SY-01 The case against lay medicine: how amateurs kill, and whether manuals help

HEALING after the FALL, research library, SY-01

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

How to read this document

This report puts HEALING after the FALL on trial. It first gathers the strongest evidence that untrained and lightly trained people harm the sick, then sets against it the trials of lay care, the record of the best-known self-help manual and the question the harm literature rarely asks: what happens with no care at all. It ends with the rules the book must obey and what it must refuse to teach. Three warnings apply throughout. The harm literature is hospital-selected: surgeons see the gangrenous limb, not the hundred fractures that healed. Professional bodies have an interest in the case against lay care. The checklist evidence comes from hospitals. Most findings come from a world with ambulances, pharmacies and referral hospitals. Where the conclusion changes after the Fall, the text says so.

1. Findings by section

1.1 The injection: the clearest lay harm, and not only a lay one

The best-documented way in which unqualified practitioners kill is the reused needle. Simonsen and colleagues (1999) estimated about 1.5 injections per person per year in the developing world, found that at least half were unsafe in 14 of 19 countries with data, and found eighteen studies linking unsafe injections to hepatitis B and C, HIV, Ebola, Lassa fever and malaria. Five attributed 20 to 80 per cent of new hepatitis B infections to injections. The companion model put the annual toll at 8 to 16 million hepatitis B, 2.3 to 4.7 million hepatitis C and 80,000 to 160,000 HIV infections (Kane et al. 1999). A later estimate for 2000 found 3.4 injections per person per year, 39.3 per cent with reused equipment, causing about 21 million hepatitis B, two million hepatitis C and 260,000 HIV infections, or 32, 40 and 5 per cent of new infections (Hauri, Armstrong and Hutin 2004).

The field record is vivid. In Darsano Channo near Karachi, syringes already used on other patients were used for 94 per cent of observed injections, and no practitioner knew that hepatitis C spread this way (Khan et al. 2000). In Hafizabad, people receiving more than four injections a year had 11.9 times the odds of hepatitis C infection (Pasha et al. 1999). In two rural hospitals in Bihar and Jharkhand in 2004 and 2005, 43 per cent of patients had received an injection in the previous month, 43 per cent of those from informal practitioners, and 30 per cent did not know injections could spread disease (Bihar and Jharkhand survey, authors not confirmed [VERIFY]).

Named outbreaks give the historical cases. In Roka commune, Battambang, Cambodia, 242 new HIV infections were diagnosed in 2014 and 2015. Cases were five times more likely to have had therapeutic injections from one unlicensed practitioner, phylogenetics showed a single cluster peaking at about 15 infections a day in September 2014, and he was sentenced to 25 years in December 2015 (Rouet et al. 2018, CDC 2016). In Unnao, Uttar Pradesh, in 2018, 21 of 566 people screened were HIV positive after an unqualified practitioner reused one syringe (Altaf 2018).

Formal practitioners do it too. In Modasa, Gujarat, in 2009, 664 of 856 hospitalised hepatitis B cases were blamed on unsafe injections by private practitioners (Altaf 2018). In Ratodero, Larkana, Pakistan, an outbreak detected in April 2019 reached 930 HIV infections among 31,239 people tested by July, most of them children (JPMA 2020, NPR 2019). A paediatrician was widely reported as the focus, but I could not read the investigating paper and cannot confirm his role [VERIFY]. The largest iatrogenic transmission on record was a state programme: Egypt's parenteral antischistosomal therapy, 12 to 16 intravenous injections of tartar emetic per patient from the 1950s to the 1980s, linked to hepatitis C across 8,499 people studied (Frank et al. 2000), though a 2020 model attributes only about 6 per cent of infections directly to it (Ayoub et al. 2020).

What changed is as instructive as the harm. Between 2000 and 2010 equipment reuse fell from 39.8 to 5.5 per cent, and unsafe injections from 1.35 to 0.16 per person per year (Pépin et al. 2013). Infections from unsafe injections fell by 87 per cent for HIV, 83 for hepatitis C and 91 for hepatitis B (Pépin et al. 2014). The fix was the cheap disposable syringe and fewer injections, not more doctors. After the Fall the disposable syringe will run out and every village will face the conditions of 1990s Pakistan. The book must teach the refusal to inject far more forcefully than the technique.

1.2 Drug sellers, informal providers and the irrational antibiotic

Informal providers are the usual first contact for the rural poor: 54 per cent of primary care visits in West Bengal, up to 75 per cent in several Indian states, and 12 informal providers for every doctor in rural Madhya Pradesh (Das et al. 2016). Standardised patient studies measure what they do. In rural Madhya Pradesh in 2010, 67 per cent of providers had no qualification, visits lasted 3.6 minutes, a correct diagnosis was given in 12.2 per cent of interactions with any diagnosis, correct treatment in 30.4 per cent, and harmful or unnecessary treatment in 41.7 per cent, 62.7 per cent for asthma (Das et al. 2012). Qualified and unqualified providers differed little: unqualified ones completed 3.24 percentage points fewer checklist items but were just as likely to treat correctly.

On antibiotics, non-prescription use made up 19 to 100 per cent of antimicrobial use outside northern Europe and North America across 35 surveys (Morgan et al. 2011), and simulated clients bought antibiotics without prescription at 88.3 per cent of 265 Ghanaian outlets (Ngyedu et al. 2023). Yet informal providers in West Bengal gave 18.8 percentage points fewer unnecessary antibiotics than public-sector doctors (Das et al. 2016). Overuse is a system property, not a lay one. The lead on Bhatia and Cleland was only partly confirmed: in south-central India they found that two-thirds of private and one-third of public patients received injections (Bhatia and Cleland, year not confirmed [VERIFY]). I found no paper of theirs on drug sellers.

