or blood is not there when a mother bleeds.

Protocols

Rung check for a new village (once a year) 1. Count households with a trained adult. Target: every household. Below half, teach before building anything else. 2. Watch three households mix rehydration fluid. Salt: half a level 5 mL teaspoon per litre. Any mix that tastes saltier than tears is remade. 3. Count the shelf against the register. Any difference over 5% is investigated the same week [OWNER]. 4. Check the pressure cooker: seal, gauge or timer, one test run at full pressure for 20 minutes unwrapped, 30 minutes wrapped. 5. Check the measure: spoons, syringes and scale against a known weight or volume. Tolerance about 10%. 6. Review every death of the year with the healer: rung reached, rung needed, delay in hours.

Choosing the next item to build 1. If any household lacks the hearth skills, train first. 2. If dosing is by guess, build the measure. 3. If needles or instruments are reused without sterilising, get a pressure cooker. 4. If handrub or skin antiseptic has run out, build the still, with a hydrometer and a lock. 5. Build the garden only after the store and labels exist. 6. Build a microscope service only at the district, with a 4 to 5 week course and a second reader checking a share of slides. 7. Build the sterile room only where 3,000 people agree to staff and fuel it, and only with a written refusal list.

Climbing a rung with a patient 1. Check the six red-flag patterns. 2. If present, start what the current rung can do: fluid, warmth, a stocked antibiotic, bleeding control. 3. Send for or carry the patient to the rung that can do the rest, with a written note of time, signs and doses. 4. If no higher rung exists, continue care, comfort and the record. Tell the family the truth about time.

Numbers to carry

- About 50% of untreated severe cholera cases die. Under 1% with full rehydration.
- Child pneumonia: about 13.5% without antibiotics, about 0.8% with amoxicillin by breath count.
- Newborn sepsis: about 16.6% untreated, about 2.8% to 3% with village antibiotics.
- A village of 300 loses 7 to 9 people a year in the tropics, 5 to 7 in a temperate climate.
- Twenty mostly hearth skills avert about a third of tropical deaths.
- Lost drugs and surgery: 0.5 to 2 deaths a year per 300, almost none preventable by a lay healer.
- Pressure cooker: 121 degrees C for 20 minutes unwrapped, 30 minutes wrapped.

- Still: 25 to 30 litres of absolute ethanol a year for 300 people.
- District infirmary for 3,000: about 30 major operations, 1 to 7 caesareans, 11 to 13 core staff.
- Type 1 diabetes ten-year deaths: 824 per 1,000 untreated, 386 on diet, 61 on insulin.

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