1.3 The traditional bonesetter

The bonesetter's catastrophe is gangrene from a tight splint. Nwadiaro (2007) described the mechanism: prolonged pressure from tight splintage gives, by degree and duration, blisters, pressure sores, Volkmann's ischaemic contracture, crush syndrome and gangrene. He quoted series in which bonesetter gangrene caused 57 to 63 per cent of amputations in Zaria and 60 to 77.8 per cent in Jos, with mortality of 26.7 per cent in Enugu and 11.1 per cent in Banjul, and called for the practice to be condemned. Onuminya (2005) put bonesetters' share of limb gangrene needing amputation in Nigerian hospitals at 50 to 60 per cent, as background rather than measured data [VERIFY]. Dada and colleagues (2009) followed 121 consecutive patients with complications for a year and named gangrene, usually ending in proximal amputation, as the most dangerous. In Ibadan, 14 of 25 such patients needed internal fixation and two had amputations (Alonge et al., via a secondary source [VERIFY]).

The denominators matter. In a Warri practice, bonesetter complications were 43 of 4,702 orthopaedic cases (0.91 per cent) over eight years: 40.8 per cent non-union, 24.5 per cent malunion, 4.1 per cent gangrene, two children losing an arm (Odatuwa-Omagbemi et al. 2018). A 2022 systematic review found twelve studies with 833 patients and 691 complications, but none could say what share of all bonesetter patients came to harm (Tropical Doctor review 2022).

In Ghana 52 to 78 per cent of fracture patients use bonesetters, and interviews with northern Ghanaian bonesetters found sound closed reduction and immobilisation alongside incantations and little referral (Yempabe et al. 2020).

The harm is teachable away. In southern Ethiopia, Eshete (2005) counted 49 amputations in two years, 25 for gangrene from tight splints. After 112 traditional healers attended ten one-day courses, the next two years saw 25 amputations, seven for gangrene. There was no control group, but a one-day course appears to have prevented about two-thirds of gangrene amputations. A Ghanaian programme from 2021 reported a 57 per cent fall in bonesetter-related amputations, also uncontrolled (AO Alliance 2022).

1.4 Birth attendants and home birth

Two harmful birth practices are well documented. The first is contamination of the cord. In Pakistan, home-made ghee on the cord was a risk factor for neonatal tetanus (Traverso et al. 1991), animal dung or ash was hazardous (Bennett et al. 1997, abstract only [VERIFY]), and in Karachi applying any substance to the cord carried an adjusted matched odds ratio of 5.1, CI 2.7 to 9.7 (Raza et al. 2004). The second is uterotonic herbs in slow labour. A Ugandan case report describes a 19-year-old who took herbs to induce labour and died of posterior uterine rupture and peritonitis (Uganda case report [VERIFY authors]). In one hospital series herbal concoctions were implicated in 24 of 41 uterine ruptures among 5,085 deliveries, but I could not confirm the country or authors [VERIFY]. Ghana banned traditional birth attendants from direct care in 2000, yet herbal uterotonic use persists (Sumankuuro et al. 2022). The South African pregnancy tonic isihlambezo, often made from Rhoicissus tridentata (part used not confirmed [VERIFY]), is used by an estimated 60 to 80 per cent of women, with uterine activity shown only in rat tissue. The lead that Mabina (1997) linked it to meconium staining could not be confirmed [VERIFY].

Training attendants has a mixed record. The Cochrane review (Sibley, Sipe and Barry 2022) found six trials, over 1,345 attendants and about 57,000 births. The one trial of trained against untrained attendants, in seven subdistricts of Larkana, combined training, delivery kits and links to emergency obstetric care, and found fewer perinatal deaths (adjusted OR 0.70, CI 0.59 to 0.83) and neonatal deaths (0.71), with maternal deaths lower but not significantly (0.74, CI 0.45 to 1.22) (Jokhio et al. 2005). Extra training on top of basic training made no clear difference (0.79, CI 0.61 to 1.02). The reviewers judged the evidence insufficient. The working part of the Pakistani intervention included the referral link, which is what will be missing after the Fall.

Home neonatal care by lay workers is among the strongest evidence for lay medicine. In Gadchiroli, India, village health workers visited newborns and managed asphyxia, low birthweight, hypothermia and sepsis, including antibiotic treatment. Against control villages, net neonatal mortality fell by 62.2 per cent and perinatal mortality by 71.0 per cent, case fatality in sepsis fell from 16.6 per cent (163 cases) to 2.8 per cent (71 cases), and one death was averted per 18 newborns at US$5.3 each (Bang et al. 1999). The design was controlled before-and-after, not randomised. In Nepal, 4 per cent chlorhexidine on the cord cut neonatal mortality by about a quarter, by 34 per cent when started within 24 hours, and omphalitis by 75 per cent, while soap and water did nothing (Mullany et al. 2006). A pooled figure of 23 per cent across three South Asian trials was seen only in secondary sources [VERIFY].

1.5 Self-medication, overdose and the household measuring error

In the United States Acute Liver Failure Study Group's prospective series, 275 of 662 patients (42 per cent) had paracetamol liver injury and 48 per cent of these overdoses were unintentional. The median dose was 24 g, 38 per cent took two or more paracetamol products at once, and 27 per cent died without transplant (Larson et al. 2005). The hidden errors are duplication and delay.

Herbal self-medication has its named catastrophe. At a Brussels slimming clinic around 1990 to 1992, Aristolochia fangchi (root) was substituted for Stephania tetrandra (root) in weight-loss pills, producing over 100 Belgian cases of kidney failure. Of 39 patients with end-stage disease who had prophylactic surgery, 18 (46 per cent) had urothelial cancer, with risk rising above a cumulative 200 g (Nortier et al. 2000, NTP). The two roots were confused by their

shared Chinese trade name, fangji [VERIFY]. This is the danger that will multiply after the Fall, when plants are traded by common name.

Measuring is a lay skill, done badly. In a randomised experiment, 84.4 per cent of parents made at least one error of more than 20 per cent, 21 per cent gave double the dose or more at least once, and 68 per cent of errors were overdoses. Dosing cups gave 4.6 times the odds of error of oral syringes, and teaspoon-only labels did worse than millilitre labels (Yin et al. 2016). Home sugar-salt solution shows the same pattern. In Natal, Brazil, 47 per cent of home solutions had sodium above 100 mmol/L, and 63.8 per cent made with a standard double-ended spoon were correct against 19.3 per cent with household utensils (Natal study 2001). In Salvador, 30.4 per cent had harmful sodium levels (Salvador study 1991), and in Edo State, Nigeria, 40.4 per cent exceeded 120 mmol/L (Ibadin et al.). Errors run towards too much salt, the dangerous direction for a dehydrated infant. Recipes differ too: six level teaspoons of sugar and half a level teaspoon of salt per litre (Rehydration Project), 40 g sugar and 3.5 g salt per litre (IFRC), and a 1988 review found grossly varying African national recipes (1988 review). Yet oral rehydration remains home care's greatest success, credited with much of the fall in child diarrhoea deaths from about 4.6 million in 1980 to 1.5 million in 2000 (Victora et al. 2000).

1.6 Delay: the harm that does not show on the body

Home treatment kills most often by taking time. In Iganga and Mayuge, Uganda, among 164 child deaths, pneumonia lasted a median seven days and families waited a median two days before seeking care outside the home. Most children first got drugs at home, 52 per cent antimalarials and 27 per cent antibiotics (Källander et al. 2008). In rural Bangladesh, delay of two days or more was 4.9 times more common in pneumonia deaths (Bangladesh verbal autopsy study [VERIFY authors]). In north-central Nigeria, 61 per cent of 72 snakebite victims arrived more than four hours after the bite (Michael et al. 2011). None of these studies proves the home treatment caused the death. All show that the families of the dead lost days. After the Fall the argument changes shape: delay kills only where there is something better to reach.

1.7 Harmful first aid: snakebite, burns and fractures

A review of 71 prospective studies from 1947 to 2023 found tourniquets in 45.8 per cent of snakebite victims (55.7 per cent in Asia), incisions in 6.7 per cent and topical substances in 5.6 per cent, with no decline over time (Maduwage, Gamage and Gutiérrez 2024). In north-central Nigeria, where three-quarters of bites were from the carpet viper Echis ocellatus, 74 per cent of 72 victims had a tourniquet and tourniquet users needed more antivenom. Traditional concoctions were associated with death or disability (odds ratios about 15 topical and 20 swallowed, with very wide intervals). Three died (4.2 per cent) and 13 (18 per cent) were disabled (Michael et al. 2011). WHO's South-East Asia guidelines advise against tight arterial tourniquets, say most western and traditional first aid does more harm than good, and recommend reassurance, immobilisation and fast transport (WHO SEARO). A 2016 review judged pressure immobilisation too difficult for lay people to apply correctly (PLoS NTD review 2016 [VERIFY authors]).

Burns show what the right lay act achieves. Among 2,495 children at a Queensland burns centre, 20 minutes of cool running water within three hours was associated with lower odds of grafting (OR 0.6, CI 0.4 to 0.8), and any cool water with 35.8 per cent lower odds of admission and 42.4 per cent lower odds of surgery (Griffin et al. 2020). The usual alternatives are worse. Among 710 Tanzanian burn patients, 24 materials had been applied, honey most often, and only 14.3 per cent had cool water (Tanzania meta-analysis [VERIFY authors]). In Douala, 132 of 284 burn admissions (46.5 per cent) were neglected burns, and 20 per cent arrived septic (Douala study). At Kilimanjaro Christian Medical Centre 53.7 per cent had wound sepsis (KCMC study). Honey has evidence on burns (Babu and Eisenberg 2010), but as first aid it displaces cooling.

Fracture first aid harms by the tight splint. Pain out of proportion and pain on passive stretching of the fingers or toes are the earliest signs of compartment syndrome, and normal pulses and capillary refill do not exclude it (LITFL, Queen's University). Numbness, pallor and pulselessness come late.

1.8 The little-knowledge problem

The fear behind the professional case is that a little knowledge makes people confidently wrong. Kruger and Dunning (1999) found students in the bottom quartile scored around the 12th percentile but placed themselves around the 62nd. Gignac and Zajenkowski (2020), in 929 adults, argued the pattern is mostly a statistical artefact, and Dunkel and colleagues (2023) found a modest real effect. In health, Motta, Callaghan and Sylvester (2018) found that 62 per cent of the worst performers on autism knowledge thought they knew as much as doctors, against 15 per cent of the best. Davis and colleagues (2006) found physicians' self-assessment had little, no or inverse relation to observed competence in 13 of 20 comparisons. Overconfidence is a human trait, and doctors have it too.

Does short training make people dangerous? The direct test is in West Bengal. Das and colleagues (2016) randomised 304 informal providers in Birbhum. Half were offered 72 sessions over nine months, at US$175 per trainee, with 56 per cent attendance. With unannounced standardised patients, trained providers managed cases correctly 7.9 percentage points (14.2 per cent) more often, 13.3 points with full attendance, closing about half the gap with public doctors. They referred more chest pain and gave more oral rehydration salts. Training did not reduce unnecessary medicines or antibiotics (70.7 and 33.1 per cent of relevant interactions in controls), and it did not increase harmful practice, the specific fear of the Indian Medical Association. A review of 337 studies found that training or supervision alone improved practice by a median of 10.3 to 15.9 points and both together by about 18. Training alone for lay health workers had a small effect of 2.4 points, and printed information alone changed professional practice by 1.4 points (Rowe et al. 2018). For anyone writing a book, that last figure is the most sobering number in this report.

1.9 The other side: lay health workers

The Cochrane review of lay health workers pooled 82 trials, a third from low- and middle-income countries. Lay health workers probably increased full vaccination (RR 1.22, CI 1.10 to 1.37), breastfeeding initiation (RR 1.36), exclusive breastfeeding (RR 2.78) and tuberculosis cure (RR 1.22, CI 1.13 to 1.31). They may reduce under-five deaths (RR 0.75, CI 0.55 to 1.03, from 50 to 38 per 1,000) and neonatal deaths (RR 0.76, CI 0.57 to 1.02), with low certainty. No trial measured maternal mortality (Lewin et al. 2010).

Narrow tasks with a drug work. In Tigray, Ethiopia, mothers taught to give chloroquine promptly cut under-five mortality to 29.8 per 1,000 against 50.2 in control clusters, a 40 per cent reduction (Kidane and Morrow 2000). Community case management of pneumonia was estimated to cut pneumonia deaths by 70 per cent (Theodoratou et al. 2010). In Kilifi, Kenya, training drug retailers raised adequate antimalarial dosing from 8 to 33 per cent in a year and to 64 per cent by 2001 (Marsh et al. 2004). Ugandan community health workers counted breaths within five per minute of a reference in 71 per cent of children, with 75 per cent sensitivity and 83 per cent specificity (Uganda CHW study [VERIFY authors]). Facility IMCI in Tanzania was followed by 13 per cent lower child mortality, with a wide interval (Armstrong Schellenberg et al. 2004).

Lay trauma care is the closest analogue to life after the Fall. In northern Iraq, where prehospital landmine mortality was 30 to 40 per cent (Wisborg et al. 2008), paramedics trained about 7,000 village first responders. Patients managed by them had 9.8 per cent mortality against 15.6 per cent without, in a non-randomised comparison of 325 and 1,016 patients (Murad and Husum 2010). Over ten years and 2,788 patients, trauma mortality fell from 17 to 4 per cent (Murad, Larsen and Husum 2012). In Kampala, 307 lay people took a one-day course, and at six months knowledge was 92 per cent and 97 per cent had used a skill (Jayaraman et al. 2009). In four Nepali villages, education plus volunteer motorcycle transport cut snakebite case fatality from 10.5 to 0.5 per cent, 32 deaths in 305 bites before and one in 187 after (Sharma et al. 2013). In combat, limb tourniquets applied before shock were associated with 90 per cent survival against 10 per cent after (Kragh et al. 2009). Bystander CPR in Sweden was associated with 10.5 against 4.0 per cent 30-day survival in 30,381 arrests (Hasselqvist-Ax et al. 2015), a result that depends on an ambulance with a defibrillator and so has little value after the Fall.

1.10 The self-help manual record

The only systematic evaluation of Where There Is No Doctor I found is by Babu and Eisenberg (2010). Three physicians assessed the prevention and first-aid chapters. Treatments were up to date in 62 per cent of prevention sections and 88 per cent of first-aid sections. Diagnostic techniques were likely to lead to the right diagnosis in only 18.5 per cent of prevention sections and 81 per cent of first-aid sections. They found tetracycline for amoebic dysentery, a misleading fever rule, improper dislocation treatment, too few warnings to seek help, little guidance on failed treatment, and child doses by age, which risks overdose where 28 per cent of under-fives are stunted. More than 90 per cent of readers believed it accurate and some called it "the bible". Early WHO, UNICEF and Christian Medical Commission reviewers called it dangerous, then backed its translation. No controlled study of its effect on health exists. A claim of falling infant mortality in Mozambican villages with the book could not be traced [VERIFY].

The book already practises restraint. Its injection chapter warns that injecting medicine is more dangerous than taking it by mouth and restricts injections to medicines with no oral form, patients who cannot swallow and emergencies (Hesperian 2025). Its strongest sections, by the evaluation above, are narrow and visible. Its weakest are diagnosis from symptoms.

1.11 First-aid training trials

The 2025 Cochrane review of lay first-aid training included 36 trials and over 15,000 people. Training probably improves knowledge, skills and confidence for up to a month. No trial measured the health of the person helped, and only two were in low- or lower-middle-income settings (Cochrane First Aid 2025). Van de Velde and colleagues (2013) found that an extra lesson on barriers to helping changed nothing in a staged emergency. A deception trial with a staged bleed found trained people no more likely to intervene but far more effective when they did (Shotland and Heinold 1985, via Rottenberg 2018). Training changes competence more than willingness, and decays.

1.12 The counterfactual: no care at all

The harm literature rarely asks what would have happened with nothing. Where measured, the answer is stark. Before antibiotics, type 1 pneumococcal pneumonia killed 58 per cent of bacteraemic and 15 per cent of non-bacteraemic patients across pre-antibiotic series (Heffron via Musher [VERIFY]). Neonatal sepsis killed 16.6 per cent of untreated newborns in Gadchiroli (Bang et al. 1999). Landmine casualties without trained responders died at 30 to 40 per cent (Wisborg et al. 2008), snakebite at 10.5 per cent in Nepal before transport (Sharma et al. 2013), and children at 50 per 1,000 in control arms without lay health workers (Lewin et al. 2010, Kidane and Morrow 2000).

Set these beside the harms. The Warri bonesetter series was 43 patients in eight years. The informal providers overprescribed, but less than public doctors. The largest harms in this report, the reused syringe and the misidentified root, are harms of equipment and supply, not of lay judgement. In the world the book describes, the comparison is not lay care against a doctor. It is disciplined lay care against nothing, and against undisciplined lay care, which will happen anyway.

1.13 Checklists and decision aids

Checklists are the book's main tool, so their record must be faced. In a before-and-after study across eight hospitals, including Ifakara, Tanzania and New Delhi, a 19-item surgical checklist was followed by deaths falling from 1.5 to 0.8 per cent and complications from 11 to 7 per cent among 7,688 patients (Haynes et al. 2009). Across 101 Ontario hospitals after mandatory adoption, deaths went from 0.71 to 0.65 per cent (OR 0.91, CI 0.80 to 1.03), and Leape suggested the checklist was simply not used (Urbach et al. 2014). A meta-analysis found risk ratios of 0.59 for complications and 0.77 for mortality (Bergs et al. 2014). In emergency laparotomy, checklist use was associated with lower mortality (OR 0.60), most in poorer countries (GlobalSurg Collaborative 2019). In Michigan intensive care units, a checklist bundle cut catheter infections from a median 2.7 per 1,000 catheter-days to zero (Pronovost et al. 2006).

The most important trial for this book is a null one. BetterBirth randomised 60 facility pairs in Uttar Pradesh to a coached WHO Safe Childbirth Checklist. Adherence to essential practices rose to 73 per cent against 42 per cent, yet perinatal mortality was 47 per 1,000 in both arms among about 170,000 births (Semrau et al. 2017). A checklist can make people do the right things without saving a life, if what kills is something it cannot fix, such as no blood or a late referral.

Decision aids and pictures improve understanding. Across 105 trials, decision aids raised knowledge by 13.27 points out of 100 and doubled accurate risk perception, with no adverse effects (Stacey et al. 2017). Pictures linked to text improve attention and recall, most for low-literacy readers, but the emotional response can push behaviour either way (Houts et al. 2006). Cockpit checklist research warns that length trades completeness against use, and that do-then-check lists let a skipped step pass unnoticed (Degani and Wiener 1993). Written guidelines alone are often ineffective, while supervision with audit and feedback works (Rowe et al. 2005).

1.14 Design features that reduce harm

Scope limits work: the strongest lay successes are narrow tasks with one action (cool water, chlorhexidine, chloroquine in a malaria zone, padded splint, carrying the snakebite victim) and the weakest are open diagnosis (Babu and Eisenberg 2010, Das et al. 2012). Do-not lists work where the harmful act is common and specific, as the Ethiopian bonesetter course shows (Eshete 2005). Red flags work only if paired with an action. Pictures help recall (Houts et al. 2006). Measuring tools beat words (Yin et al. 2016). Checklists change behaviour, and outcomes only where behaviour was the bottleneck (Semrau et al. 2017). Supervision and a register beat print alone (Rowe et al. 2018). Humility about death has not been studied as such, but a book that teaches when to stop treating and start carrying, and when to stop carrying and start comforting, removes one main mechanism of harm.

1.15 The rules the book must obey, and what it must refuse to teach

1. Teach acts, not diagnoses. Every protocol starts from a visible sign and ends in one action, a red-flag check and a time to re-check.
2. Lead every section with its do-not list, naming the harmful practices readers already use.
3. Never inject below the district infirmary. A needle never touches two people.
4. Dose by weight, measure by syringe or scale, and have a second person read back every dose.
5. One remedy per sign, and never two products with the same drug.
6. Name every plant by Latin binomial, part and lookalike, and never trade a plant by common name.
7. Give every home treatment a time limit, after which the patient goes to the next rung.
8. Pair every red flag with an action, including what to do when there is nowhere to go.
9. Keep a register of every treatment and outcome, reviewed monthly by a supervisor.
10. Revise the book from the register. A book that cannot be corrected becomes “the bible”.

The book must refuse to teach: injection or intravenous therapy below district level, reuse of needles, surgery beyond cleaning and closing simple wounds, forceful reduction of fractures or dislocations without training, tight circumferential bandaging, tourniquets, incision or suction for snakebite, uterotonic herbs or fundal pressure in labour, antibiotics without a written sign-based indication, mixtures of plant remedies of unknown dose, and any remedy that delays a proven act.

2. Evidence grades

A randomised trials or systematic reviews, B consistent observational or clinical series, C convergent traditional use with plausible pharmacology, D single tradition or anecdote, X shown ineffective or harmful.

Practice	Tradition claims	Record shows	Science infers	Grade
Reused needle or syringe	Injection is strong medicine	Outbreaks in Roka, Unnao, Modasa, Ratodero, Egypt	Major blood-borne route	X
Injection when an oral drug works	Cures faster	43 per cent of rural patients injected in a month	No benefit, added risk	X
Antibiotics without indication	Cure fever and cough	Given to a third of asthma and angina patients	Harm and resistance	X
Training informal providers	Not applicable	Correct care up 7.9 points, overuse unchanged	Useful for triage	A
Tight traditional splint	Holds the bone	Gangrene and amputation series	Pressure ischaemia	X
Bonesetter one-day training	Not applicable	Gangrene amputations 25 to 7	Plausible, uncontrolled	B
Snakebite tourniquet, cutting, suction	Stops venom	Used in 46 per cent, more necrosis	Harmful	X
Immobilise and carry for snakebite	Not applicable	Deaths 10.5 to 0.5 per cent	Before-after	B
Cool running water for burns	Not applicable	Grafting OR 0.6	Limits depth	B
Pastes, butter, dung on burns	Soothe, draw heat	Infection and neglect series	Harmful	X
Ghee, dung or ash on the cord	Heals the cord	Tetanus OR 5.1 for substances	Harmful	X
Chlorhexidine on the cord, day one	Not applicable	Neonatal deaths down about a quarter	Effective	A
Herbs or pressure to hurry labour	Speeds labour	Rupture series and deaths	Harmful	X
Birth attendant training with kit and referral	Not applicable	Perinatal death OR 0.70, one trial	Insufficient	B
Village newborn care with antibiotics	Not applicable	Sepsis deaths 16.6 to 2.8 per cent	Effective with supervision	B
Lay health workers	Not applicable	Vaccination RR 1.22, TB cure 1.22	Effective	A
Mothers giving antimalarials	Not applicable	Child deaths down 40 per cent	Effective in malaria zones	A
Lay trauma responders	Not applicable	Deaths 15.6 to 9.8 per cent	Effective with long evacuation	B
First-aid training	Not applicable	Skills up, outcomes unmeasured	Competence only	A
Where There Is No Doctor alone	Complete village medicine	62 to 88 per cent up to date	Error-prone in diagnosis	D

Practice	Tradition claims	Record shows	Science infers	Grade
Surgical checklist	Not applicable	Mortality RR 0.77, mixed	Works where used	B
Safe Childbirth Checklist	Not applicable	Practice up, deaths unchanged	Behaviour without outcome	A (null)
Oral syringe instead of cup	Not applicable	Error OR 4.6 lower	Effective	A
Home sugar-salt solution	Not applicable	30 to 47 per cent too salty	Safe only with a standard spoon	B
Two paracetamol products together	Safe over the counter	Half of paracetamol liver failure unintentional	Duplication kills	X
Aristolochia fangchi substituted for Stephania tetrandra	Weight loss	46 per cent cancer in end-stage cases	Nephrotoxic, carcinogenic	X

3. Means ledger

Practice	Hands alone	Hearth	Garden and still	Village dispensary (300)	District infirmary (3,000)	Hospital before the Fall
Injections	Refuse	Refuse	Refuse	Refuse	Only with written indication, sterile needle per person, recorded sterilisation, sharps pit	Single-use syringes
Antibiotics	None	None	None	Sign-based indications, dose by weight, register	Microscope guides choice	Culture and sensitivity
Fracture	Hold still, check fingers or toes	Padded splint, separate ties, elevation	Better padding and materials	Trained setter, timed checks	Reduction, traction, plaster	X-ray, fixation
Burns	Remove heat, rings, clothing	20 minutes cool water within 3 hours, loose cover	Clean dressings	Fluids by mouth, tetanus watch	Wound care	Grafting, intravenous fluids

Practice	Hands alone	Hearth	Garden and still	Village dispensary (300)	District infirmary (3,000)	Hospital before the Fall
Snakebite	Calm, still, no cutting or binding	Splint, carry flat, note time	Same	Recognise breathing failure, arrange transport	Antivenom if stocked [VERIFY], airway care	Antivenom, ventilation
Diarrhoea	Breastfeed, keep drinking	Measured sugar-salt solution	Scale-checked spoon	Danger-sign triage, salvaged packets	Intravenous fluids	Intravenous fluids, laboratory
Birth	Clean hands, dry and warm the baby, nothing on the cord	Boiled blade, clean ties	Alcohol for hands	Trained attendant, chlorhexidine if stocked	Skilled birth care, assisted delivery	Caesarean section
Records	Memory	Card on the wall	Same	Register, monthly review	Audit and feedback	Quality systems

What each rung changes. At hands and hearth the gain is mostly from avoiding harm (no tourniquet, no tight splint, nothing on the cord) plus a few acts with large effects (cool water, measured fluids, a warm newborn). The garden and still add materials and the scale that makes measuring exact. The dispensary adds the trained, supervised lay healer, and that is where the trial evidence of lives saved lives. The infirmary adds what lay care cannot: sterile injection, surgery and assisted birth. Most deaths averted in the trials came from the dispensary rung, not the household.

4. Harm test

Practice	How it harms	Harmful error	Signs it is going wrong	What to do	Historical cases
Injection	Hepatitis, HIV, abscess, nerve injury	One needle reused once	Fever, swelling at the site, jaundice weeks later	Stop injecting, record, test contacts if possible	Roka 2014, Unnao 2018, Modasa 2009, Ratodero 2019, Egypt
Antibiotics without indication	Resistance, masked illness	Giving for colds or simple diarrhoea	No improvement by the time limit	Re-examine, refer	Indian standardised patient studies
Tight splint	Compartment syndrome, gangrene, death	Circumferential wrap that tightens with swelling	Pain out of proportion, pain on stretching fingers or toes, numbness, pale or dusky skin	Remove at once, elevate, refer	Zaria, Jos, Enugu, Warri, Ethiopia

Practice	How it harms	Harmful error	Signs it is going wrong	What to do	Historical cases
Snakebite binding or cutting	Necrosis, limb loss, delay	Any tight band or cut	Swelling, blackening, bleeding	Immobilise, carry, see Protocol C	North-central Nigeria
Burn remedies	Infection, tetanus	Anything but water first	Fever, pus, spreading redness	Clean, cover, fluids, refer	Douala, Kilimanjaro
Substances on the cord	Neonatal tetanus, sepsis	Ghee, dung, ash, oil	Stiffness, failure to suck	Refer, keep warm, feed expressed milk	Pakistan
Labour herbs or fundal pressure	Uterine rupture, death	Any oxytocic herb, pressing on the womb	Sudden pain then quiet, bleeding, shock	Carry at once	Uganda case, rupture series
Measuring errors	Overdose, salt poisoning	Cups, household spoons	Vomiting, drowsiness, fits	Stop, give breast milk or water, seek help	Yin 2016, Brazil, Nigeria
Duplicate paracetamol	Liver failure	Two products together	Nausea, apparent recovery, then jaundice	Stop all, seek help	United States series
Misidentified plant	Kidney failure, cancer	Buying by common name	Weakness, less urine	Stop, keep a sample, record	Brussels 1990 to 1992
The manual itself	Wrong diagnosis, delay, false confidence	Treating without a red-flag check	Treatment failing past its limit	Escalate, review in the register	Babu and Eisenberg 2010

Who must never receive which practice is covered in each protocol. In general, infants under two months, the pregnant, the very old and the dehydrated are referred rather than treated at home whenever a referral exists.

5. Red flags

These signs mean the patient may die or be disabled without what the village cannot give. Where there is somewhere to go, carry the patient there now.

- After a limb injury or splint: pain greater than the injury explains, pain on gently stretching the fingers or toes, numbness, a pale or dusky hand or foot, a tense swollen limb. Remove every bandage and splint and elevate to heart level. If signs persist, keep the patient warm, drinking and as free of pain as possible, and watch for fever and blackening.
- After snakebite: drooping eyelids, double vision, trouble swallowing or breathing, bleeding from gums or old cuts, swelling spreading fast. Carry flat with the limb still. Without antivenom, keep the airway open, lay the patient on their side and stay with them.
- After a burn: burns of face, hands, genitals or joints, burns that encircle a limb or the chest, burns in infants and the old, large burns [VERIFY size threshold]. Cool, cover, give fluids by mouth, keep warm.
- In a newborn: stiffness, failure to suck, fast breathing, cold body, redness spreading from the cord. Skin to skin, expressed milk by cup, refer.
- In labour: labour that stops progressing, bleeding, fits, sudden severe pain followed by quiet, a limb or cord presenting first. Carry at once. No herbs, no pressing.

- In a child with cough or diarrhoea: unable to drink, vomiting everything, fits, unusual sleepiness, chest drawing in [VERIFY against WHO danger signs]. Start measured fluids and carry.
- After any home treatment: no improvement by its time limit.

Honest comfort. When the red flag appears and there is nothing more, the book must say so plainly. Keep the patient warm, clean and as free of pain as possible, positioned to breathe, given sips, never left alone, and told the truth in the way they ask for it. Tell the family what will not help, so that money and hope are not spent on remedies that only add suffering.

6. The case against

The strongest case against this book runs as follows. Lay practitioners already spread blood-borne virus with needles, give antibiotics and injections nobody needs, splint limbs into gangrene, bind snakebitten legs and smear dung on newborn cords. Short training raises confidence faster than competence and does nothing for overprescribing (Das et al. 2016). Print alone barely changes practice (Rowe et al. 2018). The best-known manual was up to date in only 62 per cent of the prevention sections examined, dosed children by age, and has never had its outcomes measured, yet its readers call it "the bible" (Babu and Eisenberg 2010). A manual lends authority to the confident amateur, and authority delays the journey to real care.

The critics are serious. The Indian Medical Association argued that training informal providers legitimises illegal practice (as described by Das et al. 2016). WHO, UNICEF and the Christian Medical Commission first judged Where There Is No Doctor dangerous (Babu and Eisenberg 2010). Nwadiaro (2007) called for traditional bonesetting to be condemned. Ghana banned birth attendants from direct care (Sumankuuro et al. 2022). Leape's reading of the Ontario checklist failure warns that tools on paper are not tools in use (Urbach et al. 2014).

Tested against the evidence, the case holds in part. It holds for injection, which the book must not teach. It holds for open diagnosis, where manuals err most. It holds for overprescribing, which training does not fix, and for print alone, which is why the book needs a supervisor and a register. It fails as a general claim. In no trial found did trained lay people make outcomes worse, and in several they cut deaths sharply: newborns in Gadchiroli, children in Tigray, trauma victims in Iraq, snakebite victims in Nepal. The fear that training makes informal providers more dangerous was tested in West Bengal and not borne out. And the case against assumes a counterfactual that will not exist after the Fall. Where the alternative is a doctor, the harm literature is a strong argument. Where the alternative is nothing, or a neighbour with a tourniquet, it is an argument for a better lay healer.

Both romances fail. The herbal romance fails on the Brussels clinic, the dung on the cord and the herbs that rupture the womb. The hospital romance fails on Modasa and Ratodero, the Egyptian campaigns, public doctors who overprescribed more than informal providers, and checklists that changed practice and saved no one. Old does not mean safe, and professional does not mean safe. What protects the patient is a narrow task, the right tool, a do-not list, a time limit, a register and somewhere to send the patient.

7. 10-line summary

1. Reused needles are the best-documented lay harm and also a professional one, and the fix was equipment, not doctors.
2. Qualified and unqualified providers differ less than expected, and antibiotic overuse is a system problem.
3. Tight splints cause bonesetter gangrene, and one-day courses cut gangrene amputations from 25 to 7 in Ethiopia.
4. Snakebite tourniquets, cuts and concoctions persist in nearly half of victims and add necrosis and delay.
5. Twenty minutes of cool running water is the best lay burn act, and most traditional alternatives are worse.
6. Household measuring is error-prone, and oral syringes and standard spoons fix much of it.
7. Lay health workers with a narrow task, a drug and supervision reduce deaths in trials.

8. Short training makes informal providers more useful and not more dangerous, but does not fix overprescribing.
9. Checklists change behaviour reliably and outcomes only where behaviour was the bottleneck.
10. After the Fall the counterfactual is no care, and against it a disciplined lay manual should do more good than harm.

8. Open questions

- What share of all bonesetter patients, not hospital patients, suffer complications? No community denominator exists.
- Does any self-help manual change health outcomes? No controlled evaluation was found.
- Is the Dunning-Kruger pattern real or an artefact, and does it apply to healers after short training?
- Will scarcity curb overprescribing where training could not, once no one profits from selling drugs?
- Can a village sterilise reusable syringes reliably, and how would it know? No field validation was read.
- How long does training last without refreshers? Evidence stops at one month (Cochrane) and six months (Kampala).
- Which harmful practices belong on each region's do-not list?

9. Sources to read in full

1. Das, Chowdhury, Hussam and Banerjee (2016), training informal providers in West Bengal.
2. Babu and Eisenberg (2010), evaluation of Where There Is No Doctor.
3. Lewin and colleagues (2010), Cochrane review of lay health workers.
4. Bang and colleagues (1999), home-based neonatal care in Gadchiroli.
5. Semrau and colleagues (2017), the BetterBirth trial.
6. Rowe and colleagues (2018), strategies to improve health worker practice.
7. Simonsen and colleagues (1999), unsafe injections.
8. Murad and Husum (2010), lay first responders in Iraq.
9. Eshete (2005) with Nwadiaro (2007), bonesetter gangrene and its prevention.
10. Maduwage, Gamage and Gutiérrez (2024), snakebite first aid.

10. At the bedside after the Fall

Household. Minimum viable version: a card on the wall with the do-not list, four acts (cool water for burns, measured fluids for diarrhoea, still limb and fast carrying for snakebite, nothing on the cord and a warm, fed newborn), the red flags and the name of the nearest healer. Needs: a vessel marked at one litre, a level spoon kept for the purpose, a 5 or 10 mL oral syringe, clean cloth, splint boards, clean water. Skills: measuring, padding a splint, recognising danger signs. Records: a page per person listing what was given, when and how much. First failure to expect: a relative who knows a stronger remedy and applies it first, especially the tourniquet and the burn paste.

Village of 300. Minimum viable version: one trained lay healer chosen for steadiness rather than confidence, a second person who checks every dose, sign-based algorithms for fever, cough, diarrhoea, newborn care and injury, a treatment register and a monthly review. No injections. Needs: a scale for weighing, oral syringes, standard spoons, padded splints, clean dressings, any salvaged chlorhexidine, oral antibiotics under lock against written indications, a stretcher and agreed carriers. Training: a short course focused on triage and the do-not list, with refreshers every few months [VERIFY interval]. First failure to expect: antibiotics given to please, until stock runs out when a real pneumonia arrives.

District of 3,000. Minimum viable version: the only place for injection, surgery, assisted birth and antibiotic choice beyond the algorithm, with a nurse or doctor who supervises village healers and reads their registers. Needs: a sterile room, a sterilisation method with a way of checking it works, a sharps pit, a microscope, ten beds, and a written

list of what the infirmary will and will not do. Records: referral book, outcome register, injection log naming the sterilisation batch. First failure to expect: a reused needle under pressure of numbers, exactly as in Roka and Ratodero.

11. Protocols

Protocol A. Before treating anyone

- ☐ Name the visible sign you are treating. If you cannot name one, do not treat. Watch and record.
- ☐ Read the red flags for that sign. If one is present, start carrying the patient now and treat on the way.
- ☐ Read the do-not list aloud. Ask what has already been given or applied.
- ☐ If the patient is pregnant, under two months old, very old or dehydrated, use the special rules or refer.
- ☐ Weigh the patient. Always weigh children. Write the weight.
- ☐ Choose one remedy and check it does not duplicate one already given.
- ☐ Measure with an oral syringe in mL or a scale in grams. A second person reads the dose back.
- ☐ Write date, time, name, weight, sign, remedy, dose, giver and time limit in the register.
- ☐ If not better by the time limit, escalate.

Protocol B. Burns

- ☐ Stop the burning. Remove hot or soaked clothing, rings, bracelets and belts near the burn.
- ☐ Cool with clean, cool running or poured water for 20 minutes, starting within 3 hours of the burn (Griffin et al. 2020). No ice. Keep the rest of the body warm.
- ☐ Apply no toothpaste, butter, oil, egg, dung, flour or herbs. Do not burst blisters.
- ☐ Cover loosely with clean cloth. Never wrap tightly round a limb.
- ☐ Give fluids by mouth.
- ☐ Check the red flags. Re-check at 24 hours for pus, spreading redness or fever. Dressings after cooling, including honey, belong to the burns report [VERIFY].

Protocol C. Snakebite

- ☐ Move away from the snake. Do not chase or kill it. Note the time.
- ☐ Keep the patient still and calm. Remove rings and tight clothing from the limb.
- ☐ Splint the limb loosely as for a fracture. Tie no band or tourniquet. If one is already tied, seek guidance before removing it [VERIFY removal advice].
- ☐ Do not cut, suck, burn or apply stones or herbs. Give only water by mouth.
- ☐ Carry the patient lying down to the nearest place with antivenom or breathing support. Do not let them walk. Do not stop at a healer on the way.
- ☐ Every 15 minutes on the way [VERIFY interval], check eyelids, swallowing, breathing, bleeding and swelling. If vomiting or drowsy, turn on the side.

Protocol D. Splinting a suspected fracture

- ☐ Support the limb as found. If the hand or foot is cold and pale, get trained help [VERIFY].
- ☐ Pad first with soft cloth, then place rigid supports on two sides past the joints above and below.
- ☐ Tie with several separate ties, each loose enough to slip a finger under. Never wrap round and round.
- ☐ Leave fingers or toes visible. Raise the limb.
- ☐ Check at 30 minutes, 2 hours, then every 4 hours for 48 hours [VERIFY schedule]: colour, warmth, feeling, movement and pain on gently stretching the fingers or toes, compared with the other side.
- ☐ If pain is out of proportion, stretching hurts, or there is numbness or pale or dusky skin, remove the splint at once, re-check in 30 minutes [VERIFY] and refer. Normal capillary refill does not mean safe.

Protocol E. Home rehydration solution

- ☐ Use a vessel marked at exactly one litre and a level spoon kept only for this. Check the spoon on a scale once. Published recipes differ: six level teaspoons of sugar and half a level teaspoon of salt per litre (Rehydration Project), 40 g sugar and 3.5 g salt per litre (IFRC). Confirm the final recipe against WHO before printing [VERIFY].
- ☐ Use boiled and cooled water. Level every spoonful with a knife. Never heap salt.
- ☐ If it tastes saltier than tears, throw it away and start again [VERIFY].
- ☐ Keep breastfeeding. Give small sips by cup or spoon, more after each loose stool. Make fresh daily.
- ☐ If the child cannot drink, vomits everything, is very sleepy or fits, carry.

Protocol F. Liquid medicine

- ☐ Dose by weight, never by age alone.
- ☐ Measure with an oral syringe in mL, never a cup or household spoon (Yin et al. 2016). Aim within 10 per cent of the written dose [VERIFY tolerance].
- ☐ A second person reads the dose back. Record dose and time.
- ☐ Never give two products containing the same drug, especially paracetamol.

Protocol G. Newborn cord care

- ☐ Tie and cut the cord with a boiled blade and clean ties.
- ☐ If 4 per cent chlorhexidine is available, apply it to the stump within the first day (Mullany et al. 2006).
- ☐ Otherwise keep the cord clean and dry. Apply no ghee, oil, ash, dung or powder.
- ☐ Dry and warm the baby skin to skin and start breastfeeding. Refer for spreading redness, stiffness or failure to suck.

Protocol H. Injections

- ☐ Household and village: no injections. Ask whether a medicine by mouth would do (Hesperian 2025).
- ☐ District only: write the indication first. One needle, one syringe, one person, once. Reusable equipment only after a recorded sterilisation cycle [VERIFY method and duration]. Sharps go in a pit.

Protocol I. Monthly register review

- ☐ The village healer and the district supervisor read every entry.
- ☐ Count treatments, failures past the time limit, referrals, deaths and harms.
- ☐ For every death or harm, write what happened, what the book said and what should change, and send it to the keeper of the master copy.

12. Numbers to carry

1. One needle, one person, once. In 2000, 39.8 per cent of injections used reused equipment (Pépin et al. 2013).
2. Twenty minutes of cool water within three hours for every burn (Griffin et al. 2020).
3. Pain on stretching fingers or toes means the splint comes off now. One-day courses cut gangrene amputations from 25 to 7 (Eshete 2005).
4. Snakebite: no tourniquet, carry fast. Transport cut deaths from 10.5 to 0.5 per cent (Sharma et al. 2013).
5. Measure with a syringe: 84 per cent of parents made a dosing error, and cups were worse (Yin et al. 2016).
6. Trained village newborn care cut sepsis deaths from 16.6 to 2.8 per cent (Bang et al. 1999).
7. Nothing on the cord except chlorhexidine on day one: substances on the cord carried five times the odds of tetanus (Raza et al. 2004).

8. Print alone moved practice 1.4 points, training plus supervision about 18 (Rowe et al. 2018).
9. Every home treatment has a time limit: dying children waited a median two days before care outside the home (Källander et al. 2008).

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